

Name of the Department : Chemistry

Programme : PG

S.No	Course Code	Course Name	Course Outcome
SEMESTER I			
1.	15PCHC11	Core I - Concepts-Reaction Mechanism And Stereo Chemistry	<ul style="list-style-type: none">• Get an idea about the basic concepts of organic chemistry• Enhance the knowledge on chemical reactivity by theoretical approach• Study the organic reaction mechanism by non kinetic methods• Enhance the ideas about order, molecularity, kinetics of organic reactions and its kinetic measurement• Gain knowledge about various aliphatic and aromatic substitution reactions• Deepen the ideas of electrophilic substitution reactions• Understand the concepts of chirality and its operations in organic molecules• Knowing the concepts of asymmetric synthesis and geometrical isomerism• Understand the concepts of conformation and its application to various organic molecules• Enhance the knowledge on stereo chemical aspects of organic compounds
2.	15PCHC12	Core II : Bonding and Solid state chemistry	<ul style="list-style-type: none">• Know the periodic properties and its trend in physical and chemical properties of inorganic compounds• Enhance the knowledge on acid, base concepts and non aqueous solvents• Understand the concepts of various types of solids and its properties• Deepen the ideas of properties of solid into its various applications• Gain knowledge on conductor, semiconductor and its application

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			<ul style="list-style-type: none"> • Idea about the defects of crystals and its application • Understand the concept of theories on chemical bonding and its usage in the structure detection of inorganic molecules • Enhance the ideas of ionic bond and its nature in crystal • Know the concepts involved in the inorganic polymer and conducting inorganic polymers • Increase the ideas of electron deficient molecules, cluster compounds and its chemical reactions
3.	15PCHC13	Core III - Chemical Thermodynamics & Electro chemistry	<ul style="list-style-type: none"> • Understand the concept of laws of thermodynamics and its need in chemistry • Increase the knowledge on the need of partial molar properties and its derivation • Apply the concepts of thermodynamics into quantum based thermodynamics • Deepen the ideas of statistical thermodynamics by various statistical theory and heat capacity theories • Gain knowledge on various types of conductance, conductance measurements and its application • To know the concepts of electrolyte, electrolysis and its law • To understand the various concepts such as common ion effect, pH measurement using electrochemistry • To gain the knowledge on indicators and the theories behind indicator • To deepen the idea of theory of strong electrolyte and its derivation

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			<ul style="list-style-type: none"> To know the concepts of equilibrium and electrochemistry
4.	15PCHO11	<p>Major Elective: 1. Medicinal and Pharmaceutical chemistry</p>	<ul style="list-style-type: none"> Understanding the definitions of medicinal chemistry, pharmacology and molecular pharmacology Knowing the concept of pharmacokinetics, bioisomerism and pharmacodynamics Familiarity with medically useful antibiotics and steroids Acquire the ability to understand the structural features and mode of action of antibiotics Gain knowledge in classification and synthesis of antineoplastic agents. Knowing the various terms involved in the medicinal chemistry Analyse the drug action through QSAR study, Hansch approach Gainssing the knowledge of mode of action of anti-inflammatory and CNS drug Proficiency of Anti-Histamines drug and Antihypertensive drug Role of Antibiotics and its derivatives in the treatment of generic diseases
5.	15PCHO12	<p>Major Elective: 2. Polymer chemistry</p>	<ul style="list-style-type: none"> Knowing the polymers and its types Significant knowledge in the mechanism of polymerization Acquire ideas about various polymerization techniques Understanding the application of polymer in day to-day life Acquire ideas about molecular weight determination of polymers Gain considerable knowledge in properties of polymers Gain knowledge about preparation and

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			<p>uses of individual polymers.</p> <ul style="list-style-type: none"> • Expertise on processing technique in polymers • Get idea about the physical properties of polymers • Understanding the way of techniques involved in the degradation of polymers
6.	15PCHC1P	Core IV - Organic Preparations, Qualitative and Quantitative Analysis (Lab).	<ul style="list-style-type: none"> • Learn the importance of Quantitative and qualitative organic analysis • Knowing the confirmation of the sample through the functional group and its derivative • Get an idea about the hydrocarbon, nitrogen, carbonyl compounds and its analysis • Enhancing the skill for the estimation through iodometric analysis, Bertrand's method • Develop the synthetic knowledge in the derivative preparation • Report the sample in a systematic way of proceedings • Knowing the concept involved in the multistep synthesis • Preparation of disubstituted and trisubstituted organic compound • Role of electrophilic and nucleophilic substitution reagent in the synthetic reaction • Applying the knowledge of directive influencing effect in the organic compound preparation • Learn how to convert the monosubstituted compound into di and tri substituted compound
SEMESTER II			
1.	15PCHC21	Core V - Reaction	<ul style="list-style-type: none"> • Understanding the concepts of various

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		mechanism and natural products	<p>types of rearrangement reactions involved in organic chemistry</p> <ul style="list-style-type: none"> • Enhance the ideas of rearrangement reactions into C-C, C-O, C-N migration reactions • To increase the knowledge on electrophilic and nucleophilic addition reactions and its stereo chemical aspects • Deepen the ideas of elimination reactions and its stereo chemical aspects into various types of elimination reactions • Gain knowledge about aromatic electrophilic and nucleophilic reaction with various examples • Deepen the ideas of orientation in aromatic electrophilic and nucleophilic reactions • Get ideas of the classification of terpenes and structural elucidation of specific terpenoids • Understand the structure and synthesis of various vitamins • Knowing the preparation and properties of various heterocyclic compounds • Enhance the knowledge on the biosynthesis of heterocyclic compounds
2.	15PCHC22	Core VI : Bioinorganic and coordination compounds	<ul style="list-style-type: none"> • Understanding the basic ideas of coordination compounds, nomenclature of coordination compounds and its isomerism • Knowing the various theories and its effects explaining the stability and geometry of coordination compounds • A knowledge about various types of reactions and its mechanism involved

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			<p>in coordination chemistry</p> <ul style="list-style-type: none"> • Deepening the ideas of the concepts of coordination chemistry into electron transfer reactions, photochemical reactions • Deliberating the concepts of structure and work function of various bio inorganic compounds • Gain proficiency on electron transfer, respiration, photosynthesis in biological process by bio inorganic compounds • Expertise the knowledge on co-enzymes and trace elements in biological systems • Boost the ideas of ion pumps in biological systems • Gain knowledge on metal toxicity and detoxification • Realise the ideas of chemotherapy, chelation therapy and anticancer drugs
3.	15PCHC23	Core VII - Quantum, Phase rule and Chemical Equilibria	<ul style="list-style-type: none"> • To understand the basic concepts of quantum chemistry such as operators, uncertainty principle • To know the ideas of postulates of quantum mechanics, eigen function, orthonormal set • To apply the concepts of quantum mechanics into particle in a box, ring, rigid rotator • To gain knowledge on the quantum mechanical concepts by hydrogen atom problem, shapes of various atomic orbitals • To know the need of approximation method in quantum mechanics and its application to many electron systems • To deepen the ideas of perturbation theory and its application to many

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			<p>electron system, VB theory and MO theory</p> <ul style="list-style-type: none"> • To introduce the concept of phase equilibria and its application to various one component and two component system • To enhance the ideas of phase equilibria into three component system • To know the concepts of chemical equilibrium and various relations involved in chemical equilibrium • To understand concept of thermodynamic derivation of equilibrium constant and Le-chatelier's principle.
4.	15PCHO21	Major Elective: 3. Instrumentation Techniques with cheminformatics	<ul style="list-style-type: none"> • Apply the knowledge of accuracy and precision in the analysis • Known about the Separation of compounds through various chromatographic techniques • Learn the Principles of AAS and flame photometry method in metal ion concentration analysis • Developed skill towards the Laser technology and its application in the analytical and Medicinal field, Molecular weight determination through Turbidimetry • Know the Various substance physical characteristic through TGA, DSC • Knowing the redox character of the compound through the potential study of Cyclic voltammeter and Coulometry • Framing of programme through C-language for Concentration of the solution • Syntax and Structural format of C-languauge in the chemistry Basic laws • QSAR application and drug design

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			<p>through cheminformatics studies</p> <ul style="list-style-type: none"> • Learn about the Molecular Docking Software and its importance in the pharma industry.
5.	15PCHO22	<p>Major Elective: 4.Introduction to nano science</p>	<ul style="list-style-type: none"> • Understand the basic concepts Nano chemistry. • Gain knowledge about crystal structure and its types • Get an idea of various special properties of nano materials • Make deeper knowledge about various methods for synthesis of nano particles. • Knowing the instrumentation techniques of characterization of nano materials. • Deepening the knowledge of application of nano particles in the various fields. • Enhance the ideas about UV-Visible and Photoluminescence and IR spectroscopy. • Perceptive the knowledge of optical and magnetic properties on nano particles. • Know the concepts hall effect and electronic properties. • Discerning the knowledge about biological application of nanomaterials

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6.	15PCHC2P	Core VIII – Inorganic Qualitative and Quantitative Analysis and Preparations (Lab)	<ul style="list-style-type: none"> • Mastering the techniques involved in the qualitative analysis • Get an idea about the analysis involving mixture of familiar and less familiar cations • Learn the importance of group separation for the analysis of cation • Knowing the role of common ion effect and solubility product in the separation of cations • Impact of the effect of acid and base addition in excess or deficient in the analysis • Gaining the way of reporting the mixture in the ordered form • Enrich the skill to identify the cation by the systematic procedure • Know how to synthesis inorganic complex and its condition to maintain the stability of it • Separation of mixture of metal ion through gravimetric and volumetric estimation • Importance of complexing agent and the role of buffer solution in the precipitation of metal ion and also in the estimation
SEMESTER III			
1.	15PCHC31	Core IX - Organic spectroscopy, reagents and synthetic methods	<ul style="list-style-type: none"> • Know the basic concepts, principles involved in UV spectroscopy, IR spectroscopy and ORD spectrum • Deepen the ideas of the spectroscopic principle into its application to identify the organic compounds • Gain knowledge on the basic principles, concepts of resonance spectroscopy such as ¹H NMR and ¹³C NMR

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			<ul style="list-style-type: none"> • Enhance the ideas of the application of ^1H and ^{13}C NMR to organic compounds • Understand the principles of mass spectrometry and various peaks observed in organic compounds • Boost the ideas of fragmentation of various organic compounds using mass spectrum • Understand the various types of mechanism, application and stereochemical aspects of oxidation and reduction reactions • Know the various concepts of the reagents involved in organic synthesis • Know the concepts of retro synthesis and total synthesis • Deepen the idea of functional group inter conversion
2.	15PCHC32	Core X - Physical methods in inorganic chemistry	<ul style="list-style-type: none"> • Understand the concepts of electronic transition using electronic spectra and selection rule involved in metal complexes • Enhance the ideas of magnetic properties of complexes and its determination in coordination compounds • Deepen the ideas of analysis of coordination complexes using IR and Raman spectroscopy • Understand the concepts of Mossbauer spectroscopy and its application in the study of iron and tin complexes • Know the application of ^{31}P, ^{19}F and ^{15}N NMR spectroscopy to inorganic metal complexes • Understand the principle of ESR spectroscopy and its application in transition metal complexes

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			<ul style="list-style-type: none"> • Develop the principles and application of NQR spectroscopy • Gain the knowledge on photoelectron spectroscopy, Auger spectroscopy and its applications • Understand the concepts of metal metal bonds in various poly nuclear complexes • Deepen the ideas of polyatomic zintl ions, metal carbonyls and metal clusters
3.	15PCHC33	Core XI - Group Theory & Spectroscopy	<ul style="list-style-type: none"> • Gain the knowledge on various symmetry elements, symmetry operation involved in molecules and its classification by point group assignment • Develop the concepts of matrix algebra to symmetry elements, reducible representations, Great orthogonality theorem into the construction of character table • Deepen the basic ideas of group theory for the application of finding normal modes of vibrations, symmetry selection rule for IR, Raman and electronic spectroscopy • Enhance the knowledge on froup theory using quantum mechanics to find hybridization, HMO calculation for simple molecules • Develop the theoretical knowledge on rotational spectroscopy • Gain knowledge on the theoretical aspects of vibrational spectroscopy and the principle involved • Enhance the ideas of vibrational, rotational concepts with Raman spectroscopy and laser Raman spectra • Understand the principles involved in

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			<p>NQR spectroscopy</p> <ul style="list-style-type: none"> • Gain knowledge on various NMR instrumentation techniques • Know the principles and concepts involved in ESR spectroscopy
4.	15PCHN31	<p>Non-Major Elective(any one):</p> <p>1. Industrial chemistry</p>	<ul style="list-style-type: none"> • Understand the basic concepts of chemical technology • Designing and modeling of chemical industry • Gain knowledge about the petroleum product • Induce the knowledge to idea about the chemical corrosion and its preventive measures • Get an idea of various pollutants involved in water pollution and its prevention methods • Boosting the basic idea related to water pollution and the treatment of sea water into soft water • Knowing the manufacturing process involved in matches and fireworks • Learning the knowledge about the cement and ceramic in large scale industry • Enrich the chemical knowledge towards the framing of small scale industry like cosmetics, soap and detergents • Initiate the process involved to design a chemical industry and its various aspects
5.	15PCHN32	<p>Non-Major Elective(any one):</p> <p>2. Environmental Science</p>	<ul style="list-style-type: none"> • Create the awareness about the environment studies to make pollutant free environment • Impact of various natural cycles in the environment and its current issue

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			<p>about them</p> <ul style="list-style-type: none"> • Demerits of Green house gases, Ozone layer depletion and the steps taken to reduce them • Awareness on current global issues and its threatening matter in the future • Know the water pollutant and the role of microorganism in the merit and the demerit way in the water pollution • Idea towards the government project in the desalination process of sea water to rectify the scarcity of water • Realization of deforestation effect and disposal of solid waste into the land • Effect of soil erosion and its impact to the microorganism in the soil and idea about its remedial measure • More appreciation of various organization involved in the remediation of social issues • Create awareness about the various act involved in the protection of environment
6.	15PCHC3P	Core XII - Physical chemistry practical (lab)	<ul style="list-style-type: none"> • Knowing the importance of the various physical properties by practical • Pursuing the role of potentiometric method to study pH of the buffer solution • Ability to know the solubility product of sparingly soluble salt through potentiometric method • Enrich the concept of precipitation titration of halide mixture <i>via</i> potentiometry • Finding the strength of the mixture of acid through conductometric method • Rate of the reaction study through kinetic method

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			<ul style="list-style-type: none"> • Impact of the conductivity and potentiometry methods to study the electrical properties of the ionic substance, acids and bases • Interpretation of the potentiometric curve through first order derivative and second order derivative • Applying Freundlich and Langmuir Adsorption theory practically to study monolayer adsorption occur by acid solution on the surface of charcoal • Knowing the dissociation of weak acid through potentiometric and conductometric method
SEMESTER IV			
1.	15PCHC41	Core XIII - Photochemistry and natural products	<ul style="list-style-type: none"> • Know the structure of various disaccharides, polysaccharides and its determination • Understand the concepts of peptides, proteins, enzymes and biosynthesis of aminoacids • Enhance the idea of types of electrocyclic reactions using frontier, Huckel, molecular orbital theory and gain the knowledge on various photochemical reactions • Deepen the ideas of free radical formation, stability and various free radicals mediated organic reactions • Gain the knowledge on the general structural determination of alkaloid • Enhance the ideas of structural elucidation to specific alkaloid • Know the classification, and structural elucidation of steroids • Understand the structure and properties of sex hormones • Knowing the definition, structure and

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			<p>synthesis of antibiotics</p> <p>Understand the concept of prostaglandins</p>
2.	15PCHC42	Core XIV – Nuclear chemistry, lanthanides, actinides and organometallic chemistry	<ul style="list-style-type: none"> • Know the radioactive series and the equilibrium in nuclear chemistry • Deepen the ideas of nuclear reaction by nuclear fission, fusion reactions and its applications • Gaining the knowledge of the application of radioactive isotopes in various fields • Know the chemistry of inner transition elements and its position in the periodic table • Deepen the ideas of oxidation state, spectral and magnetic properties of inner transition elements • Enhance the ideas of various organometallic compounds, their stability, metal carbonyls • Understand the concepts of π acceptor, metal alkyls, multicentre bond in organometallic compounds • Knowing the preparation, properties and structure of sandwich complexes • Enhance the ideas of the applications of organometallic compounds in catalysis
3.	15PCHC43	Core XV - Chemical kinetics and Surface Chemistry	<ul style="list-style-type: none"> • Enhance the concept of activation energy and activated complex by collision theory • Gain the knowledge on collision theory and absolute reaction rate theory • Develop the concept of molecularity and its classification • Deepen the basic ideas of molecularity by the study of various theories • Enhance the knowledge on mechanism

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			<p>and kinetics of chin reaction and the application of steady state treatment</p> <ul style="list-style-type: none"> • Develop the theoretical knowledge on primary and secondary salt effect and kinetics of fast reaction by different techniques • Gain proficiency in the theoretical aspects of homogeneous and heterogeneous catalysis • Enhance the ideas of enzyme catalysis and acid-base catalysis • Understand the characteristics and terms involved in adsorption • Gain knowledge on various adsorption isotherms, B.E.T equation and applications of adsorption in everyday life
4.	15PCHO41	Major Elective: 5. Concepts of Green chemistry	<ul style="list-style-type: none"> • Understanding the requirement of global needs to reduce the pollution created by the various chemical industry • New method of way and technology for the Greener environment and the basic principle of green chemistry • Awareness about the atom economy of the reaction and its improvement for the higher efficiency of the reaction • Enrichment of Modern technology like microwave, sonochemistry, one pot synthesis, water medium and the solvent free medium • Role of Greener solvents, catalyst and its importance in the synthetic chemistry • Techniques to know the Reduction of multistep synthetic process into one pot synthesis with minimum amount of waste disposal • Realise the current movement of

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			<p>resources like renewable source, alternative feedstock in organic synthesis</p> <ul style="list-style-type: none"> • Initiation towards the supporting catalyst of polymer, ionic liquid, phase transfer catalyst in the synthesis • Preference to the solvent free reaction, smart technology for the less consumption of various factors in the chemical industry • Role of biodegradable waste in the synthesis of the raw material which is the building block for the synthesis • Milestone for the synthesis of organic compounds using novel technical methods
5.	15PCHO42	Major Elective: 6. Supramolecular chemistry	<ul style="list-style-type: none"> • Understand the various nonbonding interaction involved in supramolecular chemistry • Knowing the basic ideas of Host-Guest interaction • Learn the structure and the synthesis of dendrimers and cryptands • Deepen the concept of dendrimers and cryptands into its applications • Get the idea of types of cyclodextrins and its role in chemistry • Enhance the knowledge of application in the pharma and chemical industry • Know the chemistry of fullrenes and its application • Understand the synthesis, properties involved in Cucurbitnrls • Enrich the knowledge on the crown ether compound as phase transfer catalyst and other applications • Learn the synthesis, application of calixarenes