

PG AND RESEARCH DEPARTMENT OF CHEMISTRY
JAMAL MOHAMED COLLEGE (Autonomous)
Tiruchirappalli-620020
UG Programme – Course Learning Outcomes (2017-2018)

| Sem. | Course Code | Course | Course Title | Course Learning Outcomes |
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| I | 17UCH1C1 | Core– I | Inorganic, Organic and Physical Chemistry-I | At the end of the program, the learners should be able to 1. Understand the address of the electron and know the trend of periodic properties. 2. Identify adulterants in food. 3. Investigate the micronutrient level of soil and portability of water. 4. Identify the nature of functional group and naming of the organic compounds. 5. Familiarize in the gas laws. |
| | 17UCH1C2P | Core– II | Volumetric Analysis – Practical | At the end of the course students could be able to 1. Apply the principles of titrimetry. 2. Familiarize the concept of indicators and dilution 3. Determine the concentration of different solutions 4. Findout portability of water. |
| II | 17UCH2C3 | Core– III | Inorganic, Organic and Physical Chemistry-II | By the end of this course, the student will be able to 1. Apply MO theory to diatomic molecules. 2. Predict the geometry and shapes of molecules by VSEPR theory. 3. Identify the physical and chemical properties of common organic functional groups and explain the reactivity of different carbonyl compounds. 4. Apply the concept and uses of liquids and colloids in the applied field. 5. Know crystal types and structure of the crystals. |
| | 17UCH2C4P | Core– IV | Industrial Chemistry – Practical | At the end of the course learners may able to 1. Measure the purity of commercial samples 2. Determine the total hardness of water 3. Understand the availability of chemical constituents in various commercial products 4. Plan, conduct the experiments and interpret the experimental results |
| III | 17UCH3C5 | Core– V | - Inorganic, Organic and Physical Chemistry-III | On the successful end of the course, the students will be able to 1. Understand the Physical, Chemical properties and uses of alkali metals, alkaline earth metals and noble gases. 2. Know the periodic properties and reactivity of boron and carbon family elements. 3. Recognize the basic practical skills for the synthesis of alkenes, dienes and alkynes. 4. Identify the structure of molecules based on electrical and magnetic properties. |
| | 17UCH3N1 | NME-I | Chemistry in Daily life | After successful completion of the course the students will be able to 1. understand the method of isolation of oils. 2. understand the ingredients needed for preparing a good perfume. 3. know the composition of Face cream, lotions, lacquers and dyes. 4. identify types of dyes and method of preparing dyes. 5. prepare polymers and differentiate the types of plastics. 6. identify a good fuel and their composition. 7. extinguish fire accidents. |

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| | 17UCH3C6P | Core– VI | Domestic Products Preparation and Food Analysis-Practical | At the end of the course, the students become strong enough <ol style="list-style-type: none"> To prepare various domestic products of daily use in simple method daily use To prepare the high quality products in affordable cost To become an entrepreneur To critically analyse the various constituents of food samples. |
| IV | 17UCH4C7 | Core– VII | Inorganic, Organic and Physical Chemistry-IV | After completing the course, the students will be able to, <ol style="list-style-type: none"> Identify the periodic trends in physical and chemical properties of elements of nitrogen family. Identify the different classes of alcohols and to apply the basic practical skills for the synthesis of alkyl halides. Interpret the concept of aromaticity and to apply electrophilic substitution reactions in various organic compounds. Classify the compounds as acids and bases. Derive rate constant for various reactions. |
| | 17UCH4N2 | NME-II | Food and Nutrition | Upon successful completion of the course, students will <ol style="list-style-type: none"> Know the nutritional values of foods and disease caused by their deficiency. be able to understand the important of vitamins and minerals like Ca, P, Fe, F, I Na and K. know the importance of mother milk and the diet for disease like fever, dysentery, anemia and blood pressure. be able to prevent food spoilage and the method of preserving foods. identify the food adulteration and gain knowledge of food additive. be able to know the food laws and standards. |
| | 17UCH4C8P | Core– VIII | Inorganic Qualitative Analysis – Practical | At the end of the course, student will be <ol style="list-style-type: none"> Well versed in the fundamentals of qualitative analysis. Able to apply the concept of solubility product and common ion effect in separation of ions. Expertise in the elimination of interrupting ions during analysis. Planned to perform experiments and interpret experimental results. |
| V | 17UCH5C9 | Core– IX | p-Block Elements, Metallurgy and Nuclear Chemistry | At the end of the course the learners should able to <ol style="list-style-type: none"> Know the structure and properties of oxygen and halogen family elements. Apply the properties of silicon compounds and silicates in applied field. Identify types and uses of various metallurgical processes. Apply the concept of nuclear chemistry and radioactivity in applied field. |
| | 17UCH5C10 | Core– X | Organic compounds, reactions and Heterocyclics | At the end of the course, the learners should be able to <ol style="list-style-type: none"> Knowledge about nomenclature of organic compounds, bonding, polar effects and reaction intermediates are highly useful in research and development at various industries. Knowledge about alkanes, Grignard reagents, carbonyl compounds and alkenes are verymuch useful for synthesing organic compounds in many industries. Assign the configuration for the optically active compound and their biological role. |

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| | | | | <ol style="list-style-type: none"> Can synthesis the assymetric compound and recemic mixture. Can do biological and chemical resolution on recemic mixture. |
| 17UCH5C11 | Core– XI | Thermodynamics and solutions | <p>At the end of the course, the learners should be able to</p> <ol style="list-style-type: none"> Understand the laws of chemical thermodynamics Apply mathematical tools to calculate thermodynamic properties Narrate the different thermodynamic quantities Differentiate states of matter and their properties Study the behaviour of binary components applying phase rule and get a complete knowledge about the phase diagram Calculate the colligative properties | |
| 17UCH5S2A | SBE-II | Analytical Techniques | <p>Upon successful completion of this course, students will be able to</p> <ol style="list-style-type: none"> handle toxic chemicals in laboratory. understand the storage and first aid techniques in handling toxic and poisonous chemicals. understand the methods of precipitation and know how to control co and post precipitation. use the TGA and DTA instrumentation and know to interpret the TGA curves. know the techniques of chromatography. use the TLC and HPLC chromatography for separation of compounds. apply the principle of electrophoresis techniques. | |
| 17UCH5S2B | SBE-II | Electroanalytical Techniques | <p>Upon successful completion of this course, students will be able to</p> <ol style="list-style-type: none"> handle the polarography instrument ad interpret the polarogram significance. apply the principle of potentiometric titrations and perform redox and complexometric titrations . carryout amperometry titrations and to predict the advantages of titration curves. carryout the coulometric analysis and they will also have knowledge to handle the instrument. describe the important terms used in electro gravimetry. separate metals by electrolytic methods. | |
| 17UCH5S3A | SBE-III | Clinical Chemistry | <p>After completing the course, the students will be able to</p> <ol style="list-style-type: none"> understand the various terms involved in pharmaceutical chemistry. synthesize the various drugs. | |
| 17UCH5S3B | SBE-III | Water quality analysis | <p>After completing the course, the students will be able to</p> <ol style="list-style-type: none"> understand the water quality parameters. apply the water treatment methods. | |
| 17UCH5EC1 | Extra Credit - I | Computer Applications in Chemistry | <p>After completing the course, the students will be able to</p> <ol style="list-style-type: none"> understand the basic knowledge of computer. understand the basic computer languages | |
| 17UCH5C12P | Core– XII | Gravimetric Estimation and Physical Constants Determination – Practical | <p>At the end of the course students should be able to</p> <ol style="list-style-type: none"> Know the various factors (temperature, solvents, precipitating agent and medium) affecting the process of precipitation. Familiarizing in handling the apparatus. Gain knowledge of gravimetric weighing method. Know the determination of the boiling /melting point. | |

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| 17UCH5M1AP | MBE | Physical Chemistry Electrical – Practical | At the end of the course students should be able to <ol style="list-style-type: none"> 1. Apply phase rule to predict the eutectic composition eutectic temperature. 2. Identify the dependency of temperature and pressure on phase transition. 3. Know the lipophilic-liphophobic character of the compounds. 4. Calculate the molecular weight of unknown molecular entities. 5. Determine the parameters which are helpful to predict the reaction pathways. |
| 17UCH6C13 | Core– XIII | Transition, Inner Transition Elements and Coordination Compounds | At the end of the course the learners should able to <ol style="list-style-type: none"> 1. Compare transition elements and apply the above elements and the various fields. 2. Characterise lanthanides and actinides and use industrially important c 3. Name the complexes and apply various theories to interpret new comp 4. Determine the stability and reactions of co-ordination compounds. 5. Apply EAN rule for simple carbonyls and apply complexes in analytic |
| 17UCH6C14 | Core– XIV | Stereochemistry and molecular rearrangements | At the end of the course, the learners should be able to <ol style="list-style-type: none"> 1. Reagents, naming reactions and hetero cyclic compounds enable the students familiar with all reagents and their applications in research field. 2. Gain the knowledge in the field of pytochemistry and get the job opportunity in pharma industries. 3. Studying about the polynuclear hydrocarbons and petroleum process will get the opportunity in petroleum refining industries. 4. Studying about the nomenclature of organic compounds and rearrangements will stimulate the Knowledge for preparing chemical compounds for day today life activities. 5. Knowledge about terpenoids and alkaloids will give basic knowledge in the field of pharmaceuticals. |
| 17UCH6C15 | Core– XV | Molecular Spectroscopy and Electrochemistry | At the end of the course, the learners should be able to <ol style="list-style-type: none"> 1. Understand the principles of microwave, infrared, Raman and electronic spectroscopies. 2. Identify the fingerprint region and functional groups region of organic molecules 3. Interpret the nature of protons in organic molecules using chemical shift values 4. Gain knowledge on conductance and apply the same to solve the problems based on conductance 5. Calculate the thermodynamic parameters from EMF |
| 17UCH6EC2 | Extra Credit-II | Photochemistry and Radiation Chemistry | At the end of the course, the learners should be able to <ol style="list-style-type: none"> 1. Understand the laws of photochemistry and its uses. 2. Get the knowledge of radiation chemistry |
| 17UCH6C16P | Core– XVI | Organic Analysis and Preparation – Practical | At the end of the course, students will be <ol style="list-style-type: none"> 1. Familiarize the solubility nature of organic compounds of different functional groups. 2. Know the structural constituents of organic compounds. 3. Detect various functional groups 4. Understand the reactivity of functional groups 5. Able to perform precipitation process by crystalization method 6. Expertise in organic synthetic methods |

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| | 17UCH6M3AP | MBE | Physical Chemistry Non-Electrical – Practical | At the end of the course students will be to 1. Learn the with rudiments of electrochemistry 2. Apply the concepts of electrochemistry for novel discoveries 3. Predict various electrochemical parameters 4. Plan and perform the experimental procedure. |
| I | 17UCH1A1:1 | For B.Sc Physics | Inorganic, Organic and Physical Chemistry-I | 1. Fundamental concepts of periodic properties understood 2. Theories of chemical bonding and molecular structure learned 3. Ability to know the chemistry of fuel and cleansing action 4. Studied the classification and structure of carbohydrates 5. Known about DNA & RNA and their functions 6. Gathered basic knowledge of polymer chemistry 7. Studied the preparation and reactions of heterocyclic compounds 8. Learned the basic principles of stereochemistry 9. Understood the principles of chromatography and photochemical laws 10. Applications of phase rule and draw phase diagrams for one component systems 11. Basic concepts of electrochemistry and its applications |
| | 17UCH1A2P | | Volumetric Analysis – Practical | At the end of the course students could be able to 1. Apply the principles of titrimetry analysis 2. Familiarize the concept of indicators and dilution 3. Determine the concentration of different solutions 4. Find out portability of water. |
| II | 17UCH2A1:1 | | Inorganic, Organic and Physical Chemistry-II | 1. Identified the principles, structure and reactivity of coordination complexes 2. Gained the basic knowledge of electron displacement and substitution reaction in organic chemistry 3. The aromaticity of simple heterocyclic compounds and mechanism of substitution reaction studied. 4. Explained to grasp the behavior of some chloro compounds and chemotherapy of sulpho drugs 5. Learned the chemical compositions based on unit cell contents and fractional coordinates 6. Explained the theoretical and experimental methods of chemical kinetic 7. Types and theories of catalysis understood |
| | 17UCH2A4P | | Organic Analysis – Practical | At the end of the course students are capable to 1. Familiarize the solubility nature of organic compounds of different functional groups. 2. Know the structural constituents of organic compounds. 3. Detect various functional groups. Understand the reactivity of functional groups. |
| I | 17UCH1A1:1 | For B.Sc Botany/Zo ology | Inorganic, Organic and Physical Chemistry-I | 1. Acquired fundamental knowledge in periodic properties 2. Theories of chemical bonding and molecular structure understood 3. The chemistry of fuel and cleansing action learned 4. Summarized the classification and structure of carbohydrates 5. Gained the knowledge of different types of amino acids and proteins and their applications in biological functions. 6. Gathered basic knowledge of polymer chemistry 7. Explained the preparation and reaction of heterocyclic compounds 8. Learn a the basic principles of stereochemistry studied 9. Processed various separation and chromatographic techniques |

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| | | | | <p>10. Understood the principles of photochemical laws</p> <p>11. Studied the common theories and properties of acid, bases and catalysis</p> |
| | 17UCH1A2P | | Volumetric Analysis – Practical- | <p>At the end of the course students could be able to</p> <ol style="list-style-type: none"> 1. Apply the principles of titrimetry analysis 2. Familiarize the concept of indicators and dilution 3. Determine the concentration of different solutions 4. Find out portability of water. |
| II | 17UCH2A1:1 | | Inorganic, Organic and Physical Chemistry-II | <ol style="list-style-type: none"> 1. Identified the principles, structure and reactivity of coordination complexes 2. Utilize the principles of transition metal coordination complexes in understanding functions of biological systems 3. The students will acquire knowledge of Basics of nuclear chemistry and radio analytical techniques 4. To explain the importance of vitamins in life and suppha drugs in chemotherapy 5. Understand the biochemistry of enzymes and harmones 6. Known about colloids, emulsion & gels and their functions |
| | 17UCH2A4P | | Organic Analysis – Practical | <p>At the end of the course students are capable to</p> <ol style="list-style-type: none"> 1. Familiarize the solubility nature of organic compounds of different functional groups. 2. Know the structural constituents of organic compounds. 3. Detect various functional groups. 4. Understand the reactivity of functional groups. |

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PG Programme–Course Learning Outcomes (2017-2018)

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|-----|-------------|------------------------|---|--|
| I | 17PCH1C1 | Core I | Structure, bonding, Acids-bases and Radioactivity | At the end of the course the learners should be able to 1. Identify the crystal type and defects. 2. Apply CFSE for co-ordination compounds. 3. Implement various processes in extraction of metals and manufacture of alloys. 4. Apply various concepts of acids and bases to interpret the types of materials. 5. Use various radioactivity detectors and apply various nuclear reactions in their research |
| | 17PCH1C2 | Core – II | Nomenclature and Reaction Mechanism | At the end of the course, the learners should be able to 1. Studying about the nomenclature of organic compounds and reaction intermediates will help for naming the newly synthesised organic compounds in research. 2. Knowledge about aliphatic and aromatic substitution reactions, oxidation and reduction, addition and elimination reactions will kindle the mind for proposing the new reactions and mechanisms. 3. Knowig about naming reactions, photochemical reactions and pericyclic reactions is useful synthesis the compounds via proper mechanism and to study the thermal and photochemical feasibility of the reactions. 4. Knowledge about terpenoids, alkaloids and flavonoids is useful to find the phytochemical and their biological importance. |
| | 17PCH1C3P | Core III | Inorganic Estimation and Complex Preparations - Practical | At the end of the course, students are capable of performing 1. The qualitative separation of binary mixture and individual quantitative estimation adopting volumetric and gravimetric methods 2. The advanced method of estimation of metal ions through Complexation 3. The preparation of complex compound in aqueous state and isolation in crystalline pure forms 4. The technique to obtain maximum yield of the dried product not leading to wastages of chemicals |
| | 17PCH1C4P | Core IV | Organic Estimation and Chromatography -Practical | At the end of the course, students are capable of 1. Doing the estimation of chemicals which provides knowledge about the concentration, purity and adulteration 2. Performing the chromatography technique by which complex mixtures are separated or analyzed 3. Preparing slurry and silica gel coated glass plates 4. Understanding the concept of solid gas adsorption adopting the iodine chamber for the spotting of samples 5. Knowing various organic solvents |
| | 17PCH1CE1A | Core Based Elective– I | Chemical Kinetics, Electrodeics and Quantum Mechanics | At the end of the course, the learners should be able to: 1. Understand the kinetics of fast reactions and different types of catalysed reactions. Correlate the solvent nature and kinetics of reactions 2. Learn the importance of concepts like linear algebra for eigen values and eigen vectors and first and seconder order differential equations in quantum mechanics. 3. Solve all problems pertaining to different models assumed for molecules |

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| | | | | in quantum mechanics. 4. Solve the complex problems arise in the case of unsaturated molecules using theories like perturbation and variation theories |
| | 17PCH1CE1B | Core Based Elective- I | Quantum chemistry and Spectroscopy | At the end of the course, the learners should be able to: 1. Learn the importance of concepts like linear algebra for eigen values and eigen vectors and first and second order differential equations in quantum mechanics. 2. Solve all problems pertaining to different models assumed for molecules in quantum mechanics. 3. Solve the complex problems arise in the case of unsaturated molecules using theories like perturbation and variation theories 4. Understand the principles of Infrared, Raman and NMR spectroscopies. 5. Familiar with modern spectrometers (like FT-IR, FT-NMR, NMRI and 2D-NMR) and methods, which are applied in industrial and scientific laboratories in the field of synthesis and structural determinations. |
| II | 17PCH2C5 | Core- V | Stereochemistry and Natural Products | At the end of the course, the learners should be able to, 1. Learning the concepts of stereochemistry, dynamic stereochemistry and aromaticity will help the students community in the field of pharma i.e, optical activity and pharmacological activity, which are useful forpharma industries. 2. Knowig about naming reactions, photochemical reactions and pericyclic reations is useful synthesis the compounds via proper mechanism and to study the thermal and photochemical feasibility of the reactions. 3. Knowledge about terpenoids, alkaloids and flavonoids is useful to find the pytochemical and their biological importance. 4. Studying about the concept of organic spectroscopy such as, NMR, ESR, C ¹³ and Mass are very useful for the structural elucidation of newly synthesised compounds in the research field. 5. Knowing about steroids, carotenoids and lipids and their medicinal values will give the knowledge in the field of medicinal chemistry. |
| | 17PCH2C6 | Core- VI | Group Theory and Spectroscopy | At the end of the course, the learners should be able to: 1. Assign the symmetry elements and point group of molecules/ions/complexes. 2. Identify the symmetry in molecules and construct the character table for molecules of different point groups. 3. Verify spectroscopic selection rules applying group theoretical concepts. 4. Determine the symmetry operations of any small and medium-sized molecule and apply point group theory to the study of selection rules for absorption. 5. Differentiate molecular symmetry and crystallographic symmetry. |
| | 17PCH2C7P | Core- VII | Inorganic Qualitative Analysis and Colorimetric Estimations - Practical | At the end of the course, students are capable of 1. Doing the estimation of chemicals which provides knowledge about the concentration, purity and adulteration 2. Performing the chromatography technique by which complex mixtures are separated or analyzed 3. Preparing slurry and silica gel coated glass plates 4. Understanding the concept of solid gas adsorption adopting the iodine chamber for the spotting of samples 5. Knowing various organic solvents |
| | 17PCH2C8P | Core- VIII | Organic Preparations and Mixture Analysis- Practical | At the end of the course, students are capable of 1. Performing the qualitative separation of binary mixture of organic compounds and individual qualitative analysis of isolated compound adopting qualitative methods 2. Knowing the separation and regeneration of the compounds 3. Understanding isolation and purification of compounds 4. Detecting various functional groups |

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| | | | | 5. Analyzing the element present |
| | 17PCH2CE2A | Core Based Elective– II | Coordination Compounds and Spectral Characterization | At the end of the course the learners should able to 1. Determine the stability of complexes and to apply various reactions of coordination compounds in their research. 2. Identify the synthesis, structure and bonding of carbon π -donor complexes. 3. Identify the different type of organometallic reactions and apply the above concepts to explain different catalytic reactions. 4. Identify the electronic transition in various d^n -systems. 5. Use various spectroscopic principles to characterise inorganic and organometallic compounds |
| | 17PCH2CE2A | Core Based Elective– II | Spectroscopy of Inorganic Complexes and Organometallics | At the end of the course the learners should able to 1. Use various spectroscopic principles to characterise inorganic and organometallic compounds. 2. Compare lanthanide and actinides and characterise them. 3. Identify the different type of organometallic reactions and apply the above concepts to explain different analytic reactions. |
| III | 17PCH3C9 | Core– IX | Inorganic Spectroscopy, Solid State and Bio-Inorganic Chemistry | At the end of the course the learners should able to 1. Interpret the spectroscopic data of simple inorganic compounds. 2. Predict the photochemical reactions and magnetic properties of materials. 3. Predict the crystal structure. 4. Predict the shapes of metal clusters. 5. Know the uses of radioisotopes and toxicity of various metals in bio field. |
| | 17PCH3C10 | Core– X | Organic Spectroscopy and steroids | At the end of the course, the learners should be able to, 1. Name any newly synthesised organic compounds in research field. 2. To perform new reactions and propose mechanisms. 3. Synthesis the compounds via proper mechanism and study the thermal and photochemical feasibility of the reactions. 4. Interpret the biological importance of natural products. 5. Elucidate structure of a newly synthesised compounds in the research field. |
| | 17PCH3C11 | Core– XI | Industrial Chemistry | At the end of the course, the learners should be able to 1. Understand the fermentation process in industries 2. Know the various pigments and their functions 3. Understand the composition, uses and types of paper. 4. Know the different methods of preparation of adhesives and explosives. 5. Know the properties of oils and fats. |
| | 17PCH3C12P | Core– XII | Physical Chemistry Non-Electrical Practical | At the end of the course, students are capable of 1. Understanding Phase diagram which applicable in various industrial processes 2. Knowing the reaction kinetics of the reaction 3. Understanding the effect of temperature on the rate of the reaction 4. Knowing the activation energy which determines the speed of the reaction. 5. Determining the molecular weight 6. Comparing the strength of acids |
| | 17PCH3CE3A | Core Based Elective– III | Modern Synthetic methods and Pharmaceutical Chemistry | At the end of the course, the learners should be able to 1. Use retrosynthetic method for the logical disconnection of complex organic molecules and devise synthetic methods. 2. Create awareness for reducing waste, environmental pollution and minimizing energy consumption in organic synthesis. 3. Modernly approach of supramolecular chemistry. 4. Understand drugs, Drug design, Drug synthesis and Diagnostic aids. 5. Modern approach and easy way to adopt the methods of Drug design and Drug synthesis. |

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| | 17PCH3CE3B | Core Based Elective– III | Material Chemistry | At the end of the course, the learners should be able to 1. Understand the inorganic materials, formation and properties of bulk materials. 2. Use the inorganic materials as superconductors and pigments. 3. Apply the inorganic materials in the field of electrical, electronic and other industries. 4. Monitor the electronic transition in metal complexes by inorganic photochemistry. 5. Arrive the chemical compositions based on unit cell contents and fractional coordinates. 6. Understand the Electron diffraction by gases and Neutron diffraction by cry |
| | 17PCH3EC1 | Extra Credit Course - I | Analytical Techniques | At the end of the course, students will be able to 1. Understand the accuracy, precision and errors. 2. Know the solvent extraction and recrystallization techniques. 3. Understand the basic principle, instrumentation, working and uses of Fluorimetry, Turbidimetry and Nephelometry, Flame photometry and Phosphorometry. 4. Use the TGA and DTA instrumentation and know to interpret the TGA curves. 5. Know the basic concepts of electro analytical techniques. |
| IV | 17PCH4C13 | Core– XIII | Surface Phenomena, Statistical thermodynamics and Phase rule | At the end of the course, the learners should be able to: 1. Evaluate the adsorption capacity of different materials 2. Calculate Change in thermodynamic properties like partial molar quantities, fugacity, activity, chemical potential and partition functions. 3. Explain heat capacity of solids using Debye and Einstein theories 4. Relate the microscopic properties of molecules with macroscopic thermodynamic observables. 5. Understand Onsager’s reciprocal relations and microscopic reversibility to the natural systems. 6. Study the properties of three component systems using phase diagram |
| | 17PCH4C14 | Core– XIV | Polymer Chemistry | At the end of the course, the learners should be able to 1. Understand the basic concepts of polymer 2. Know the various polymerization techniques and characterization 3. Study the Properties of Polymers 4. Know the processing techniques of polymers 5. Know the Commercial uses of polymers. |
| | 17PCH4C15P | Core– XV | Physical Chemistry Electrical Practical | At the end of the course, students are capable of 1. Knowing the concentration, potential difference between two electrodes employing potentiometry methods 2. Adopting the technique for the estimation of acids and halides 3. Understanding the acid base, redox precipitation and complex titrations adopting conductometry methods 4. Applying the technique for the estimation of acids and determination of solubility product 5. Handling the conductometer and potentiometer |
| | 17PCH4CE4A | Elective - IV | Nano and Green Chemistry | At the end of the course, the learners should be able to 1. Understand the basic concepts of Nanomaterials and their properties. 2. Synthesize the Nanomaterials using different methods. 3. Reduce the pollution in the environment. 4. Synthesize the new materials using green synthesis. 5. Understand the uses of green solvents |
| | 17PCH4CE4B | Elective - IV | Quality Control and Environmental Chemistry | At the end of the course, the learners should be able to 1. Identify the food adulteration in common food 2. Understand the energy sources using various methods. |

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| | | | | 3. Understand the radioactive and thermal pollution & their control methods. 4. Get knowledge about recycling process from waste materials. |
| 17PCH4EC2 | Extra Credit Course - II | Instrumentation and Separation Techniques | | At the end of the course, the learners should be able to 1. Know the basic principles of spectroscopy 2. Understand the instrumentation, working and applications of UV, IR, NMR and Mass spectroscopy. 3. Know the separation techniques like chromatography 4. Know the principles and uses of electrophoresis. |

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M.Phil Programme – (2017-2018)

Programme Objectives:

- ❖ To bring understanding of chemistry in different fields required to observe philosophy of chemistry
 - ❖ To educate graduates in undertaking higher level chemical research
 - ❖ To generate skilled post graduates who can act in the increasingly wide research area of chemistry.
 - ❖ To perform innovative teaching methods to communicate clearly and effectively
 - ❖ To produce leaders in science for academia
 - ❖ To provide the scholars with the opportunity to acquire or develop skills and expertise relevant to their research interests
 - ❖ To train competent and problem-solving researchers for academia and industry
- This discipline can also be extended to research studies by the addition of one year's worth of research.

Programme Outcomes:

- ❖ The main outcome of the course shall be the gaining of knowledge and expertise for impacting quality research
- ❖ Students will develop knowledge and understanding of current issues, research and developments
- ❖ Students will be able to describe the scientific principles employed in particular areas of research in chemistry
- ❖ Students will describe possible future directions of chemical research
- ❖ Possibility to join research activities
- ❖ To introduce the innovative techniques and dynamics of teaching

Course Learning Outcomes

| Sem | Course Code | Course | Course Title | Course Learning Outcomes |
|-----|-------------|-----------|--|---|
| I | 17MPCH 1C1 | Core– I | Research Methodology in Chemistry | <ol style="list-style-type: none"> Scholars shall identify various ways to design a research problem. Scholars shall develop the numerical aptitude and computational knowledge in the fundamental of collection and presentation data Scholars shall get innovative idea for their research work based on the compilation of literature Scholars shall acquire knowledge for writing and publishing the research paper and drafting the thesis Scholars shall understand the role of statistical analysis of data in research Scholars shall learn basic concepts of computer knowledge for presentation of dissertation |
| | 17MPCH 1C2 | Core – II | Advanced Physical Methods And Molecular Modelling In Chemistry | <ol style="list-style-type: none"> Scholars shall learn various analytical tools for the characterization of organic, inorganic and nano materials Scholar shall be able to predict the concepts and applications of UV-Visible, FTIR, NMR and ESR spectral studies Scholars shall be adapting the simulations to the problem at hand with respect to force fields, simulation parameters, analysis method, etc. Scholars should be able to relate the simulations to experimental methods and present the results in the form of graphs and molecular graphics |
| | 17MPCH 1C4 | Core– III | Teaching Methodology | <ol style="list-style-type: none"> Scholars shall understand teaching strategies and education Scholars shall propagate updated knowledge of chemistry and use ideas and information. Scholars Shall facilitate their personal development Scholars shall learn concepts and benefits of guidance and counselling. |