

SRI PADMAVATI MAHILA VISVAVIDYALAYAM, TIRUPATI
DEPARTMENT OF ORGANIC CHEMISTRY

OUTCOMES

After completion of the program, the students are able to:

Programme outcomes

PO1. Work in the interdisciplinary and multidisciplinary areas of chemical sciences and its applications.

PO2. Acquire the ability to synthesize, separate and characterize compounds using laboratory and instrumentation techniques.

PO3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyse the results of chemical reactions.

PO4. Helps to gain the knowledge in developing the green route for chemical reaction for sustainable development

PO5. Apply physical, theoretical and spectroscopic methods to chemical systems

PO6. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.

Programme Specific Outcomes

PSO1. Attain the skills in the preparation, estimation and characterization of organic compounds using chemical and instrumental methods.

PSO2. Design the methods for the synthesis of specific organic compounds and such methods are useful in pharmaceutical industry in the development of target oriented drug molecules.

PSO3. Analyse a mixture of organic compounds or inorganic compounds and identify the nature of components present in the mixture using chemical and instrumental methods.

PSO4. Understand the advanced concepts in quantum chemistry and molecular thermodynamics.

PSO5. Attain the practical skills in use of potentiometry, conductometry, colorimetry and spectrophotometric techniques for different applications.

PSO6. Acquire experimental skills in the measurement of rates of reactions and understand the mechanisms of complex reactions.

PSO7. Understand the structure of coordination compounds and the function of organo metallic reagents in organic synthesis.

PSO8. Understand the theory and the applications of different analytical, spectroscopic and separation techniques.

PSO9. Understand organic reaction mechanisms, apply novel strategies in the development of synthetic methods for new organic compounds.

PSO10. Elucidate the chemical structure of organic compounds using their spectra obtained from UV, IR, NMR and MS techniques.

PSO11. Study the occurrence, isolation, synthesis and structure of some naturally occurring compounds.

COURSE OUTCOMES

After completion of the program, the students are able to:

CHE 101: INORGANIC CHEMISTRY – I

CO-1: Apply the Crystal Field Theory to understand the properties of coordination compounds

CO-2: Evaluate the stability of metal complexes and to know the theory and applications of HSAB.

CO-3: Understand the reaction mechanisms of inert and labile transition metal complexes.

CO-4: Study the chemistry of metal carbonyls, nitrosyls and clusters and their properties.

CHE 102: ORGANIC CHEMISTRY – I

CO-5: Understand the stability and reactivity of reactive intermediates.

CO-6: Familiarize the types of aliphatic and aromatic nucleophilic substitution reactions.

CO-7: Know the types of elimination reactions and their stereo chemical aspects with examples

CO-8: Learn the concept of stereochemistry to identify the stereo chemical notations and its importance in daily life.

CHE103: PHYSICAL CHEMISTRY – I

CO-9: Learn the significance of wave function and its application to simple systems.

CO-10: Apply the theories of reaction rate for gas phase reactions.

CO-11: Understand the classical and statistical thermodynamic concepts.

CO-12: Evaluate the conductivity, activity and activity coefficients in ionic solutions.

CHE104: GENERAL CHEMISTRY – I

CO-13: Apply the different statistical methods to test the significance of analytical data.

CO-14: Explain the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques.

CO-15: Learn the principles and applications of spectroscopic techniques such as UV-Vis and Microwave spectroscopy.

CO-16: Understand the principles and applications of flame emission and atomic absorption spectroscopic techniques.

CHE 105: PRACTICAL-I (INORGANIC)

CO-17: Identify inorganic salts present in a mixture by qualitative analysis.

CO-18: Determine the amount of inorganic salt present in a mixture by quantitative analysis.

CHE 106: PRACTICAL-II (ORGANIC)

CO-19: Identify the type of organic compound present in a mixture by qualitative analysis.

CHE 201: INORGANIC CHEMISTRY – II

CO-20: Understand the importance of organo-metallic reagents and their properties. Learn the fluxional behaviour of transition metal η -complexes.

CO-21: Study in detail about transition metal π -complexes and their properties.

CO-22: Apply the electronic spectra and Electron Spin Resonance (ESR) Spectra to transition metal complexes.

CO-23: Learn the magnetic properties of transition metal complexes.

CHE 202: ORGANIC CHEMISTRY – II

CO-24: Learn the selective name reactions and their synthetic applications.

CO-25: Understand the types of addition reactions and their stereochemical aspects.

CO-26: Understand the pericyclic reactions and types of reactions

CO-27: Study the photochemical reactions of carbonyl compounds, alkenes, dienes, polyenes, and photo rearrangements.

CHE 203: PHYSICAL CHEMISTRY – II

CO-28: Apply quantum mechanical methods to angular momentum, and molecular orbital theory.

CO-29: Understand the theories of adsorption of gases and liquids on solids and the conditions for micellisation.

CO-30: Study the equilibrium in three component systems using phase rule.

CO-31: Learn the concepts of irreversible electrodeprocess and polarographic techniques.

CHE 204 A: GENERAL CHEMISTRY-II

CO-32: Study the symmetry elements and symmetry operations. To apply the orthogonality theorem to derive character tables.

CO-33: Apply molecular spectroscopy, infrared spectroscopy and Raman spectroscopy for simple molecules.

CO-34: Apply thermal methods and radio analytical methods for clays and minerals.

CO-35: Understand the concepts of electroanalytical methods such as potentiometry, coulometry and voltammetry.

CHE 205: PRACTICAL-I (ORGANIC)

CO-36: Learn the separation and analysis of organic mixtures

CHE 206: PRACTICAL-II (PHYSICAL)

CO-37: Measure the end points using conductometric and potentiometric titrations, CST, phase diagram and adsorption etc.

CHE 301: ORGANIC SYNTHESIS-I

CO-38: Apply the organic reagents such as AlCl_3 , BF_3 , diazomethane, DDQ, Merrifield resin etc. in organic synthesis.

CO-39: Learn in depth about the properties and applications of organometallic reagents in organic synthesis.

CO-40: Understand the molecular rearrangements and their mechanistic aspects

CO-41: Study asymmetric synthesis and their classification. Understand the terms Topocity, Prochirality and selectivity in stereochemical transformations.

CHE 302: HETEROCYCLIC CHEMISTRY

CO-42: Understand the systematic nomenclature for monocyclic, fused and bridged heterocycles.

CO-43: Study the synthesis and reactions of five membered heterocyclic compounds.

CO-44: Know the synthetic strategies, reactions and medicinal applications of Benzofused five membered heterocycles.

CO-45: Learn the synthesis and reactions of six membered Heterocycles with one or more hetero atoms.

CHE 303: SPECTROSCOPY AND ITS APPLICATIONS (Skill Based)

CO-46: Apply UV-Vis spectroscopy for organic molecules and to study the Woodward Fisher rules.

CO-47: Apply IR-spectra for the determination of functional groups inorganic molecules.

CO-48: Apply NMR spectra (^1H & ^{13}C NMR) for structural elucidation of organic molecules.

CO-49: Study the fragmentation of organic compounds in mass spectrometry for structural determination.

CHE 305: PRACTICAL-I (ORGANIC ESTIMATIONS)

CO-50: Estimate the amounts of selective organic compounds

CHE 306: PRACTICAL-II (ORGANIC PREPARATIONS)

CO-51: Setup the apparatus and organic reactions for the preparation of different organic compounds using single step synthetic approach.

CHE 401: ORGANIC SYNTHESIS-II

CO-52: Apply organo boron, phosphorus, sulfur and silicon reagents for organic synthesis.

CO-53: Understand the reagents involved in oxidations and reductions and their mechanistic aspects including stereochemistry with examples.

CO-54: Apply the disconnection approach in synthetic organic chemistry and study of protecting groups with examples.

CO-55: Familiarize the concepts of newer methods in organic synthesis such as Phase Transfer Catalysis, Microwave induced reactions and enamine mediated reactions.

CHE 402: Natural Products

CO-56: Learn the occurrence, nomenclature and synthesis of Steroids and Hormones.

CO-57: Evaluate the structural elucidation and degradation of alkaloids. Study of structure, stereochemistry and synthetic aspects of alkaloids.

CO-58: Gain the knowledge about Structure determination, stereochemistry and synthesis of the terpenoids.

CO-59: Learn the structure determination and synthetic strategies of Flavonoids and Isoflavonoids.

CHE 403: PRACTICAL-I (SPECTAL PROBLEMS)

CO-60:Elucidate the structure of different organic compounds using spectroscopic data from literature

CHE 404: PRACTICAL – II (MULTISTEP PREPARATIONS)

CO-61:Handle and use of different organic reagents for the preparation of different organic compounds using two-step synthetic approach.