



BON SECOURS COLLEGE FOR WOMEN

Nationally Accredited with 'A' Grade by NAAC

UGC Recognized 2(f) and 12(B) Institution

VILAR BYPASS, THANJAVUR - 613 006



DEPARTMENT OF CHEMISTRY

Programme Outcomes (UG)

PO1: Exhibit Livelihood Competences in the field of Science and Technology in terms of relevant Knowledge, Skills and Attitude.

PO2: Expected sense of being seasoned and spirited are tuned with required qualities of productive contribution to society.

PO3: Instilled with Confidence shall rise up to take up Leadership Roles in the field of Science and Technology, given the occasion.

PO4: Realize that pursuit of knowledge is an integral part of a Life-long Activity towards a successful life.

PO5: They are able to spread knowledge, creating Awareness about social evils and participate Voluntarily in social and cultural activities.

Program Specific Outcomes (UG)

PSO1: In-depth and detailed functional knowledge of the fundamental theoretical concepts and experimental methods of chemistry

PSO2: Apply/implement interface between on the one hand, the history of chemistry and natural science and, on the other hand, issues pertaining to the areas of modern technology, health, and environment

PSO3: Skills in planning and conducting advanced chemical experiments

PSO4: Skill in applying structural-chemical characterization techniques

PSO5: Skill in examining specific phenomena theoretically and/or experimentally

PSO6: Generation of new scientific insights or to the innovation of new applications of chemical research

COURSE OUTCOME (UG)

16SCCCH1-GENERAL CHEMISTRY-I

1. Remember the periodic properties of elements and its classifications-L1
2. Analyse the compounds qualitatively and quantitatively-L3
3. Understand the basics of alkanes-L2
4. Understand reactive intermediates and reaction mechanisms-L2
5. Understand the chemistry of cycloalkanes, alkenes and alkynes., addition reaction, Chemical properties and Uses of cycloalkanes, alkenes-L2
6. Apply the properties of colloids and macromolecules-L4

16SCCCH2-General Chemistry-II

1. Remember the type of chemical bonding, Theories and Hybridisation -L1
2. Understand s-block elements, purification of metals and applications.-L2
3. Understand Aromaticity, Mechanism, properties and uses of benzene and benzenoid compounds -L2

4. Understand the nomenclature, structure preparations, substitution reaction mechanisms and uses of alkyl and aryl halogens-L2
5. Analyse the properties of atoms and characteristic of wave functions.-L3
6. Analyse different models of atoms-L3

16SCCCH1P-Volumetric Analysis (P)

1. Remember the techniques of titrimetric analysis-L1
2. Understand the principles of alkalimetry, permanganometry and iodometry-L2
3. Apply the principles of alkalimetry, permanganometry and iodometry-L4
4. Analyse the strength of acids and bases using alkalimetry, permanganometry and iodometry-L3
5. Evaluate the strength of cations and anions-L5
6. Evaluate the total hardness of water-L5

16SCCCH3-General Chemistry-III

1. Remember p-block elements, oxides of carbon, allotropic forms of carbon.-L1
2. Understand preparation, properties, structure and uses of interhalogen compounds, classification of oxides-L2
3. Apply the knowledge of arrangement of atoms in space-L4
4. Apply the rules for finding the isomers and their nomenclature-L4
5. Apply the structures to classification of solids and x ray diffraction technique-L4
6. Evaluate the given inorganic cations and anions -L5

16SCCCH4-General Chemistry-IV

1. Remember the general characteristics of d and f block elements-L1
2. Understand the reactions of organometallic compounds -L2
3. Understand the preparation, properties and uses of alcohols, phenols and ethers-L2
4. Analyse the fundamental concepts of first law of thermodynamics -L3
5. Analyse heat, work and energy and to calculate work -L3
6. Apply the fundamental concepts of rate of the reaction to determine order of the reaction-L4

16SCCCH2P-Semi Micro Analysis (P)

1. Remember the techniques of semimicro qualitative analysis -L1
2. Understand the principles and theory behind the analysis technique-L2
3. Apply the skill for identifying inorganic cations and anions-L4
4. Analyse and identify the given cations and anions -L3
5. Evaluate the interfering radicals-L5
6. Evaluate the given inorganic cations and anions-L5

16SCCCH5-Inorganic Chemistry - I

1. Remember the basics of coordination compounds-L1
2. Remember the basic principles and applications of magnetic properties. -L1
3. Remember the theories of coordination compounds. -L1
4. Understand the stability of complexes, substitution reactions, theories and biologically important coordination compounds-L2

5. Analyse the structure and bonding of carbonyls and metallic compounds-L3
6. Apply the oxidising reagent for synthesis and other transformation-L4

16SCCCH6-Organic Chemistry - I

1. Remember the reactions of carbonyl compounds and their preparation and properties-L1
2. Understand the preparation and properties of carboxylic acids-L2
3. Understand the nomenclature of nitro alkanes, reduction reaction, preparation and application-L2
4. Analyse the preparation and properties of amines of heterocyclic compound-L3
5. Apply the oxidising reagent for synthesis and other transformation-L4
6. Apply the oxidising reagent for synthesis and other transformation-L4

16SCCCH7 – Physical Chemistry I

1. Remember the various concepts of photochemistry-L1
2. Remember the basics of group theory – L1
3. Apply the second law of thermodynamics, carnot cycle, carnot theorem and Maxwell relations-L4
4. Apply the third law of thermodynamics-L4
5. Apply the laws and properties of solutions-L4
6. Remember the fundamental concepts of phase rule and its applications-L1

16SMBECH1:1 – Analytical Chemistry

1. Remember the storage and handling of various chemicals and first aid procedures-L1
2. Analyse data analysis, various separation techniques-L3
3. Analyse gravimetric analysis-L3
4. Analyse thermo analytical methods & electroanalytical techniques-L3
5. Understand visible spectrophotometry and colorimetry-L2
6. Analyse the various electroanalytical techniques-L3

16SCCCH3P-Physical Chemistry Practical (P)

1. Apply the fundamentals of conductometric -L4
2. Understand the Potentiometric titration-L2
3. Apply the method of determination of molecular weight-L4
4. Analyse the method of CST and TT-L3
5. Evaluate the Acid and base Titration-L5
6. Apply the Determination of Cell Constant-L4

16SCCCH8 - ORGANIC CHEMISTRY II

1. Remember the chemistry of carbohydrates and their structure and configuration-L1
2. Remember general method preparation of proteins and vitamins-L1
3. Remember natural product of alkaloids -L1
4. Remember terpenoids classification-L1
5. Understand the Molecular rearrangements -L2
6. Analyse Spectroscopy techniques for the elucidation of structures-L3

16SCCCH9 - PHYSICAL CHEMISTRY -II

1. Remember the various concepts of electrochemistry-L1

2. Understand Types of Electrochemical cells and potentiometric titration-L₂
3. Remember the types and theories of catalysis-L₁
4. Remember the Surface phenomena and adsorption isotherms-L₁
5. Analyse the spectroscopic techniques such as IR, UV-visible-L₃
6. Apply spectroscopic techniques such as Raman and NMR.-L₄

16SMBECH2 NUCLEAR, INDUSTRIAL CHEMISTRY & METALLIC STATE

1. Remember the fundamentals of nuclear chemistry -L₁
2. Apply the Detection and measurement of radioactivity method-L₄
3. Apply VTo understand the applications of nuclear chemistry-L₄
4. Analyse the metallic bond, theories and applications-L₃
5. Analyse the applications of inorganic polymers-L₃
6. Apply Industrial Chemistry of Paints and Varnishes-L₄

16SMBECH3:2 PHARMACEUTICAL CHEMISTRY

1. Remember the principles and functioning of drugs-L₁
2. Understand the classification of antibiotics and biosynthesis-L₄
3. Understand the importance and functioning of antibiotics-L₄
4. Apply the properties and uses of Disinfections-L₄
5. Understand the impact of poisons-L₄
6. Understand the applications of Analgesic and antipyretics-L₄

16SCCCH4P-Gravimetric and Organic Qualitative Analysis (P)

1. Understand the techniques of gravimetric analysis-L₂
2. Analyse the methods of different organic compounds-L₃
3. Understand the Organic analysis-L₂
4. Remember the Organic preparation-L₁
5. Understand Determine of the physical constants-L₂

Programme Outcomes (PG)

PO₁: Professionally Competent with characteristic Knowledge-bank, Skill-set, Mind-set and Pragmatic Wisdom in their chosen fields.

PO₂: Demonstrate the desired sense of being seasoned and exhibit unequivocal Spiritedness with excellent qualities of productive contribution to society and nation in the arena Science and Technology.

PO₃: Mentored such that they exert Leadership Latitude in their chosen fields with commitment to novelty and distinction.

PO₄: Directed in understanding of ethical principles and responsibilities, moral and social values in day-to-day life thereby attaining Cultural and Civilized personality.

PO₅: Able to Collate information from different kinds of sources and gain a coherent understanding of the subject

Program Specific Outcomes (PG)

PSO₁: Gains complete knowledge about all fundamental aspects of all branches of chemistry

PSO2: Understands the basic concepts behind complex chemical structures, reagents in organic syntheses, reactive intermediates, important organic reactions and its mechanisms, naming reactions, molecular rearrangements, stereochemistry, instrumental method of chemical analysis and natural products etc.

PSO3: Identify the importance of various elements present in the periodic table, coordination chemistry and structure of molecules, properties of compounds, structural determination of complexes using theories and instruments, complex metal drugs and catalysts, role of metal ions in biological processes and organometallic chemistry

PSO4: Gathers attention about the physical aspects of atomic structure, quantum chemistry, thermodynamics, reaction pathways with respect to time, various energy transformations, significance of electrochemistry, molecular spectroscopy, role of catalysts in reactions, polymer chemistry, materials chemistry and biophysical chemistry.

PSO5: Learns about the potential uses of analytical industrial chemistry, medicinal chemistry, and environment oriented chemistry.

PSO6: Apply the various analytical techniques like IR, mass, NMR, NQR, EPR, XRD to structural characterization of unknown compounds.

PSO7: Carry out experiments in the area of organic analysis, estimation, separation, derivative process, inorganic semi micro analysis, preparation, conductometric and potentiometric analysis.

COURSE OUTCOME

Organic chemistry I P16CH11

1. Remember the basic concepts of aromaticity-L₁
2. Understand the oxidation and reducing reagents for organic synthesis-L₂
3. Analyse the stereochemistry of organic compounds-L₃
4. Apply the effect of light in organic reactions-L₄
5. Analyse the concerted pericyclic reactions-L₃
6. Analyse the organic synthesis-L₃

Inorganic chemistry I P16CH12

1. Remember the basic concepts of main group elements-L₁
2. Understand the Principles of Coordination Chemistry-L₂
3. Evaluate the Principles of Coordination Chemistry -L₅
4. Apply the theories of Metal-Ligand Bond -L₄
5. Understand the reactions of metal complexes-L₂
6. Apply the concepts of photochemistry and its applications-L₄

Physical chemistry I P16CH13

1. Remember the concepts of group theory-L₁
2. Understand the theories of quantum chemistry-L₂
3. Apply the chemical kinetics, and their theor-L₄
4. Apply the statistical thermodynamics and theories of kinetics-L₄
5. Understand the photochemistry and radiation chemistry-L₂
6. Analyse the photochemistry and radiation chemistry-L₃

Organic chemistry Practical I - P16CH14P

1. Analyse the qualitative analysis of organic mixture-L1
2. Evaluate the organic compounds-L5
3. Apply the principles of qualitative analysis of organic mixture-L4
4. Apply the principles of preparation of organic compound-L4
5. Evaluate the characteristics of different functional groups-L5
6. Apply the reactions of different organic compounds-L4

Inorganic chemistry Practical I P16CH15P

1. Understand the applications of semi- micro Qualitative analysis-L2
2. Evaluate the metal ions using calorimeter-L5
3. Apply the principles of semi- micro Qualitative analysis-L4
4. Apply the principles of calorimeter-L4

Inorganic Chemistry II P16CH21

1. Understand the role of metal ions in biological process-L1
2. Understand the General Principles of Bioinorganic Chemistry -L1
3. Evaluate the basic concepts of chemotherapy-L5
4. Analyse the characters of the organo metallic compounds-L3
5. Analyse principle of catalysis of organometallics -L3
6. Apply the reaction mechanisms of organometallics-L3

Physical Methods in Chemistry I P16CH22

1. Remember the role principles of molecular spectroscopy-L1
2. Understand the NMR spectroscopy-L2
3. Analyse the UV visible and IR spectroscopy-L3
4. Apply ESR, ORD Techniques-L4
5. Apply X -ray diffraction-L4
6. Apply the Mass Techniques-L4

Solid State Chemistry P16CHE1A

1. Understand the crystal structures of few inorganic solids-L2
2. Analyse the chemistry of crystallization and vapour phase transport-L3
3. Evaluate the applications of magnetic materials-L5
4. Remember the chemistry of organic solids-L1
5. Understand the Solid State intra molecular reactions-L2
6. Understand the Chemistry of organic solids-L2

Organic Chemistry Practical II P16CH23P

1. Analyse the qualitative analysis of organic mixture-L3
2. Evaluate the organic compounds-L5
3. Formulate the preparation of organic compounds-L6
4. Apply the principles of preparation of organic compound-L4
5. Evaluate the characteristics of different functional groups-L5
6. Apply the reactions of different organic compounds-L4

Inorganic Chemistry Practical II P16CH24P

1. Evaluate the Gravimetric and Titrimetric analysis-L5
2. Analyse the inorganic compounds-L3
3. Apply the principles of semi- micro Qualitative analysis-L4
4. Apply the principles of calorimeter-L4

Organic Chemistry II P16CH31

1. Understand the nucleophilic and electrophilic substitution reactions-L2
2. Remember the addition reaction and naming reaction-L1
3. Understand the substituent effects and elimination reactions-L1
4. Understand the variety of heterocycles-L1
5. Analyse the chemistry of terpenoids, steroids-L3
6. Analyse the chemistry of alkaloids-L3

Physical Chemistry II P16CH32

1. Remember the applications of quantum chemistry -L1
2. Remember the group theory-L1
3. Understand the electrochemistry, adsorption -L2
4. Apply the corrosion and cells-L4
5. Remember the surface chemistry and their theories-L1
6. Understand the classical thermodynamics-L2

Pharmaceutical Chemistry P16CHE2A

1. Remember the basics of pharmaceutical chemistry-L1
2. Remember the antibiotics and their classification analgesic-L1
3. Apply the Analgesic and their derivatives -L4
4. Apply the activities of anaesthetics -L4
5. Analyse the concept of clinical chemistry-L3
6. Apply the antipyretic activities-L4

Analytical Chemistry P16CHE3

1. Remember the Instrumental methods-L1
2. Understand the Data and Error analysis-L2
3. Apply the Analgesic Chromatography method-L4
4. Analyse the activities Instrumentation of Thermo analytical techniques -L3
5. Analyse the Fluorescence techniques-L3
6. Apply Electro analytical techniques-L4

Physical Chemistry Practical I P16CH33P

1. Remember the various techniques in Physical Chemistry-L1
2. Evaluate the critical solution temperature-L5
3. Evaluate the integral and differential heat of solution-L5
4. Apply the principles of phase diagram-L4
5. Analyse the physical constant for the given compound- L3

6. Evaluate the rate constant of the reaction-L5

Physical Methods in Chemistry II – P16CH41

1. Remember the basics of electronic spectroscopy-L1
2. Understand the applications of IR Spectroscopy-L2
3. Understand the applications of Raman Spectroscopy-L2
4. Apply the principles of NMR Spectroscopy-L4
5. Apply the principles of EPR Spectroscopy-L4
6. Understand the applications of Mossbauer Spectroscopy-L2

Industrial Chemistry – P16CHE4B

1. Remember the basic ideas about industrial wastes-L1
2. Apply the preparation of petrochemical products-L4
3. Understand the process of manufacture of cement-L2
4. Understand the manufacture of paper-L2
5. Apply the manufacture of soaps and detergents-L4
6. Apply the manufacture of perfumes-L4

Selected Topics in Chemistry – P16CHE5A

1. Remember the basics of quantum chemical approach to chemical bonding-L1
2. Understand the mechanism of naming reactions-L2
3. Understand the applications of reagents in organic synthesis-L2
4. Apply the principles of synthetic methodology-L3
5. Understand the applications of polymerization-L2
6. Understand the fundamentals of nuclear chemistry-L2

Physical Chemistry Practical II P16CH42P

1. Remember the various techniques in Physical Chemistry-L1
2. Evaluate the dissociation constant-L5
3. Evaluate the degree of hydrolysis-L5
4. Apply the principles of conductometry-L4
5. Analyse the physical constant for the given compound- L3
6. Evaluate the solubility product-L5