DEPARTMENT OF CHEMISTRY

B. Sc. Chemistry

Goals :

The Department has formulated three broad educational goals for the undergraduate degree programs:

Chemistry knowledge: To provide students with the basic foundation in Chemistry and allied subjects, the interplay of theory and experiment, and to motivate scientific enthusiasm and curiosity and the joy of learning.

Problem solving skills: To provide students with the tools needed to analyse problems with the skills required to succeed in graduate school, the chemical industry or professional school.

Employment and technical skills: To provide the students with technical skills necessary for successful careers in chemistry and related or alternative careers for which a chemistry foundation can be very useful. These include to a breadth of experimental techniques using modern instrumentation and communication skills (oral and written).

Programme Specific Outcomes :

Knowledge outcome:

After completing B.Sc. Chemistry Programme students will be able to:

PO1: Transfer and apply the acquired fundamental knowledge of chemistry, including basic concepts and principles of 1) organic chemistry, Inorganic chemistry, Physical and Analytical Chemistry; (2) analytic techniques and experimental methods for chemistry to study different branches of chemistry;

PO2: Demonstrate the ability to explain the importance of the Periodic Table of the Elements and represent key aspects of it and its role in organizing chemical information.

Skills Outcomes :

Professional Skills

After completing B.Sc. Physics Programme students will be able to:

PO3: apply and demonstrate knowledge of essential facts, concepts, laws, principles and theories related to chemistry;

PO4: demonstrate the learned laboratory skills, enabling them to perform qualitative and quantitative analysis of given samples and able to make conclusions on it;

PO5: set procedure and synthesize simple compounds of commercial importance;

PO6: engage in oral and written scientific communication, and will prove that they can think critically and work independently.

PO6: Communicate effectively using graphical techniques, reports and presentations within a scientific environment.

PO7: to recognize problems in chemical science and make strategies to solve it

PO8: Respond effectively to unfamiliar problems in scientific contexts

PO9: Plan, execute of design experiment, make documentation of it, interpret data at entry level of chemical industry and report the results;

PO10: Integrate and apply these skills to study different branches of chemistry.

Generic Competencies

PO11: The student will acquire knowledge effectively by self-study and work independently, present information in a clear, concise and logical manner and apply appropriate analytical and approximation methods

PO12: The student will learn professionalism, including the ability to work in groups and in society, and apply basic ethical principles.

Program Specific Outcomes

After completing B. Sc. Chemistry, students will be able to

PSO1: Understand the nature and basic concepts of Physical, Organic and Inorganic chemistry;

PSO2: Analyze Organic and inorganic compounds qualitatively and quantitatively;

PSO3: Understand the applications of physical, organic, inorganic and analytical chemistry in pharmaceutical, agriculture and chemical industries;

PSO4: Able to perform experimental procedures as per laboratory manual in the area of physical, Inorganic and organic chemistry;

PSO5: interpretation and synthesis of chemical information and data obtained from chemical and instrumental analysis.

Course Outcomes :

F.Y.B.Sc. Chemistry

Paper-I, Physical and Inorganic Chemistry

At the end of course student will be able to -

CO1: define the terms related to Surface chemistry, Mole concept, redox reaction, chemical bonding, chemical mathematics, states of matter, thermodynamics and atomic structure.

CO2: explain the laws related to thermodynamics, GMV, redox reaction, mole concept, chemical mathematics and chemical bonding

CO3: Discuss formation of chemical bonds, Properties of gases and liquids such as ideal gas behavior, van der Waal's and Critical constant and regarding P-V-T relations, viscosity, surface tension.

CO4: describe steps involved in hybridization, electrical properties of colloids, Theoretical basis of adsorption and its applications in catalysis, liquid crystals and their application

CO5: classify hybridization, catalysis, graphical representation, chemical bonding, adsorption

CO6: apply concept of redox reaction to balance the equation by ion electron method & oxidation number method, hybridization concept to predict geometries of molecule, mole concept to find concentrations.

CO7: derive Vander Waal's equation, atomic radius and energy, Schrodinger's equation, classical wave equation, expression for entropy change for n moles of an ideal gas

CO-8: solve numerical problems related to Van der Waal's equation, Critical constant and regarding P-V-T relations. surface tension, entropy, mole concept, integrations, derivations and for plotting various types of graphs.

Paper-II Organic and Analytical chemistry

By the end of this course students will able to

CO1: describe chemical bonding, structure and reactivity of organic compounds;

CO2: define the terms related to different functional groups of Organic compounds;

CO3: explain the chemical Preparation and reactions of Functional groups;

CO4: explain Stereochemistry of organic compounds;

CO5: interpret R/S Configurations of organic compounds;

CO6: recall the Periodic properties of s and p block elements;

CO7: describe periodic trends in s block elements;

CO8: describe periodic trends in p block elements;

Paper-III, Practical Chemistry

At the end of course student will able **to**

CO1: handle laboratory glassware's, hazardous chemicals safely in laboratory;

CO2: Set up the apparatus properly for the given experiments. Perform all the activities in the laboratory with neatness and cleanness;

CO3: maintain records of quantitative and qualitative analysis; CO4: acquire laboratory skills for -the purpose of collecting, interpreting, analysing, and

reporting (in written form) chemical data;

CO5: explain mole concept and its application in the preparation of normal and molar solutions,
and use of mole concept in quantitative calculations for inorganic analysis;

CO6: perform quantitative analysis using chemical methods of quantitative analysis;

CO7: illustrate physical chemistry principle with the help of experiments;

CO8: Describe and demonstrate data using graphical representations and communicate the report.

S.Y.B.Sc. Chemistry

CH 211: -Paper-I Physical and Analytical Chemistry

After completion of course student will able to

CO1: define order of reaction, molecularity of reaction, half-life period of reaction, quantum yield, florescence, phosphorescence, photo catalysis

Nernst distribution law, partition coefficient, qualitative and quantitative analysis, error, accuracy, precision, significant figure, interfering radicals, common ion effect, solubility product;

CO2: explain the terms and facts related to Chemical kinetics, first order and second order chemical reaction, law of photochemistry, theory of extraction, organic and inorganic qualitative analysis;

CO3: recognize order and molecularity of chemical reaction, apply distribution law for extraction process, apply procedure for removal of interfering ions;

CO4: derive rate equation for first and second order chemical reaction, Nernst distribution law, Lambert's Beers Law, efficiency of extraction;

CO5: describe order of chemical reaction, process of extraction, accuracy of analysis, precision in analysis, methods to minimize errors in analysis;

CO6: distinguish between first and second order chemical reaction, accuracy and precision in analysis, photochemical and thermal reactions;

CO7: calculate order of and molecularity of chemical reaction, absolute and relative error in analysis, standard deviation in analysis;

CO8: solve numerical problems related to Physical and analytical chemistry.

CH 221 Paper –I Physical and Analytical chemistry, Sem. –II

After completion of course student will able to

CO1: define Raoult's law, Henry law, Dalton's law, Ideal and non-ideal solutions, critical solution temperature, Azetropic mixtures, Helmoltz and Gibbs free energy.

CO2: describe Raoult's law and variation of partial vapour pressure with mole fraction, various types of solutions, pH range of indicator of various indicators;

CO3: explain variation of Helmoltz free energy and Gibbs free energy with their parameter, equilibrium conditions for a chemical reaction, variation of boiling point with vapor pressure, best indicator for various types of titrations, equivalence and end point of titration;

CO4: distinguish between ideal and non-ideal solution, miscible and immiscible liquid pairs, primary and secondary standard solution, equivalent weight and molecular weight;

CO5: draw P-N and T-N diagrams for ideal and non-ideal solutions, titrations curve for various types of titrations;

CO6: judge end point of various types of titrations, choose best indicator of various types of titrations;

CO7: calculate pH at various points of titrations, partial vapour pressure at various compositions of solutions, molecular weight by steam distillation;

CO8: solve numerical problems related to syllabus.

CH 212: Paper-II, Organic and Inorganic Chemistry, Sem.-I

After completion of course student will able to

CO1: define terms related to: optical isomerism, conformations of cyclohexane, elimination reaction, substitution reaction, addition reaction and rearrangement reaction, metallurgy and corrosion. Write formulas of organic and inorganic compounds. Write elementary reactions in organic and inorganic chemistry related to syllabus;.

CO2: explain the terms and facts related to: optical activity and isomerism, conformations of cyclohexane, corrosion and metallurgy. Will explain process of: metallurgy of Al, Fe, corrosion. Explain how to avoid the corrosion;

CO3: recognize functional groups and their reactions, addition reaction, nucleophilic substitution, elimination reaction. Will wire and explain mechanism of reactions such as SN1, SN2, E1, E2, Markovinkoves, rule, Satzeff's rule;

CO4: apply reaction mechanism to predict the products of reaction in SN1, SN2, E1, E2, rearrangement reaction. Apply rules of absolute configuration and will predict the configuration at chiral C atom;

CO5: determine absolute configuration at chiral C atom, determine suitable process for purification of particular ore, predict the products of specific organic reactions related to syllabus, predict the stability of different conformations of cyclohexane;

CO6: reasoning for appropriate facts related to optical activity, metallurgy, corrosion, reaction mechanism;

CO7: draw diagrams of various metallurgical processes;

CO8: predict products of various chemical reactions.

CH-222: Paper-II, Organic and Inorganic Chemistry, Sem. II

After completion of course student will able to

CO1: define terms: biomolecules, carbohydrates, proteins, glyosidic bond, peptide bond, optical activity, monosaccharides, polysaccharides, oxidation, reduction, oxidizing agent, reducing agent, acid, bases, solvents, Arrhenius, bronsted, Lewis definitions of acids and bases, d block elements, 18-electron rule, homogeneous catalysis, toxicology, etc.;

CO-2: explain the terms and chemical facts related to: carbohydrates, proteins, oxidation and reduction, d-block elements, carbonyl compounds, acids-basses- solvents and toxic metals in environment;

CO-3: recognize functional groups and their reactions, oxidation reaction, reduction reaction. Will wire and explain mechanism of reactions such as Cannizaro's reaction, birch reduction, reduction by $NaBH_4$ / $LiAlH_4$, reduction of carbonyl group, oxidation by $KMnO_4$, $K_2Cr_2O_7$, hydro-formilation reaction, Wacker's reaction, etc.;

CO-4: apply reaction mechanism and should predict the correct products of reaction in Cannizaro's reaction, Birch reduction, reduction by $NaBH_4$ / $LiAlH_4$, reduction of carbonyl group, oxidation by $KMnO_4$, $K_2Cr_2O_7$, Hydro-formilation reaction, Wacker's reaction, etc.;

CO-5: evaluate the possibility of correct products in oxidation reduction reaction, homogeneous catalysis, correct trends in periodic properties of d-block elements.

CO-6: reasoning for appropriate facts related to acids-bases-solvents, toxicology of heavy metals, homogeneous catalysis, d-block elements, oxidation and reduction reaction of organic compounds, carbohydrates and proteins;

CO-7: write strategy for the synthesis of required products;

CO-8: solve numerical related organic and inorganic chemistry.

CH-223 Chem. Paper-III, Practical Chemistry

After completion of practical course student should be able to

CO1: verify theoretical principles experimentally

CO2: interpret the experimental data and improve analytical skills

CO3: correlate the theory and experiments and understand their importance and Acquire the simple and complex practical skill

CO4: Separation of organic compound and their identification by chemical methods.

CO5: Write balanced equation for all the reactions, they carry in the laboratory.

CO6: Perform organic synthesis and follow the progress of the reaction by using TLC technique.

CO7: Set up the apparatus properly for the given experiments. Perform all the activities in the laboratory with neatness and cleanness

CO8: Perform the complete qualitative chemical analysis of the given inorganic mixture and find out acidic and basic radicals.

T.Y.B. Sc. Chemistry

CH-331 Physical chemistry, Sem.-I

At the end of course students will able to

CO1: define / recall various terms related to electrolytic conductance, molecular spectroscopy, chemical kinetics and phase diagram.

CO2: write correct equation such as Ohms law, equivalent conductance, molar conductance, rate constant of first, second, third order reactions, Kohlarch law, Debye equation, transport number, molar polarization, force constant, energy of rotational, vibrational excitations, etc.

CO3: derive equations for half-life of third order reaction, rate constant of third order reaction, transport number, dipole moment, molar polarization, reduced mass of diatomic molecule, etc.

CO4: explain / describe various terms in electrolytic conductance, molecular spectroscopy, chemical kinetics and phase diagram. To derive relations between / among various terms / quantities in electrolytic conductance, molecular spectroscopy, chemical kinetics and phase diagram

CO5: differentiate between / among the terms / quantities with suitable example such as molecularity and order of reaction, conductance and resistance, equivalent and molar conductance, rotational and vibrational spectra, etc.

CO6: apply his knowledge to explain / interpret spectra of simple diatomic molecules

CO7: describe facts and observations in electrolytic conductance, molecular spectroscopy, chemical kinetics and phase diagram.

CO8: solve numerical related to electrolytic conductance, molecular spectroscopy, chemical kinetics and phase diagram.

CH-341 Physical chemistry, Sem.-II,

At the end of course students will able to

CO1: define / recall various terms related to electrochemistry, nuclear chemistry and application of radioactivity, crystallography and basics of quantum chemistry.

CO2: write / remember the correct equation such as Nernest equation, representation of cell and cell reactions, Bragg equation, half of radioactive materials, etc.

CO3: derive equations for potentials of various types of cells and electrodes, Bragg equation, half of radioactive materials, kinetics of decay of radioactive materials, particle in 1D box, quantum tunneling, etc.

CO4:explain / describe various terms related to electrochemistry, nuclear chemistry and application of radioactivity, crystallography and basics of quantum chemistry.

CO5: derive relations between / among various terms / quantities related to electrochemistry, nuclear chemistry and application of radioactivity, crystallography and basics of quantum chemistry.

CO6: apply his knowledge to explain experimental observation and should able to correlate theory and particle or observed facts.

CO7: describe facts and observations related to electrochemistry, nuclear chemistry and application of radioactivity, crystallography and basics of quantum chemistry.

CO8: solve numerical in in electrolytic conductance, molecular spectroscopy, chemical kinetics and phase diagram.

CH-332 Paper –II Inorganic Chemistry Sem-III

At the end of course students will able to

CO1: Define terms related to molecular orbital theory, coordination chemistry

CO2: Explain mononuclear and hetero nuclear molecules, LCAO principle, primary and secondary valancy, bond order and magnetic properties of molecules

CO3: Distinguish between atomic and molecular orbitals, bonding and antibonding molecular orbitals, different theories of coordination chemistry

CO4: Draw MO energy level diagrams for homo and hetero nuclear diatomic molecules, crystal field splitting energy level dig. for octahedral and tetrahedral complexes

CO5: Apply IUPAC nomenclature rules and writ name of coordinate complexes, predict structure of complexes by using hybridization

CO6: Describe valance bond theory and crystal field theory to different type of complexes

CO7: Calculate effective atomic number and crystal field stabilization energy for various complexes

CO8: solve numerical problems related to syllabus

CH-342 Paper –II Inorganic Chemistry

Sem-IV

At the end of course students will able to

CO1: define lanthanides, actinides, semiconductors, superconductor, close packed structure, l anthanide contraction, super heavy elements, catalyst, catalysis

CO2: describe lanthanide contraction, types of holes in close pack structure

CO3: distinguish between lanthanides and actinides, homogeneous and heterogeneous catalysis, n-type and p-type semiconductor, nuclear fusion and fission

CO4: explain applications of lanthanides and actinides, superconductivity, acetic acid synthesis, properties of heterogeneous catalyst, separation of lanthanides

CO5: explain n(E), and N(E) curves for semiconductors, band structures for sodium metal, hemoglobin, vit. B12

CO6: predict product of nuclear reactions, geometry of ionic solid from radius ratio effect

CO7: derive names of super heavy elements and symbols form IUPAC rules

CO8: solve numerical problems related to syllabus.

CH-347 Practical Paper-I, Physical Chemistry Practical

CO1: Maintaining records of chemical and instrumental analysis.

CO2: Laboratory skills for the purpose of collecting, interpreting, analysing, practical data.

CO3: Laboratory skills for the purpose handling different analytical instruments.

CO4: Interpretation of results of experiment and their correlation with theory.

CO5: Study of reaction kinetics practically.

CO6: Study of conduct metric, potentiometric, colorimeter and pH metric principles.

CO7: Application of conduct metric, potentiometric, colorimetric and pH metric measurement in quantitative analysis.

CO8: Viscosity measurement and its application.

CO9: Refractometric measurement and its application.

CH-348 Practical Paper-II, Inorganic Chemistry Practical

CO1: Maintaining records of quantitative and qualitative analysis.

CO2: Laboratory skills for the purpose of collecting, interpreting, analysing, and reporting (in written form) chemical data.

CO3: Laboratory skills for the purpose handling different equipment's and analytical instruments.

CO4: Identify methods and instruments that can be used qualitative and quantitative analysis.

CO5: Mole concept and its application in the preparation of normal and molar solutions, and use of mole concept in quantitative calculations for inorganic analysis.

CO6: Choice of proper quantitative methods for analysis of samples containing inorganic substances.

CO7: Synthesis and purify coordination compounds.

CO8: Statistical treatment to quantitative data

CO9: Quantitative analysis using instrumental methods of quantitative analysis.

CH-349 Practical Paper-III, Organic Chemistry Practical

CO1: Maintaining records of quantitative and qualitative analysis.

CO2: Laboratory skills for the purpose handling different equipment's and analytical instruments.

CO3: Study of organic reactions their applications.

CO4: Separation of mixture of organic compound and their identification by chemical methods.

CO5: Perform organic synthesis and follow the progress of the reaction by using TLC technique

CO6: Write balanced equation for all the reaction performed in laboratory and write it mechanism.

CO7: Choice of proper quantitative methods for analysis of samples containing organic substances.

CO8: Synthesis and purify organic compounds.

CO9: understanding of reaction mechanism involved.

CO10: physical constant determination.

Programme Outcomes: M. Sc Chemistry

Goals :

The Department has formulated three broad educational goals for the undergraduate degree programs:

After successful completion of two year degree program in chemistry a student should be able to;

Programme Outcomes

PO-1. Determine molecular structure by using UV, IR and NMR.

PO-2. Study of medicinal chemistry for lead compound.

PO-3. mprove the Skill of student in organic research area.

PO-4. Synthesis of Natural products and drugs by using proper mechanisms.

PO-5. Study of Asymmetric synthesis.

PO-6. Determine the aromaticity of different compounds.

PO-7. Solve the reaction mechanisms and assign the final product.

Programme Specific Outcomes

PSO-1. Know the structure and bonding in molecules/ ions and predict the Structure of molecule/ions.

PSO-2. Understand the various type of aliphatic, aromatic, nucleophilic substitution reaction.

PSO-3. Understand and apply principles of Organic Chemistry for

understanding the scientific phenomenon in Reaction mechanisms.

PSO-4. Learn the Familiar name reactions and their reaction mechanisms.

PSO-5. Understand good laboratory practices and safety.

PSO-6. Study of organometallic reactions.

PSO-7. Study of free radical,bycyclic compound, conjugate addition of Enolates and pericyclic reactions.

PSO-8. Study of biological mechanisms using amino acid

Course Outcomes

After completion of these courses students should be able to;

CHP-110 Physical Chemistry

CO-1. Know the Eigen function, Eigen value, operator and postulates of quantum mechanics.

CO-2. Learn two and three dimensional box, mechanics of particle.

CO-3. Understand the adsorption of gases by solid type of isotherms

CO-4. Learn the thermodynamic description of exact, inexact differential and state function.

CO-5. Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure.

CO-6. Know the statistical thermodynamics and various partition functions.

CO-7. Study the steady state approximation michaelis- menten mechanism, lindemann-hinshelwood mechanism, chain reaction, Rate determining stapes and consecutive elementary reactions.

CHI-130 Inorganic Chemistry

CO-1 Determine and Learn about Dipole moment and bond order of The inorganic molecule.

CO-2. Learn about geometry and shape of the molecule.

CO-3. Known the preparation and properties of transition metal carbonyls

CO-4. To understand the 18 electron rule and its application.

CO-5. Find out the point group of inorganic molecules.

CO-6. Learn molecular orbital and its orientation.

CO-7. Learn concept of symmetry elements in molecules.

CHO-150 Organic Chemistry

CO-1: Study the various name reaction with examples.

CO-2: Learn the mechanism of rearrangement reaction, use synthetic reagent of oxidation and reduction for solving the problems.

CO-3: Learn E and Z nomenclature inC,N,S,P containing compound ,Stereo chemical principal, enantiomeric relationship

Semester-II

CHP-210 Physical Chemistry

CO-1: Recognized the Fricke and cerric sulphate Dosimeter.

CO-2: Learn parent-daughter relationship, application of radioactivity, NAA, IDA. Effect of radiation and units of radiation**.**

CO-3: Learn the molecular spectroscopy, R.Raman, Electronic and Mossbauer and its application.

CHI-230 Inorganic Chemistry

CO-1: Understand the mechanism in transition metal complexes, Born Haber cycle to calculate lattices energy.

CO-2: Learn the use of catalyst, radius ratio rule of coordination number,

CO-3: Study the structure of atom, Hunds rule, term symbol, calculation of microstate and selection rule.

CO-4. Understand the metal complexes in biological system.

CHO-250 Pericyclic ,Photochemistry and spectroscopy

CO-1: Study of photochemistry: Carbonyl compounds, alkenes, dienes, polyenes and aromatic compounds.

CO-2:Study photo rearrangement Barton reaction, application of photochemical reaction.

CO-3: Learn Pericyclic reaction: Electro cyclic, Cycloaddition, and Ene Reaction, analysis by correlation diagram, FMO approach and ATS concept.

CO-4: Understand the factors affecting UV-absorption spectra, Interpret IRspectra on basic values of IR-frequencies.

CO-5:Discuss the problem of UV, IR and NMR.

CHP-107 Physical chemistry practical's

CO-1: Calculate molar and normal solution of various concentrations.

CO-2: Determine specific rotations and percentage of to optically active substances by polorimetrically.

CO-3: Study the energy of activation and second order reaction.

CO-4: Study the stability of complex ion and stranded free energy change and equilibrium constant by potentiometry.

CO-5: Find out the acidity, Basicity and PKa Value on pH meter.

CHA-190 Inorganic chemistry practical's

CO-1. Study the gravimetric and volumetric analysis of ores and alloy.

CO-2. Prepare a various inorganic complexes and determine its % purity.

CO-3. Preparation of nonmaterial.

CO-4. To understand the chromatographic techniques.

CHO-107 Organic chemistry practical's

CO-1. Preparation of organic compounds, their purifications and run TLC.

CO-2. Determination of physical constant: Melting point, Boiling point.

CO-3 Different separation techniques.

Semester-III

CHO-350 Organic reaction mechanism

CO-1: Study of carbanion-formation, stability and related name reaction, enemies and its applications.

CO-2: Understand the NGP.

CO-3: Learn the carbines and nitrenes.

CO-4: Study of free radicals: generation of radicals, Nucleophilic electrophilic radicals, inter and intra molecular C-C bond formation via mercuric hydride.

CO-5: Study of oxidative coupling and SNAr reaction.

CHO-351 Spectroscopic methods in structure determination.

CO-1: Study 1H NMR Spectroscopy: Chemical Shift, deshielding, correlation for protons bonded to carbon and other nuclei.

CO-2: Study of 13C NMR spectroscopy: FT- NMR, type of 13C NMR Spectra, proton decoupled , off resonance, APT, INEPT, DEPT, Chemical shift, nuclear and hetero nuclear coupling constant

CO-3: 2D NMR techniques: COSY, homo and hetero nuclear 2D resorts Spectroscopy, NOESY and the applications

CO-4: Study of mass spectrometry: Instrumentation, various methods of ionization, SIMS, FAB, MALDI. Different detectors rules of fragmentations of different functional groups.

CHO-352 Organic stereochemistry

CO-1: Study of stereochemistry of six member ring.

CO-2: Learn the stereochemistry of rings other than six members.

CO-3: Understand fused bridge and Caged rings.

CO-4: Learn resolution of racemic modification, stereochemistry of organic compound using NMR.

CO-5: Determine geometrical isomerism and stereochemistry of olefins.

CHO-353 Photochemistry, Pericyclic reaction and heterocyclic chemistry.

CO-1: Study of photochemistry: Carbonyl compounds, alkenes, dienes, polyenes and aromatic compounds.

CO-2: Study photo rearrangement Barton reaction, application of photochemical reaction.

CO-3: Learn Pericyclic reaction: Electro cyclic, Cycloaddition, and Ene ` Reaction, analysis by correlation diagram, FMO approach and ATS concept.

CO-4: Study of heterocyclic chemistry: Five and six member heterocyclic with one or two hetero atoms.

CO-5: Understand condensed five and six member‟s heterocyclic.

CO-6: Study the synthesis, reactivity, aromatic character and importance of heterocyclic compounds.

Semester-IV

CHO-450 Chemistry of natural product

CO-1: Study structure and stereochemistry of hardwickiic acid, camptothecin and podothyllotoxin.

CO-2: Study the synthesis of taxol, estorne and mefepristone, fredericamycin

CO-3: Learn biogenesis terpenoides, alkaloids and shikimmte pathway.

CHO-451 Advance synthetic organic chemistry.

CO-1: Learn C=C formation reaction, multi compound reaction, ring formation reaction.

CO-2: Study of sharpless azides Cycloaddition, use of boron and silicon in organic synthesis.

CHO-452 Carbohydrate and chiral approach, chiral drugs and medicinal chemistry.

CO-1. Study of carbohydrates: Introduction of sugar, structure of triose tetrosa, panctose, hexoes, stereochemistry of glucose.

CO-2: Understand the chiral approach, concept of chiral templates, and utilization of the basic concept for reterosynthetic strategy.

CO-3: Study of chiral drug.

CO-4: Learn medicinal chemistry, the action and discovery.

CO-5: Study the structure activity and drug targets.

CO-6: Study of antimicrobial drugs, antibacterial, antifungal, antiviral, antimalerial etc.

CHO-453 Designing organic synthesis and asymmetric synthesis.

CO-1: Study the design of organic synthesis, protection deprotation of hydroxyl, amino carboxyl, ketones and aldehyde.

CO-2: Learn retrosynthesis.

CO-3: Understand the principle and application of asymmetric synthesis.

CO-4: Study of cram‟s rule, felkin-Anh rule, Cram‟s chelate model asymmetric synthesis using chiral reagent.

CHO-347 Single stage preparations

CO-1: Spectral analysis best on instrumental techniques.

CO-2 :Preparation of organic compounds, their purifications and run TLC.

CO-3: Determination of physical constant: Melting point, Boiling point.

CO-4: Different separation techniques.

CHO-447 Two stage preparation

CO-1: Spectral analysis best on instrumental techniques

CO-2: Preparation of organic compounds, their purifications and run TLC.

CO-3: Determination of physical constant: Melting point, Boiling point.

CO-4: Different separation techniques.

Department of Chemistry
M.Sc. (Chemistry) 4th Semester
Subject : Inorganic Special

CO-1. The objective of the course is to appraise the students about the organometallic Chemistry.

CO-2. To learn about the 18 e rule and its violation.

CO-3. To identify the basic concept, terms, and important events in the development of organometallic chemistry.

CO-4. To learn methods, including spectroscopy techniques, used to determine the structure of organometallic complexes and to probe reaction mechanism.

CO-5. To develop an appreciation for the scope, diversity, and application of organometallic chemistry.

CO-6. To learn about the common organometallic reactions and to be able to draw reasonable reaction mechanisms.

M.Sc. (Chemistry) 3rd Semester

Subject : Physical Special

CO-1. Objectives for Nuclear Chemistry.

CO-2. Defineradioactivity and distinguish between natural and artificial. .

CO-3. Radioactive emissions: alpha, beta, gamma.

CO-4 Describe what each emission is composed of and how they differ from each other with respect to mass , charge ,penetrating power, and ionizing power.

CO-5. Tell what happens to an element that under goes alpha decay , beta decay, or gamma d ecay.

CO-6. Discuss the process used to separate the three types of radioactive emissions.

CO-7. Define and explain mass defect.

CO-8. Define binding energy.

CO-9. Explain the basic difference between a fission reaction and a fusion reaction.

CO-10. Discuss the difference between a fission reaction in a nuclear bomb and the one in a nuclear fission reactor.

CO-11 Give the details of a fusion reaction.

CO-12.List the three places fusion occurs : fusion reactors ,the sun , hydrogen bomb.

M.Sc. (Chemistry) 4 Semester

Subject : Physical Special

CO-1. To understand the basic concepts elecroanalytical chemistry

CO-2. To understand the terms AC and DC Polarography

CO-3. To understand the working of different types of electrodes

CO-4. To understand the concepts of voltametery amperometery

CO-5. To understand the working and reaction of electrochemical cells

CO-6. To understand the concept of quantum mechanics.

CO-7. To study kinetics of reaction in solution and influence of pressure, ionic strength, solvent on reaction rates.

CO-8. To learn about kinetics of catalytic reactions i.e. acid-base catalysis, heterogeneous catalysis and enzyme catalysis.

CO-9. To explain the cocept of photochemistry and study Beer-Lambert law.

CO-10 To describe and explain photochemical and photophysical processes using Jablonski diagramand their quantum yield expressions.