

Programme outcomes: B Sc Chemistry

- PO-1. Understand, solve and explain the major concepts in different disciplines of chemistry.
- PO-2. Solve the problems and draw conclusions and relate to other topics.
- PO-3. Analyze the chemical reactions by critical thinking and record them.
- PO-4. Create an awareness regarding the impact of chemistry in society specially the environment.
- PO-5. Find out the green route for chemistry.
- PO-6. To inculcate scientific attitudes in and out the science community.
- PO-7. To understand the use of scientific instruments and softwares.

Programme Specific Outcomes: B Sc Chemistry

- SPO-1. Gains complete knowledge about all fundamental aspects of all the elements of chemistry
- SPO-2. Understands the background of chemical reactions, complex chemical structures, instrumental method of chemical analysis, molecular rearrangements and separation techniques.
- SPO-3. Appreciates 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.
- SPO-4. Gathers attention about the physical aspects of atomic structure, dual behavior, reaction pathways with respect to time, various energy transformations, phase rule, significance of electrochemistry, molecular segregation using their symmetry.
- SPO-5. Learns about the potential uses of analytical, industrial chemistry and medicinal chemistry .

**COURSE OUTCOME**

B.Sc I

PAPER-I

- CO1 – To study atomic structure and periodic properties to explain the chemical behavior.
- CO2- To discuss chemical bonding ,valence bond theory and shape of some inorganic molecules.
- CO3 - To study chemical bonding and ionic structures.
- CO4 – Comparative study and features of s block & p block elements.

CO5 – To study chemical properties of noble gases and inorganic chemical analysis.

#### PAPER-II

CO6- To study electronic structure and bonding of organic reactions.

CO7 – To discuss stereochemistry of organic compounds

CO8 – To study aliphatic and aromatic ring compounds of cycloalkanes.

CO9 – Discuss the mechanism of alkenes , dienes, alkynes.

CO10- Study the Mechanism and stereochemistry of Alkyl halides and Aryl Halides.

#### PAPER- III

CO11- To study the mathematical concept ,peremutation & combination & probability.

CO12- Discuss the molecular velocities.

CO13- To study the liquid state and colligative properties.

CO14- Discuss liquid crystals & colloidal state.

CO15 - Study the chemical kinetics Arrhenius theory & catalysis.

#### B.Sc -II

##### PAPER-I

CO1- Discuss the Chemistry of elements of first transition series

CO2- Discuss the Chemistry of elements of second & third transition series.

CO3- Study the oxidation & reduction and coordination compounds.

CO4 - Study of Chemistry of lanthanide elements.

CO5- Study the Acid and bases.

##### PAPER-II

CO6 - To study alcohols ,phenols & ethers.

CO7- Study of aldehydes & ketones.

CO8- Discuss the carboxylic acid and its derivatives.

CO9- Discuss the organic compounds of nitrogen.



CO10- Study of heterocyclic compounds.

PAPER-III

CO11- To study fundamentals of thermodynamic system and surroundings.

CO12- To study change in entropy of different processes through thermodynamics.

CO13 - To discuss phase rule , phase component & Nernst distribution law.

CO14 - To study electrochemistry and its various laws.

CO15- To study about electrochemical cell & various redox reactions .

B.Sc -III

PAPER-I

CO1- To study Metal-ligand bonding in transition metal complexes.

CO2- To discuss Magnetic properties of transition metal complexes.

CO3- To study organometallic compounds.

CO4 - To Study Bioinorganic chemistry Essential and trace elements in biological processes

CO5 - Study of Hard and soft acids and bases

PAPER-II

CO6 –To study organometallic & organolithium compounds.

CO7- To study biomolecules classification and their constituents.

CO8- To study synthetic polymers and synthetic dyes.

CO9- To Discuss mass and UV-visible spectroscopy

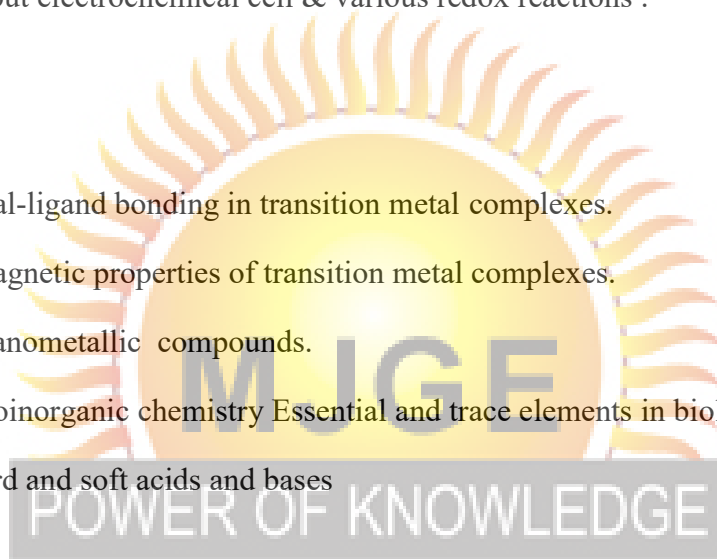
CO10- To study NMR spectroscopy.

PAPER-III

CO11- To study Quantum Mechanics.

CO12- To Discuss Quantum mechanical approach of molecular orbit theory.

CO13- To study electromagnetic radiations and raman spectra.



CO14- To study Electronic Spectra of diatomic molecule and : Interaction of radiation with matter

CO15- To study principles and application of thermodynamics.

**PROGRAMME: M.Sc. CHEMISTRY PROGRAMME OUTCOMES**

At the end of the programme the students will be able to:

PO1: Acquire knowledge, abilities and insight in well-defined area of research within Chemistry.

PO2: Work as a Chemistry professional, and qualify for training as scientific researcher.

PO3: Develop knowledge of scientific theories and methods, gain experience in working independently with scientific questions and clearly express their opinion on academic issues.

PO4: Develop communication skills, both written and oral, for specialized and non-specialized audiences.

PO5: Acquire the skills of planning and conducting advanced chemical experiments and applying structural-chemical characterization techniques.

PO6: Examine specific phenomena theoretically and/or experimentally, contribute to the generation of new scientific insights or to the innovation of new applications of research in Chemistry.

**PROGRAMME: M.Sc. CHEMISTRY SPECIFIC PROGRAMME OUTCOMES**

PSO1: Have sound knowledge about the fundamentals and applications of chemical and scientific theories

PSO2: Every branch of Science and Technology is related to Chemistry

PSO3: Easily assess the properties of all elements discovered.

PSO4: Apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.

PSO5: Will become familiar with the different branches of chemistry like analytical, organic, inorganic, physical, environmental, polymer and biochemistry

PSO6: Helps in understanding the causes of environmental pollution and can open up new methods for environmental pollution control.

PSO7: Develops analytical skills and problem solving skills requiring application of chemical principles.

PSO8 : Acquires the ability to synthesize, separate and characterize compounds using laboratory.

## **M.Sc Chemistry**

The Scientific study of the structure of substances and what happen to them in different conditions or when mixed with each other.

### **First Semester**

#### **Paper I**

CO1 - Study of symmetry and group theory in chemistry.

CO2 - Discussions on metal ligand bonding and metal complexes.

CO3 – Study of metal ligand equilibria in solution and study of isopoly acid and heteropoly acid.

CO4 – Study on metal clusters, chains and rings.

#### **Paper II**

CO5 – To study nature of bonding in organic molecules and aromaticity.

CO6 – Knowledge about conformational analysis and stereochemistry.

CO7 – Study of reaction intermediates and elimination reactions.

CO8 – To study about pericyclic reactions.

#### **Paper III**

CO9 – Understanding some mathematical concept in quantum chemistry.

CO10 – Study of basics of thermodynamics.

CO11 - Knowledge about electrochemistry of various solutions.

CO12 – Study of various rate laws through chemical dynamics.

#### **Paper IV**

CO13 – Study of unifying principles of spectroscopy.

CO14 – Detailed study on microwave spectroscopy.

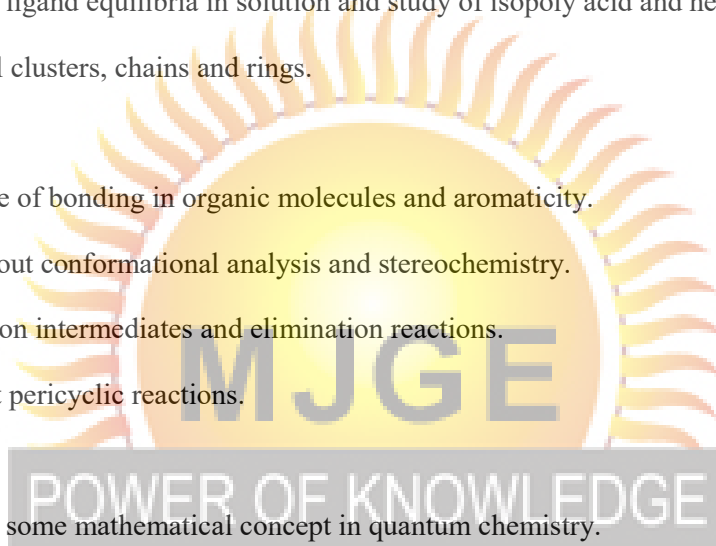
CO15 – Discussions on scattering spectroscopy.

CO16 – Study of theories, instrumentation and applications of Raman spectroscopy.

### **Second Semester**

#### **Paper I**

CO17 – Study of reaction mechanism of transition metal complexes.



CO18 - Discussion on electronic spectra and magnetic properties of transition metal complexes.

CO19 – Study on transition metal complexes and transition metal compounds with bond to hydrogen.

CO20 – Discussions on alkyl and aryl of transition metals, compounds of transition metal – carbon multiple bonds and fluxional organometallic compounds.

## **Paper II**

CO21 – To study about aliphatic nucleophilic substitution and aromatic nucleophilic substitution reactions.

CO22 – To study aliphatic electrophilic substitution and aromatic electrophilic substitution mechanisms.

CO23 - Mechanistic and stereochemical aspects of addition reactions i.e.addition to carbon-carbon multiple bonds.

CO24 – Study on addition to carbon-hetero multiple bonds.

## **Paper III**

CO25 – Application of matrices in quantum chemistry, angular momentum in quantum chemistry and approximate methods.

CO26 – Study on statistical thermodynamics.

CO27 – Discussions on electrochemistry.

CO28 – Study on chemical dynamics.

## **Paper IV**

CO29 – Study on ultraviolet and visible spectroscopy.

CO30 – Explanation about Infrared spectroscopy.

CO31 – Detailed study on mass spectrometry.

CO32 – Study on nuclear resonance spectrophotometry.

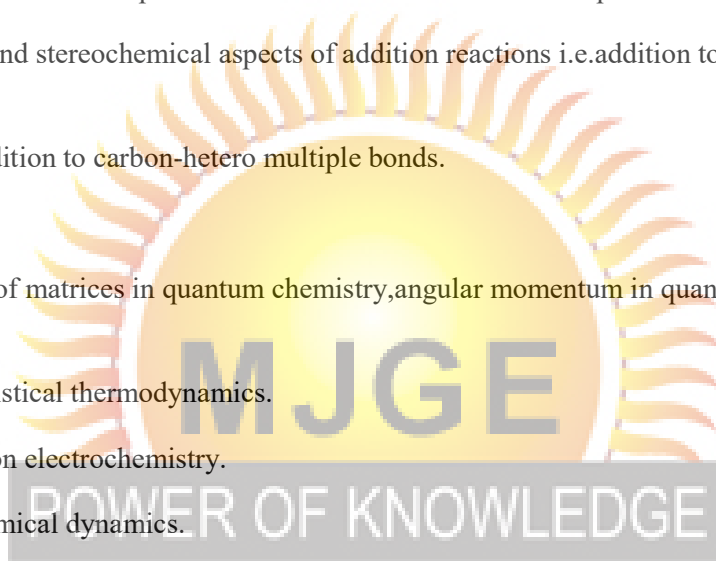
## **Third Semester**

### **Paper I**

CO33 – Study about electron spin resonance spectroscopy and nuclear quadruple resonance spectroscopy.

CO34 – Discussions on photoelectron spectroscopy and photoacoustic spectroscopy.

CO35 – Explanations on photochemical reactions, determination of reaction mechanism and study on some miscellaneous photochemical reactions.



CO36 – A descriptive study on organocatalysis.

### **Paper II**

CO37 – Conceptual study on bioenergetics, electron transfer in biology and transport and storage of dioxygen.

CO38 – Study on metalloenzymes and enzyme models.

CO39 – Study about enzymes, co-enzyme chemistry and biotechnological applications of enzymes.

CO40 – Discussions on biopolymer interactions, thermodynamics of biopolymer solutions and study on cell membrane and transport of ions.

### **Paper III**

CO41 – Study of acids, bases, electrophiles, nucleophiles and catalysis.

CO42 – Discussion on micelles and adsorption.

CO43 – Study on solid state chemistry

CO44 – Explanations on Macromolecules.

### **Paper IV**

CO45 – Knowing about sample preparation, digestion and statistical analysis.

CO46 – Discussion on different separation techniques in analytical chemistry.

CO47 – Study about thermal and automated methods.

CO48 – Study about electrochemistry.

### **Fourth Semester**

#### **Paper I**

CO49 – Knowledge on advanced chromatography including ion chromatography, size exclusion chromatography etc.

CO50 – Study of X – Ray and photon induced spectroscopy.

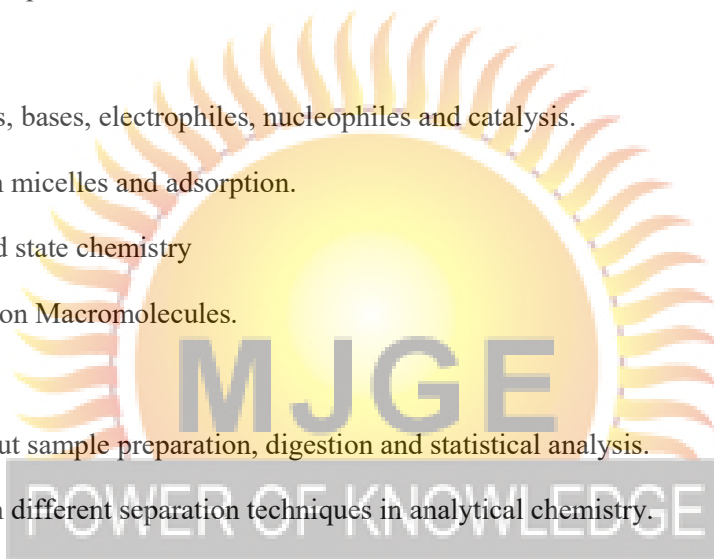
CO51 – Study about atomic emission spectroscopy.

CO52 – Discussions on atomic absorption spectroscopy and hyphenated techniques.

#### **Paper II**

CO53 – Study about terpenoids and carotenoids, alkaloids.

CO54 – Study of steroids and plant pigments.



CO55 – A detailed study on drug design including various theories and discussions on pharmacokinetics and pharmacodynamics.

CO56 – Study on antineoplastic agents, antibiotics, antimalarials.

### **Paper III**

CO57 – Study on non equilibrium thermodynamics.

CO58 – Discussion on material chemistry.

CO59 – Study on supramolecular chemistry.

CO60 – Study on nuclear and radiochemistry, nuclear theory, nuclear fission, nuclear energy and applied radiochemistry.

### **Paper IV**

CO61 – Discussions on air pollution monitoring and analysis.

CO62 – Study of soil and water pollution.

CO63 – Detailed study on food chemistry involving food additives, food adulteration etc.

CO64 – Description about cosmetics, clinical and drug analysis.

