Program Outcomes, Program Specific Outcomes & Course Outcomes

B.Sc. Chemistry

POs:

At the time of graduation, Students would be able to

PO1. Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

PSOs:

Upon completion of the programme successfully, the learners would be able to-

1.Understand the scope, methodology and application of modem chemistry.

2.Apply theoretical and practical concepts of instruments that are commonly used-in most chemistry field.

3.Plan and conduct scientific experiments and record the results of such experiments.

4.Get acquainted with safety of chemicals, transfer, and measurements of chemicals, preparation of solutions, and using physical properties to identity compounds and chemical reactions.

5.Describe how chemistry is useful to solve social, economic and environmental problem and issues facing our society in energy, medicine, and health.

B.Sc. I sem-I

COs: (Theory)

By the end of this course, the students would be able to:

1. Solve the conceptual questions using the knowledge gained by studying periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.

2. Apply concepts of acids and bases as well as non-aqueous solvents and their industrial usage.

3. Compare different reaction intermediates, functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.

4. Choose correct synthetic approach to prepare derivatives of industrially important molecules

5. Solve different numerical problem of varying difficulty associated with gaseous and liquid state.

6. Apply the concepts from advanced mathematics to solve the derivation of different chemical formulae.

COs (Practical)

At the end of Lab/Practical course, students would be able to

1. Synthesise different types of organic compounds.

2. Perform the process of filtration, crystallization, melting point, waste management.

3. Understand the effect of orientation effect of a group

4. Skilfully determine the surface tension, viscosity of liquid.

5. Predict the endothermic or exothermic process from heat of solution of a salt.

COs (SEM/Internal)

By the end of this module, the students will be able to:

1. Create models associated with periodic table

2. Associate reaction intermediates and functional group chemistry with different types of reaction mechanisms.

3. Solve numerical problem associated with gaseous and liquid state.

B.Sc. I (Sem-II)

COs (Theory)

By the end of this course, the students would be able to:

1. apply the knowledge gained by studying types of bonding, solvation, hybridization and molecular geometries.

2. Draw the correct molecular structures, bond order and bond length.

3. synthesize commercially important compounds of varying carbon backbone.

4. Choose correct synthetic approach to prepare derivatives of industrially important molecules.

5. Solve numerical problems related to crystalline state.

6. Acquire skills to use chemical kinetics to develop mechanism of chemical reactions.

COs (Practical)

At the end of Lab/Practical course, students would be able to –

1. Analyse the given organic compound qualitatively by different tests.

2. Prepare the derivative of the provided substance.

3. Illustrate the practical skills in volumetric analysis.

4. Differentiate types of titrations e.g. acid-base, redox, etc.

5. Comprehend the kinetics of reactions and interpret the experimental data.

6. Calculate, communicate and analyse the result.

COs: (SEM/Internal)

By the end of this module, the students will be able to:

1. Create models associated with molecular geometries, hybridization, MO diagrams.

2. Develop synthetic routes for halobenzenes and benzyl halides.

3. Solve numerical problems associated with crystalline state and chemical kinetics.

B.Sc. II Sem-III

COs: (Theory)

By the end of this course, the students will be able to:

1. apply concepts of volumetric and gravimetric analysis

2. use commercial method for extraction of elements and acquaintance of transition series elements.

3. compare functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.

4. select correct synthetic approach to prepare derivatives of industrially important molecules

5. solve different numerical problem of varying difficulty associated with thermodynamics, phase equilibrium and colligative properties.

6. apply the concepts from advanced mathematics to solve the derivation of different chemical formulae.

COs: (Practical)

At the end of Lab/Practical course, students will be able to –

1. estimate different metals using a variety of methods.

2. skillfully prepare solution of different concentrations.

3. determine molecular weight of an organic molecule.

4. determine thermodynamic parameters associated with a physical phenomenon and state.

5. use methods of determination of partition coefficient.

COs: (SEM/Internal)

By the end of this module, the students will be able to:

1. Create models associated with stereochemistry

2. Use aldehydes, ketones and carboxylic acids as starting material for different commercially important molecules.

3. Solve numerical problem associated with thermodynamics and colligative properties

B.Sc. II Sem-IV

COs: (Theory)

By the end of this course, the students will be able to:

1. Application of methods of synthesis of soaps and detergents.

2. Commercial method for extraction of elements and acquaintance of transition series elements.

3. Compare functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.

4. Choose correct synthetic approach to prepare derivatives of industrially important molecules.

5. Solve different numerical problem of varying difficulty associated with electrochemistry and photochemistry.

6. Apply the concepts of UV and IR spectroscopy for structure elucidation.

COs: (Practical)

At the end of Lab/Practical course, students will be able to –

1. prepare soap from available oil or fat and determine its different parameters.

2. extract different constituents of milk.

3. prepare glucose from cane sugar.

4. use advanced instruments like pH-meter, potentiometer, conductometer, etc.

5. determine electrode potential of a metal.

6. determine pH of given soil sample.

COs: (SEM/Internal)

By the end of this module, the students will be able to:

1. Create charts and posters for nitrogen-based compounds and groups

2. Use of carbonyl compounds for starting material for different commercially important molecules

3. Solve numerical problem associated with thermodynamics and colligative properties

B. Sc. III Sem –V

COs: Students will able to

1. Understand Werners formulation of complexes and identify the type of valencies.

2. Get importance of electronic spectra of transition series elements

3. Solve numerical on crystal field theory

4. Have the knowledge of various drugs their synthesis and application

5. Knowledge about various pesticides and herbicides

6. Acquaint about mode of action of drugs on various diseases

7. Understand different terms Lamberts law Beers law, Quantum yield, Fluorescence, phosphorescence

8. Derive expression for rotational spectra, vibrational spectra, band spectra

9. Solve numerical on rotational and vibrational spectroscopy

10. Know idea for preparation of complexes like tetramine Cu(II) sulphate, hexamine Ni(II) chloride, Prussian blue, Sodium thiosulphate

11. Perform titration and estimation by conductometry, potentiometric, polarimetrically.

B. Sc. III Sem –VI

COs:

Students will able to-

1. Knowledge of different reaction SN^1 and SN^2 substitution reaction.

2. Understand various concept of beers law verification, expressions Understand chromatography types

3. Know the role Na, K, Ca, Mg haemoglobin myoglobin in biologicalsystem

4. Understand different spectroscopic terms In electronicspectroscopy chromophore, auxochrome bathochromic shift, hypochromic shift

5. Know application of electronic spectra for dienes unsaturated aldehydesand ketones, aromatic compound

6. Understand concept of NMR, Mass spectroscopy and their applicationin structure determination

7. Determination pH of solution by using hydrogen, glass, quinhydroneelectrode

8. Understand different terms of nuclear chemistry Shell model, liquiddrop model, meson theory

9. Knowledge about nuclear fusion and fission, Q value

10. Know the application of radioisotope in industries agriculture andmedicine

11. Know the idea to perform various titration formaldehyde, ascorbicacid, phenol, aniline, urea

12. Develop skill-based practicals like separation of mixtures of dyes

13. To develop titration skill for conductometry, potentiometry, pH metry.Verify lamberts beers law by using colorimeter