Programme Outcomes, Program Specific Outcomes, Course Outcomes (2018 to 2023)

Mechanism of Communication

The following mechanism is followed by the institution to communicate the learning outcomes to the teachers and students.

1. Hard Copy of syllabi and Learning Outcomes are available in the departments for ready reference to the teachers and students.
2. Learning Outcomes of the Programmes are displayed on the notice boards of career counselling cell.
3. The importance of the learning outcomes has been communicated to the teachers in departmental meetings.
4. The students are also made aware of the same through Tutorial classes.

Program Outcomes

Programme: Bachelor of Science (B.Sc.)

Bachelor of Science (B.Sc.) offers theoretical as well as practical knowledge about different subject areas. These subject areas include Physics, Chemistry, Mathematics and Botany, Zoology and Biochemistry.

This programme course is most beneficial for students who have a strong interest and background in Science and Mathematics. The course is also beneficial for students who wish to pursue multi and inter-disciplinary science careers in future. Following are the various programme outcomes:

1. This course forms the basis of science like physics, chemistry, biology, zoology and mathematics.
2. After the completion of this course students have the option to go for higher studies i.e.M.Sc. and then do research work in their respective fields.
3. It helps to develop scientific temper and thus can prove to be more beneficial for the society as the scientific developments can make a nation or society to grow at a rapid pace.
4. Students after this course have the option to join Indian Civil Services UPSC CSE as IAS,IFS, IPS SSC, andPCSetc.after passing competitive exams.

5. This course also offers opportunities for serving in Indian Army, Indian Navy, Indian Air Force as officers.
6. Science graduates can go to serve in industries or may opt for establishing their own industrial unit.
7. After the completion of the B.Sc. degree there are various other options available for the science students. Often, in some reputed universities or colleges in India the students are recruited directly by big MNC's in related fields.
8. After higher studies, students can join as scientist/Assistant professor/ Ph.D. and can even look for professional job oriented courses.

dents can also get jobs in Marketing, Business& other technical fields. Science graduates alsobe recruited in the banks atProbationary and clerical cadre posts. They can opt for eaching jobs in Govt. &private schools and various coaching centres.

Program Specific Outcomes

Programme: B.Sc. Medical

1. B.Sc. Medical students acquire knowledge in the subjects of Botany, Zoology, Chemistry and Biochemistry.
2. Medical Students will become able to define and explain major concepts in the biological sciences.
3. They are able to correctly use biological and chemical instrumentation and proper laboratory techniques.

Students will be efficient to communicate biological and chemical knowledge in oral and itten form.

dents will be capable to recognize the relationship between structure and function at all evels: molecular and cellular.

6. They can opt for higher studies in Botany, Zoology, Chemistry and Biochemistry.

Programme: B.Sc. Non-Medical

1. B.Sc. Non-Medical students acquire good knowledge in the subjects of Chemistry, Physics, and Mathematics.
2. A non-medical student will be able to use the scientific knowledge of the core physics principles in Mechanics, Electromagnetism, Modern Physics, and Optics.
3. They are able to acquire the basic manipulative skills in algebra, geometry, trigonometry, and calculus.
4. The students will acquire knowledge of appropriate level of technology for use in: a) experimental design and implementation, b) analysis of experimental data, and c) numerical l mathematical methods in problem solutions.

students will be able to apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them.

6. They can investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods.

   The student will acquire knowledge of Chemical Thermodynamics, Kinetics, Electrochemistry, Atomic Structure, Inorganic and Organic Chemistry, Spectroscopy and Skills in Industrial Chemistry.

8. They can join as a scientist in reputed research institutes having a great scope for growth and development. He can prove to be an asset for the society by producing something more innovative.
9. They can join higher studies in Mathematics, Chemistry, Physics.

Post Graduate Department of Chemistry

Program Outcomes

Programme: B.Sc. with Chemistry

The chemistry course curriculum for the undergraduate classes includes the main branches of chemistry: organic, inorganic and physical chemistry. After the completion of B. Sc. Course with Chemistry, the students are able:

1. To understand the concepts of Chemistry and their applications in daily life.
2. To acquire goodfoundation in chemistry that stresses scientific reasoning and Analytical problem solving with a molecular perspective.
3. To understand the concepts and significance of various physical phenomena.

   To pursue research and various post graduate programs.

   To achieve the skills required to succeed in, the chemical industries and professional schools.

6. To get exposures to the in depth knowledge of experimental techniques using modern instrumentation.
7. To understand the importance and natureof the various existing elements on earth and their role in our daily life.
8. To understand nomenclature, stereochemistry, reactivity of compounds and mechanism of chemical reactions of organic compounds.
9. To understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems.

10. To learn the laboratory skills needed to work safely and interpret chemical research activities.
11. To improve the oral communication skills of the graduates through various seminars, discussions and lectures.

Course Specific Outcomes of B.Sc.General Chemistry

SEMESTER	COURSE	LEARNING OUTCOMES: By the End of the Course the Student w
& II	Inorganic Chemistry	Understand the atomic structure, behavior and interactions betwee The Periodic Properties Chemical Bonding Chemistry of Noble Gases, S Block Elements, P Block Elements
& II	Organic Chemistry	Understand the Structure & bonding of organic compounds and r Stereochemistry of organic compounds Nomenclature, Synthesis, Physical and Chemical properties of alk and about aromaticity
I & II	Physical Chemistry	Learn aboutGaseous States, Colloidal State,Solutions, dilute solut Mathematical concepts and evaluation of analytical data. Kinetic aspects of chemical reactions. Thermodynamics
& II	Laboratory Practical Chemistry	Qualitative Inorganic analysis and quantitative volumetric analysi Standardisation of solutions and determination of Refractive Inde
&IV	Inorganic Chemistry	Learn about Chemistry of elements of First, second and third Trai Chemistry of coordination compounds. Concepts of Acids and Bases, oxidation and reduction. Reaction in non- aqueous solvents.
III &IV	Physical Chemistry	Learn about Chemical Equilibrium, Principles of Phase Equilibriu Electrochemistry and Liquid State.
III &IV	Laboratory Practical Chemistry	Volumetric, gravimetric analysis and organic analysis Column Chromatography Extraction of Caffeine from Tea Leaves. Heat of Neutralisation and Effect of Temperature on Solubility.
& VI	Inorganic Chemistry	Learn about Metal-Ligand bonding and Thermodynamic and Kin

SEMESTER	COURSE	LEARNING OUTCOMES: By the End of the Course the Student w
		Bioinorganic Chemistry and Organometallic chemistry. Hard and Soft acids and bases, Bonding in Silicones and Phospha Electronic spectra and Magnetic properties of Transition metal co
VI	Organic Chemistry	Understand the concept, principleand applications of UV, IR and elucidation of simple organic compounds. Learn about structure of carbohydrates, amino acids, Peptides and Organic Synthesis via organometallic compounds and Enolates.
V & VI	Physical Chemistry	Understand the fundamental concepts of Elementary Quantum M Rotational, vibrational and Electronic Spectrum.
V & VI	Laboratory Practical Chemistry	Synthesis of organic and co-ordination compounds. Some Experiments on Conductometry and on distribution Law.

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Course outcomes

Department of Chemistry(2018-2023)

Learning objectives and Outcomes B.Sc.-1 (Semester –1)

Subject : Inorganic Chemistry Paper-I

1. To understand the shapes of different orbitals.
2. To understand different principles for filling electrons.
3. To understand how to draw energy diagrams.
4. To understand how to calculate bond order.
5. To understand how to calculate lattice energy through Born Haber Cycle.

Subject : Physical Chemistry Paper-II

1. Students will be able to describe the concept of pressure from a macroscopic and microscopic perspective.
2. Students will describe the relationship between partial pressures and total pressure as described in Dalton's Law of partial pressure.
3. Students will be able to explain the quantitative relationship between T,V,n & P as described by kinetic molecular theory.
4. The students will be able to compare and contrast the chemical behaviour and physical properties of common substances.
5. The students will be able to classify matter by its state and bonding behaviour using the periodic table as a reference.

Subject : Organic Chemistry Paper – III (semester-2)

1. To understand the core concepts of organic chemistry i.e. resonance, hyperconjugation, inductive effect etc. and their application.

2. To study about the isomerism and types of isomerism.

3. To understand optical isomerism, geometric isomerism and conformational isomerism.

4. To acquire basic knowledge of reactive intermediates and mechanism of organic reactions.

5. To study about nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes.

Subject : Analytical Chemistry Paper IV

1. Recognize and draw constitutional isomers,stereoisomers, including enantiomers and diasteromers, racemic mixture and meso compounds .

2. the fundamental principles of organic chemistry and predict outcomes and derive mechanism s types of organic reactions.

3. Understand various types of reactive intermediates and factors affecting their stability .

4. Understand the nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes.

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Course outcomes

Department of Chemistry(2018-2023)

Learning objectives and Outcomes B.Sc.-2 (Semester –3)

ubject : Inorganic Chemistry Paper-V

1. The purpose of study semiconductor devices and materials is to familiarize students with P-N junction and transistors.

2. The students will be able to understand general trends in the chemistry behind p-block elements.

3. The students will be able to know the important compounds and important applications of compounds of boron and carbon.

4. The students will understand the biological significance of sodium ,potassium, magnesium and calcium.

The students will be able to explain large scale preparation and properties of industrially viz., cement, ster of paris, sodium hydroxide, sodium carbonate and bicarbonate etc.

. The students will be able to describe the salient features of alkali and alkaline earth metals.

ubject : Physical Chemistry Paper - VI

1. To describe a reaction rate in terms of a change in concentration divided by a change in time (at constant volume) and a general form of a (differential) rate law.

2. To write a general form of the rate law for any chemical reaction and define the order of a chemical reaction.

3. To determine integrated rate expression for zero order, first order, second and third order reaction nd their respective half life period expressions.

4. To study the various factors which affect the rate of a chemical reaction such as concentration ,temperature, solvent, catalyst etc. And theories of chemical kinectics.

5. acquire basic knowledge of electrode conduction.

6. determine the solubility of sparingly soluble salts.

7. explain the various methods for the determination of transport number.

bject-Organic Chemistry Paper – VII (semester – 4)

identify addition reactions for alkenes and alkynes.

o understand the nature of double and triple bonds for addition reactions.

3. To identify the difference between dienes and alkenes.

4. To understand the mechanism of attack of electrophiles and nucleophiles.

5. To understand the preparation methods for alkenes, alkynes, alkyl halides.

Subject – Analitical Chemistry Paper - VIII

Recognize the basic practical skills for the synthesis of alkenes, alkynes, alkyl halides.

ble to predict the reactivity of organic compound from its structure.

le to understand the rules for naming different organic compounds

4. Able to recognize mechanism for given chemical reaction.

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Course outcomes

Department of Chemistry(2018-2019)

Learning objectives and Outcomes B.Sc.-3 (Semester –5)

ject : Inorganic Chemistry Paper - IX

o understand the concepts of metal ligand bonding in transition complex compounds.

2. To understand the thermodynamics and kinetic aspects of metal complexes.

3. To understand the nomenclature, classification, properties and preparations of coordination compounds.

4. To understand the chemistry of organometalic compounds, homogenous hydrogenation and carbonyls.

5. To understand the bioinorganic chemistry of hemoglobin, myoglobin Learning etc.

ject- Physical Chemistry Paper X

understand the concept of black body radiations.

2. To understand the concept of wave functions.

3. To understand different properties of molecular structure.

4. To understand the basic features of spectroscopy.

5. To understand the Harmonic Osillator.

Subject: Organic chemistry Pape - XI

1. In order to study the NMR spectroscopy to understand the important role of nuclear magnetic resonance spectroscopy in the study of the structures of organic compounds

2. To develop an understanding of the significance of the number, positions, intensitiesand splitting of signals in nuclear magnetic resonance spectra

3. To be able to assign structures to simple molecules on the basis of nuclear magnetic resonance ctra.

der to study carbohydrates will develop the skills to recognize and draw particular carbohydrate es.

5. To know general structural elementsof cyclic monosaccharide and disaccharidesand their implications for structure and function.

Subject-Analytical Chemistry Paper - XII

1. To understand the role of metal ions in biological system.

2. To understand the role of metal ions in oxygen transport.

To understand the concept of acid and bases.

derstand the uses of inorganic polymers.

understand the nature of bonding of different metals with carbon atom.

Subject : Physical chemistry Paper –X III (Semester – 6)

1. To understand the transitions through electronic spectroscopy

2. To understand the term symbols of diatomic molecules

3. To understand the different type of vapour pressure curves

4. To understand the ideal and non ideal solutions and their behaviour

understand the thermodynamics of one and two component system.

Subject: Organic chemistry Paper –IVX

main aim of Heterocyclic compounds study is to develop novel, efficient, convenient, selective onmentally benign synthetic methods in organic chemistry.

objective of the present study of heterocyclic compounds is to develop green methodologies for the synthesis of nitrogen containing heterocyclic.

3. The students will be aware about most of drugs in the present market are the compounds containing various heterocyclic moieties.

4. To enable students to acquire a specialised knowledge and understanding of selected aspects by means of lecture series and a research project.

5. The course aims to provide an advanced understanding of the core principles and topics of biochemistry and their experimental basis.

Inorganic Chemistry Paper - XV

udents should be able to demonstrate advanced knowledge and understanding in aspect of protein structure.

2. The students will be able to introduce about basic chemistry of the heterocyclic.

3. The students will get familiar with particular properties and reactions for the most important heterocyclic as well as different systems of nomenclature.

4. The students will develop fundamental theoretical understanding of heterocyclic chemistry.

5. The students will be able to fully comprehend the chemistry of many heterocyclic products, carbohydrate, amino acids, peptides, proteins and lipids in use such as drugs and food.

dustrial Chemistry Paper – XVI

1) The rate of corrosion depends on the relative position of the metal in electrochemical series.
2) When the two dissimilar metals are in contact with an electrolyte, then the metal with low SRP (or high SOP or at higher position in electrochemical series) has greater tendency to go into solution and gets corroded very easily.
3) On the other hand, metal with high SRP (or low SOP) has little tendency to go into solution and hence they are not corroding.
4) Similarly, if the two metals are much apart in electrochemical series then corrosion of anodic metal is greater or faster.

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Course outcomes

Department of Chemistry(2019-2020)

Learning objectives and Outcomes B.Sc.-3 (Semester –5)

Subject : Inorganic Chemistry Paper - IX

1. To understand the concepts of metal ligand bonding in transition complex compounds.

2. To understand the thermodynamics and kinetic aspects of metal complexes.

3. To understand the nomenclature, classification, properties and preparations of coordination compounds.

nderstand the chemistry of organometalic compounds, homogenous hydrogenation and

To understand the bioinorganic chemistry of hemoglobin, myoglobin Learning etc.

Subject- Physical Chemistry Paper X

1. To understand the concept of black body radiations.

2. To understand the concept of wave functions.

3. To understand different properties of molecular structure.

4. To understand the basic features of spectroscopy.

nderstand the Harmonic Osillator.

Subject: Organic chemistry Pape - XI

1. In order to study the NMR spectroscopy to understand the important role of nuclear magnetic nance spectroscopy in the study of the structures of organic compounds

. To develop an understanding of the significance of the number,positions,intensitiesand splitting of gnals in nuclear magnetic resonance spectra

To be able to assign structures to simple molecules on the basis of nuclear magnetic resonance ectra.

4. In order to study carbohydrates will develop the skills to recognize and draw particular carbohydrate structures.

5. To know general structural elementsof cyclic monosaccharide and disaccharidesand their implications for structure and function.

ubject-Analytical Chemistry Paper - XII

To understand the role of metal ions in biological system.

To understand the role of metal ions in oxygen transport.

o understand the concept of acid and bases.

4. To understand the uses of inorganic polymers.

5. To understand the nature of bonding of different metals with carbon atom.

Subject : Physical chemistry Paper –X III (Semester – 6)

1. To understand the transitions through electronic spectroscopy

2. To understand the term symbols of diatomic molecules

To understand the different type of vapour pressure curves

o understand the ideal and non ideal solutions and their behaviour

o understand the thermodynamics of one and two component system.

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Course outcomes

Department of Chemistry(2021-2022)

Learning objectives and Outcomes B.Sc.-3 (Semester –5)

Subject : Inorganic Chemistry Paper - IX

In order to study transition metals to understand the trends in properties and reactivity of the d-block elements.

2. To explain the typical physical and chemical properties of the transition metals.
3. To identify simple compound classes for transition metals and describe their chemical properties.
4. To make the students understand that solutions which have water as a solvent are called aqueous solutions and those with solvent other than water are called non-aqueous solutions.
5. The students should know that that equivalent weight of an acid and base can be find out from their molecular weight and the acidity and basicity of that compound.
6. The student should understand that there are different methods of expressing concentration of a solution such as mass percent, ppm, normality, molarity, and molality.

Subject : Physical chemistry Paper - X

1. To understand thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials.
2. To understand Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law
3. To understand the concept of equilibrium constant, free energy, chemical potential
4. To understand the Nernst distribution law – its thermodynamic derivation, modification of distribution law when solute undergoes dissociation, association and chemical combination. Applications of distribution law
5. To understand the determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride.

ct: Organic chemistry Paper –IVX

ie main aim of Heterocyclic compounds study is to develop novel, efficient, convenient, selective and environmentally benign synthetic methods in organic chemistry.

2. The objective of the present study of heterocyclic compounds is to develop green methodologies for the synthesis of nitrogen containing heterocyclic.

3. The students will be aware about most of drugs in the present market are the compounds containing various heterocyclic moieties.

4. To enable students to acquire a specialised knowledge and understanding of selected aspects by means of lecture series and a research project.

The course aims to provide an advanced understanding of the core principles and topics of hemistry and their experimental basis.

ubject : Inorganic Chemistry Paper - XV

1. The students should be able to demonstrate advanced knowledge and understanding in aspect of protein structure.

2. The students will be able to introduce about basic chemistry of the heterocyclic.

3. The students will get familiar with particular properties and reactions for the most important heterocyclic as well as different systems of nomenclature.

4. The students will develop fundamental theoretical understanding of heterocyclic chemistry.

The students will be able to fully comprehend the chemistry of many heterocyclic products, hydrate, amino acids, peptides, proteins and lipids in use such as drugs and food.

Subject : Industrial Chemistry Paper – XVI

1)The rate of corrosion depends on the relative position of the metal in electrochemical series.

2)When the two dissimilar metals are in contact with an electrolyte, then the metal with low SRP (or high SOP or at higher position in electrochemical series) has greater tendency to go into solution and gets corroded very easily.

3)On the other hand, metal with high SRP (or low SOP) has little tendency to go into solution and hence they are not corroding. Similarly, if the two metals are much apart in electrochemical series then corrosion of anodic metal is greater or faster.

Subject-Organic Chemistry Paper - XI

1. To understand the methods for preparation of alcohols.
2. To understand the different classes of alcohols.
3. To understand the structure of carboxylic acid and their derivatives.
4. To understand the reactivity of different carboxylic acid derivatives.
5. To understand the chemical reactions of phenols.

Subject – Analytical Chemistry - XII

1. Able to recognize structures of acid halides, esters, amides, acid anhydrides.
2. Able to convert given name of alcohol to structure.
3. Able to write the order of reactivity of different carboxylic acid derivatves.
4. Able to describe different classes of alcohols.
5. Able to write down structure of phenol and phenoxide ion.

Subject : Inorganic chemistry Paper – XIII (Semester – 6

1. The students will understand the importance of periodic table of the elements, how itcame to be and its role in organising chemical information.

2. The students will develop the ability to effectively communicate scientific information and research results in written and oral formats.

3. The students will learn the laboratory skills needed to design, safely conduct and interpret chemical research.
4. The primary aim of a qualitative research is to provide a complete detailed description of the research topic.
5. Quantitative research focuses more in counting and classifying features and constructing statistical models and figures to explain what is observed.

Subject : Physical Chemistry Paper – IV

1. To understand the concepts of thermodynamics and its laws
2. To understand the entropy change in reversible and irreversible reaction
3. To understand the physical significance of third law of thermodynamics
4. To understand the concepts of electrochemistry
5. To understand the working and reaction of electrochemical cells.

Subject-Organic Chemistry Paper - XV

1. To understand how to name different aldehydes and ketones.
2. To understand the reactivity of different carbonyl compounds towards nucleophillic reaction.
3. To understand how to write the products of addition reaction to carbonyl compounds.
4. To understand to differentiate between primary, secondary and tertiary amines.

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Course outcomes

Department of Chemistry(2020-2021)

Learning objectives and Outcomes B.Sc.-3 (Semester –5)

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1) 1. In order to study transition metals to understand the trends in properties and reactivity of the d-block elements.
2) 2. To explain the typical physical and chemical properties of the transition metals.
3) 3. To identify simple compound classes for transition metals and describe their chemical properties.
4. To make the students understand that solutions which have water as a solvent are called aqueous solutions and those with solvent other than water are called non-aqueous solutions.
5) 5. The students should know that that equivalent weight of an acid and base can be find out from their molecular weight and the acidity and basicity of that compound.
6) 6. The student should understand that there are different methods of expressing concentration of a solution such as mass percent, ppm, normality, molarity, and molality.

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1. To understand thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials.

2. To understand Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law

3. To understand the concept of equilibrium constant, free energy, chemical potential

4. To understand the Nernst distribution law – its thermodynamic derivation, modification of distribution law when solute undergoes dissociation, association and chemical combination.

3. To understand how to write the products of addition reaction to carbonyl compounds.
4. To understand to differentiate between primary, secondary and tertiary amines.
5. To determine the percentage composition of a liquid sample mixture by the application of Beers Law.

Subject – Industrial Chemistry Paper - XVI

1.The students should be able to demonstrate advanced knowledge and understanding in aspect of protein structure.
2. The students will be able to introduce about basic chemistry of the heterocyclic.
3. The students will get familiar with particular properties and reactions for the most important heterocyclic as well as different systems of nomenclature.
4. The students will develop fundamental theoretical understanding of heterocyclic chemistry.
5. The students will be able to fully comprehend the chemistry of many heterocyclic products, carbohydrate, amino acids, peptides, proteins and lipids in use such as drugs and food.

Applications of distribution law 5. To understand the determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride.

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