

## **Program Outcome B.Sc. Chemistry**

1. To impart scientific attitude, to be a responsible individual
2. To encourage critical thinking
3. To create interest in gathering higher level understanding in Chemistry
4. To raise environmental awareness and concern.
5. To identify the potential of chemistry in understanding the nature and society
6. To make students able to use libraries and modern gadgets such as smart phones and computers to obtain information about a topic and to familiarise computer softwares for data tabulation and analysis, writing and presentation
7. To prepare students capable for individual and team work
8. To prepare students for effective communication of ideas through various means such as oral, written or through power point presentations
9. To find gainful employment in industry, government or other sectors, be accepted for higher studies or find employment in school systems as teachers.

## **Program Specific Outcome**

1. To lead students to the world of chemistry, starting from basic concepts and fundamental knowledge, to the advanced, exciting aspects of chemistry
2. To develop ability to apply chemistry knowledge, especially in daily life scenarios
3. To prepare students to be responsible to the environment in a way that they contribute in terms of chemist's view point
4. To be familiarised with new vistas of chemistry such as way that the students can appreciate the growth of the discipline and its contribution to the development of humankind
5. To encourage them into research, to update them with most discussed research topics of the time
6. To create awareness about safety, started in students' lab, to be able to cope in research labs and industries
7. To develop experimental skills and good lab practices
8. To be able to realise theoretical knowledge by relating to experiments
9. To be able to design, carry out, record and analyse the results of chemical experiments.
10. To be introduced into the hugenumber of possibilities by which students aspire deeper understanding in chemistry and its various spheres, in future.

## Course Outcomes

### **I. CHE1B01 THEORETICAL AND INORGANIC CHEMISTRY – I**

CO1.1: Students will learn how science is being practiced and about the evolution of chemistry as a discipline which contributed to the growth of humanity. Fundamental ideas about structure of atoms and the historical development will be communicated.

CO1.2: Detailed understanding on nuclear chemistry and applications

CO1.3: Concepts of laboratory safety, good lab practices and theoretical background required for volumetric analysis will be learned.

### **II. CHE2B02 THEORETICAL AND INORGANIC CHEMISTRY – II**

CO2.1: Introduction to quantum chemistry will be given, to be able to appreciate its applications in all the fields of chemistry.

CO2.2: Introduction to periodic table and periodic properties

CO2.3: Both classical and quantum mechanical approaches on chemical bonding will be communicated

### **III. CHE3B03 PHYSICAL CHEMISTRY – I**

CO3.1: Detailed understanding in properties and processes relevant for gaseous state, liquid state, and chemical equilibrium will be discussed

CO3.2: Essential ideas in thermodynamics, including statistical thermodynamics, will be provided, such that the knowledge can be used to understand various systems to be met in future

### **IV. CHE4B04 ORGANIC CHEMISTRY – I**

CO4.1: General introduction to organic chemistry, reaction mechanism and considerations on stereochemistry will be given

CO4.2: To learn structure, properties and reactions of aliphatic and aromatic hydrocarbons

### **V. CHE4B05 INORGANIC CHEMISTRY PRACTICAL – I**

CO5.1: Introduction to good lab practices, importance of safety measures to be adopted in the lab

CO5.2: Preparation of solutions and quantitative analysis of inorganic compounds by volumetry, based on various principles such as neutralisation, redox reactions and complex formation.

## **VI. CHE5B06INORGANIC CHEMISTRY – III**

CO6.1: Theoretical knowledge behind qualitative analysis of inorganic mixtures and gravimetry analysis will be given

CO6.2: Introduction to microscale experiments as a green approach and its advantages

CO6.3: Properties and reactions of main group elements, basic ideas on inorganic polymers and non-aqueous solvents will be discussed

CO6.4: Awareness on environmental pollution, impacts, need to protect the environment, pollution management will be raised. Individual's environmental responsibility as a citizen of the world is to be awakened, as well as the need to be aware of and to involve in local environmental issues.

## **VII. CHE5B07ORGANIC CHEMISTRY – II**

CO7.1: Various functional groups and heterocyclic compounds will be studied in detail.

## **VIII. CHE5B08PHYSICAL CHEMISTRY – II**

CO8.1: To study about reaction kinetics, catalysis, photochemistry, phase equilibria, theories about sorption processes and molecular symmetry

CO8.2: A detailed understanding on chromatography as a separation technique and principles behind spectroscopy will be provided, with a view to inspire students in chemistry research.

## **IX. CHE6B09INORGANIC CHEMISTRY – IV**

CO9.1: Principles behind metallurgy and various metallurgy processes will be introduced.

CO9.2: Chemistry of transition and inner transition elements, coordination compounds, organometallic compounds and their significance in biological systems will be detailed.

## **X. CHE6B10ORGANIC CHEMISTRY – III**

CO10.1: Help students to use the basic knowledge on spectroscopy in structure elucidation of organic compounds

CO10.2: Various class of biopolymers such as carbohydrates, proteins, nucleic acids, Lipids and other biochemicals, as well as pericyclic reactions, will be introduced

### **XI. CHE6B11PHYSICAL CHEMISTRY – III**

CO11.1: Electrochemistry, solution chemistry and solid state chemistry will be discussed in details

### **XII. CHE6B12ADVANCED AND APPLIED CHEMISTRY**

CO12.1: Relatively newer domains of chemistry, such as supramolecular chemistry, computational chemistry, combinatorial chemistry and green chemistry will be introduced with a view to raise awareness among students about the recent trends in chemistry research and about the growth of the field.

CO12.2: To provide fundamental concepts of nano chemistry and its significances in daily life.

CO12.3: To have a sound understanding on synthetic polymers and other man-made organic and inorganic materials which contributed significantly for the development of humankind.

### **XIII. CHE6B13 (E2)POLYMER CHEMISTRY**

CO13.1: Fundamental concepts in polymer chemistry, industry-oriented knowledge on various polymers and their applications.

### **XIV. CHE6B14 (P)PHYSICAL CHEMISTRY PRACTICAL**

CO14.1: To study properties such as viscosity and refractive index to find out composition of unknown solutions

CO14.2: To measure and use colligative properties for calculating molecular mass of solute

CO14.3: To determine kinetics of reactions

### **XV. CHE6B15 (P)ORGANIC CHEMISTRY PRACTICAL**

CO15.1: To be able to identify the unknown organic compound, for its functional group, aromaticity, etc.

CO15.2: Solvent extraction and recrystallization techniques

CO15.3: Reagent preparation and derivative preparation

CO15.4: Paper chromatography

### **XVI. CHE6B16 (P)INORGANIC CHEMISTRY PRACTICAL – II**

CO16.1: Gravimetric and colorimetry estimation of unknown solutions

**XVII. CHE6B17 (P)INORGANIC CHEMISTRY PRACTICAL –III**

CO17.1: Identification of anions and cations present in mixtures and inorganic preparations

**XVIII. CHE6B18 (Pr) PROJECT WORK**

CO18.1: To equip the students to carryout small research work in groups, starting form identifying area of interest, knowledge gap in the area, setting hypotheses, designing and conducting experiments to verify the hypotheses and communicating the outcome both in written format and by presentation.

### CO-PSO Mapping for B.Sc. Chemistry

Mapping of Course Outcome against Program Specific Outcome is given in the following chart. The match of each CO towards respective PSO is indicated by a 3-point scale. Rank 3 shows strong contribution of CO to respective PSO, rank 2 shows medium contribution and rank 1 shows low contribution.

PSO →	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9
CO ↓									
CO1.1	3								
CO1.2	1								
CO1.3	1					3	3	3	
CO2.1	1								
CO2.2	1								
CO2.3	1								
CO3.1	1								
CO3.2	1								
CO4.1	1								
CO4.2	1								
CO5.1	2					3	3	3	3
CO5.2	1	3					3	3	3
CO6.1	1	3						3	
CO6.2	1		3	1	3			3	
CO6.3	1	1						3	
CO6.4	1	3	3						
CO7.1	1							3	
CO8.1	1	2							
CO8.2	1				3				
CO9.1	1	1							
CO9.2	1	1							
CO10.1	1				2				
CO10.2	2	2							
CO11.1	1								
CO12.1	3		2	3	3				
CO12.2	3			3	3				
CO12.3	1	3			1				
CO13.1	1	3			3				
CO14.1	3	1			1		3	3	3
CO14.2	3	1			1		3	3	3
CO14.3	3	1			1		3	3	3
CO15.1	3	1			1		3	3	3
CO15.2	3	1			1		3	3	3
CO15.3	3	1			1		3	3	3
CO15.4	3				3		3	3	3

<b>CO16.1</b>	3				2		3	3	3
<b>CO17.1</b>	3	3			2		3	3	3
<b>CO18.1</b>	3	3	1	3	3		3	3	3