

Shri Gulab Singh Government Degree College Chakrata, Dehradun

Department of Chemistry

Program outcome B.Sc. Yearly

Purpose of the Program


The importance of chemistry arises because so many other disciplines draw on certain chemical principles and concepts. The purpose of the undergraduate chemistry program at the university and college level is to prepare our students for all those fields where basic knowledge of chemistry is required including academia for careers as professionals in various industries and research institutions.


Program Outcomes

- PO 1. Students will have a firm foundation in the fundamentals and applications of chemical and scientific theories including those in analytical, inorganic, organic and physical chemistry.
- PO 2. Students will be able to design and carry out scientific experiments as well as accurately record and analyze the data of such experiments.
- PO 3. Students will develop skill in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
- PO 4. Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.
- PO 5. Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
- PO 6. Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.
- PO 7. Students will be able to function as a member of an interdisciplinary problem-solving team.

Course outcome B.Sc. Yearly

After completion of degree, students gained the theoretical as well as practical knowledge of handling chemicals. Also they expand the knowledge available opportunities related to chemistry in the government services through public service commission particularly in the field of food safety, health inspector, pharmacist etc. Afford a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. Achieve the skills required to succeed in graduate school, professional school and the chemical industry like cement industries, agro product, Paint industries, Rubber industries, Petrochemical industries, Food processing industries, Fertilizer industries etc. Got exposures of a breadth of experimental techniques using modern instrumentation. Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life. Understand the concept of chemistry to inter relate and interact to the other subject like mathematics, physics, biological science etc. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.


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चक्राता (देहरादून)

Shri Gulab Singh Government Degree College Chakrata, Dehradun

Department of Chemistry

Program outcome B.Sc. (NEP) Semester

First Year	CERTIFICATE IN INTRODUCTORY CHEMISTRY
<p>Certificate in Introductory Chemistry will give the student a basic knowledge of all the fundamental principles of chemistry like atomic structure, molecular polarity, bonding theories of different molecules, resonance concept, hyperconjugation, field effects, periodic properties of more than 111 elements, mechanism of organic reactions, stereochemistry, detailed study of states of matter including kinetic theories of gases, solid and liquid states, chemistry of aliphatic and aromatic compounds, chemical kinetics, its scope and first law of thermodynamics. Student will be able to understand the qualitative and quantitative chemical analysis of the compounds in the laboratory. This certificate course is definitely going to prepare the students for various fields of chemistry and will give an insight into all the branches of chemistry. It will enable students to join the diploma course (semester III and IV) in any University or College of Higher education in Uttarakhand</p>	
Second Year	DIPLOMA IN CHEMICAL SCIENCE
<p>Diploma in Chemical Science will provide the theoretical as well as practical knowledge of handling chemicals, apparatus, equipment and instruments. The knowledge about second law of thermodynamics, chemical equilibrium, phase equilibrium, electrochemistry, coordination chemistry, acid-base theories, chemistry of transition elements, halides, alcohols, phenols, aldehydes, ketones and carboxylic acids will enable the students to work as chemists in various industries. The experimental work during the diploma course will enhance the skill of the students regarding chemical and physical tests of inorganic as well as organic compounds along with some physical experiments which will be beneficial to achieve their goals in industrial sectors. It will enable students to join the Bachelor of Science course (semester V and VI) in any University or College of Higher education in Uttarakhand</p>	
Third Year	DEGREE IN BACHELOR OF SCIENCE
<p>Degree in Bachelor of Science programme aims to introduce very important aspects of modern-day course curriculum, namely, chemistry of nitrogen containing compounds, organometallic, lipids, fats, dyes, paints, reagents in organic synthesis, carbohydrates, proteins, biomolecules, data analysis, nano-chemistry, green chemistry, stability of coordination compounds, cement, paint, ceramics, glass, inorganic fertilizers, radioactivity, corrosion, magnetic behaviour of transition metal complexes, surface chemistry, quantum mechanics, solutions, third law of thermodynamics, photochemistry, and spectroscopic techniques. This knowledge will make the students skilled to work in various chemical industries like cement industries, agro product, paint industries, rubber industries, petrochemical industries, food processing industries, fertilizer industries, pollution monitoring and control agencies etc. It will also enable the students to understand the importance of the biomolecules in biological science and related fields.</p> <p>Upon completion of a degree, chemistry students will able to employ critical thinking and scientific inquiry in the performance, design, interpretation and documentation of laboratory experiments. It will help a candidate to succeed at an entry-level position in chemical industry or a chemistry postgraduate program.</p>	

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Pracharya
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Department of Chemistry

Course outcome B.Sc. (NEP) Semester

Course outcome Paper-I (Theory)

Course Title: Fundamentals of Chemistry-I

Molecular geometries, physical and chemical properties of the molecules.

Current bonding models for simple inorganic and organic molecules in order to predict structures and important bonding parameters.

This course gives a broader theoretical picture in multiple stages in an overall chemical reaction.

It describes reactive intermediates, transition states and states of all the bonds broken and formed.

It enables to understand the reactants, catalyst, stereochemistry and major and minor products of any organic reaction. It describes the types of reactions and the kinetic and thermodynamic aspects one should know for carrying out any reaction and the ways how the reaction mechanism can be determined.

The chapter stereochemistry gives the clear picture of two-dimensional and three-dimensional structure of the molecules, and their role in reaction mechanism. The course will also strengthen the knowledge of students regarding complete picture of states of matter that includes gaseous, liquid, solid and colloidal states.

Course outcome Paper-I (Theory)

Course Title: Fundamentals of Chemistry-II

Upon successful completion of this course, the students will be able to describe the reactions shown by aliphatic and aromatic compounds. They will also be able to understand the bonding in inorganic molecules, salient features of s- and p- block elements, different aspects of chemical kinetics, catalysis and first law of thermodynamics.


Course outcomes: Paper-I (Theory)


Course Title: General Chemistry-I

It relates and gives an analytical aptitude for synthesizing various industrially important compounds.

This paper also provides a detailed knowledge on the elements present in our surroundings, their occurrence in nature. Their position in periodic table, their physical and chemical properties. This paper also gives detailed understanding of the d-block elements and their characteristics. After successful completion of this course, the students will be able to gather the information regarding Werner's theory and VBT of transition metal complexes.

Students will be able to learn the basic concepts of spontaneity, chemical and phase equilibrium and able to apply these concepts in predicting the spontaneous reactions and will be able to solve the numerical problems based on these concepts.


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Paper-I (Theory)

Course Title: General Chemistry-II

This paper provides detailed knowledge of synthesis of aldehydes, ketones, carboxylic acids and functional groups inter conversion. The students will be able to describe the concepts of electrochemistry in detail and its applications. Also, they will be able to solve the numerical problems based on these concepts. Students will be able to define the acids and bases on the basis of various concepts/ theories and will be able to identify the position of various elements in the periodic table and able to explain their properties on the basis of their position.

Course outcomes: Paper-I (Theory)

Course Title: Inorganic Chemistry

Upon successful completion of this course, the students will be able to describe the stability, crystal field theory, electronic spectra and magnetic properties of coordination compounds. They will also learn about organometallic compounds, some industrially important inorganic materials and their applications in various industries. It will assist them to get a suitable job in the relevant industrial and scientific field.

Course outcomes: Paper-II (Theory)

Course Title: Organic Chemistry

Upon successful completion of this course, the students should be able to describe the chemistry of nitrogen containing compounds, the basic understanding of the chemistry of industrially important materials such as lipids, fats, soaps, detergents, dyes, paints and reagents in organic synthesis. Upon completion of this course students may get job opportunities in food, soap, detergent, paint and other organic material based synthetic labs and industries. Biomolecules are important for the functioning of living organisms. These molecules perform or trigger important biochemical reactions in living organisms. When studying biomolecules, one can understand the physiological function that regulates the proper growth and development of a human body. This course aims to introduce the students with basic experimental understanding of carbohydrates and proteins.

Course outcomes: Paper-I (Theory)

Course Title: Physical Chemistry

The core concepts of Physical Chemistry have been included in this semester with a view that students' command over these topics will help them to understand the higher chemistry in PG classes. Their understanding of Photochemistry and Solutions will help him to explain the day today phenomenon of the relevant field whereas. Thermodynamics will help them to understand the natural flow of energy. Learning the Quantum Mechanics will help them to praise the beauty of behaviour of fundamental particles. It will assist them to get a suitable job in the relevant industrial and scientific field.


Course outcomes: Paper-II (Theory)

Course Title: Analytical Chemistry

Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.

Students will be able to function as a member of an interdisciplinary problem-solving team.


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Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

Students will gain an understanding of how to determine the structure of organic molecules using UV, IR and NMR spectroscopic techniques.

Course Outcomes: Practical

Semester-I, Paper-II (Practical) Course Title: Chemical Analysis -I

Course outcomes: Upon completion of this course, the students will have the knowledge and skills to: understand the laboratory methods and tests related to inorganic mixture analysis and estimation of surface tension of commercial products. Also, they can understand the absolute configuration of organic molecules with the help of models. The students will be able to

- Qualitatively estimate anions and cations in samples.
- Determine the relative surface tension of a given liquid.
- Find out the absolute configuration of organic molecules.

Semester-II, Paper-II (Practical) Course Title: Chemical Analysis -II

Course outcomes: After completing this course, the students will be able to quantitatively find out the amount of acid or base in the samples, to qualitatively differentiate among different classes of organic compounds and to measure the relative viscosity of a given liquid.

Semester-III Paper-II (Practical) Course Title: Analytical Procedures-I

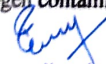
Course outcomes: After completing this course, the students will be able to test the inorganic mixtures of acidic and basic radicals in given samples, to qualitatively differentiate between alcohols and phenols and determine the critical solution temperature of partially miscible liquids.


Semester-IV Paper-II (Practical) Course Title: Analytical Procedures-II

Course outcomes: After completing this course, the students will be able to determine the concentrations of oxidising and reducing agents through double titration, qualitatively differentiate between aldehydes, ketones and carboxylic acids and determine the solubility of salts.

Semester-V, Paper-III (Practical) Course Title: Analytical Procedures-III

Course outcomes: Upon completion of this course, the students will have the knowledge and skills to understand the synthetic methods related to inorganic and organic fields. Also, they can easily analyze the nitrogen containing compounds and separate the binary organic mixture.


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Semester-VI, Paper-III (Practical) Course Title: Analytical Procedures-IV

Course outcomes: Upon completion of this course, the students will have the knowledge and skills to determine the heat of neutralization, solubility of organic compounds by titration method. They will be able to estimate different metal ions through gravimetric exercise. Spectroscopic and chromatographic exercise will train them to interpret the spectral data and chromatograms of organic compounds and will make them job ready for suitable industries.


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