DEPARTMENT OF CHEMISTRY
Programme Outcome (PO)
Programme Specific Outcome (PSO)
Course Outcome (CO)
FYUGP Course under Gauhati University

Programme Outcome (PO): The Chemistry Department at North Gauhati College, under the Four-Year Undergraduate Programme (FYUGP) as per NEP 2020 guidelines of Gauhati University, aims to provide a comprehensive education in chemistry. Here are some key program outcomes:

1. **Fundamental Knowledge**: Students will gain a solid foundation in various branches of chemistry, including organic, inorganic, physical, and analytical chemistry.
2. **Practical Skills**: Emphasis on laboratory skills and techniques, ensuring students are proficient in conducting experiments and using modern instrumentation.
3. **Research and Innovation**: Encouraging students to engage in research projects, fostering innovation and critical thinking.
4. **Interdisciplinary Approach**: Integrating chemistry with other scientific disciplines to provide a holistic understanding of its applications.
5. **Employability**: Preparing students for careers in academia, industry, and research by equipping them with the necessary skills and knowledge.
6. **Ethical and Social Responsibility**: Instilling a sense of ethical responsibility and awareness of the societal impacts of chemical research and industry

Programme Specific Outcome (PSO): The proposed program has outlined specific outcomes for its students. Here are the key program-specific outcomes:

1. **In-depth Chemical Knowledge**: Students will acquire comprehensive knowledge in various branches of chemistry, including organic, inorganic, physical, and analytical chemistry.
2. **Experimental Proficiency**: Emphasis on developing strong laboratory skills, enabling students to conduct experiments accurately and safely using modern techniques and instruments.
3. **Research Competence**: Encouraging students to undertake research projects, fostering a spirit of inquiry and innovation.
4. **Interdisciplinary Integration**: Applying chemical principles to solve problems in other scientific disciplines, promoting a holistic scientific approach.
5. **Career Readiness**: Equipping students with the skills and knowledge necessary for careers in academia, industry, and research.
6. **Ethical Awareness**: Instilling a sense of ethical responsibility and understanding the societal impacts of chemical research and industry

COURSE OUTCOME

SEMESTER I:

Course Name: Chemistry-I

Course Outcome:

CO1- Upon completion of this course, a student will be able to gain the knowledge of fundamental aspects of atoms, ions and molecules, structure and bonding of molecules dealt with basic quantum chemistry treatment.

CO2: Introduction to the structure, nomenclature, and properties of organic molecules. Students will learn about different types of organic reactions and mechanisms.

CO3: Students will learn about the different states of matter.

CO4-Accompanying laboratory course is designed to introduce the preparation of standard solutions, measurement of physical properties and laboratory safety.

SEMESTER II:

Course Name: Chemistry-II

Course Outcome:

CO1- Students will learn and apply the concepts of chemical bonding, coordination chemistry, acids and bases and reactive intermediates.

CO2: Students will learn about the structure, properties, and reactions of organic compounds. They will understand mechanisms of organic reactions and be able to predict the outcomes of various organic transformations.

CO3: Students will explore the laws of thermodynamics. They will learn to apply mathematical concepts to solve physical chemistry problems.

CO4: Practical sessions will focus on developing hands-on skills in conducting experiments, recording data, and interpreting results accurately and safely.

SEMESTER III:

Course Name: Chemistry-III

Course Outcome:

CO1- This course will cover advanced topics in coordination chemistry, organometallic compounds.

CO2: Students will explore complex organic reactions, mechanisms, and synthesis of organic compounds in terms of the functional groups and reactivity.

CO3- Focus on redox reactions, ideal solution and colligative properies. Students will learn to apply these concepts to real-world chemical problems.

CO4: Practical sessions will focus on advanced experimental techniques, data analysis, and interpretation of results. Students will develop skills in using sophisticated laboratory instruments.

SEMESTER IV: (Paper I)

Course Name: Inorganic Chemistry-I

Course Outcome:

CO1- Students will learn about the properties, reactions, and applications of transition metals and their compounds. Moreover, they will have an overview of lanthanides, actinides and nuclear chemistry.

CO2: Students will be able to learn the molecular symmetry, with which they will able to assign different point groups.

CO3- Practical sessions will focus on advanced inorganic synthesis, characterization techniques, and the safe handling of chemicals. Students will learn how differential reactivity under different conditions of pH can be used to identify variety of ions in a complex mixture.

SEMESTER IV: (Paper II)

Course Name: Organic Chemistry-I

Course Outcome:

CO1-The objective of this course is to illustrate the structure and reactivity of organic compounds containing carboxylic acid derivatives, nitrogen based functional groups and heterocyclic compounds.

CO2-After gaining these knowledge, students will be able to apply all these basic concepts towards the understanding of amino acids, peptides/proteins and alkaloids.

CO3-Practical session will focus to familiarize with organic synthesis and purification.

SEMESTER IV: (Paper III)

Course Name: Theoretical Chemistry

Course Outcome:

CO1-Aim of this course is to introduce the students to the important areas of quantum chemistry.

CO2-Students will be able to formulate the basic structural properties of atoms in terms of mathematical theories.

CO3-Students shall be able to plot and program equations using different programming language such as BASIC, FORTRAN, Python.

SEMESTER IV (Paper IV)

Course Name: Magnetic Resonance Spectroscopy and Analytical Techniques

Course Outcome:

CO1-Students are expected to learn about the different spectroscopic, chromatographic, electroanalytical, diffraction techniques and their applications.

CO2-Students will learn about spectroscopy and how chemical compounds are identified and separated using contemporary method.

SEMESTER V: (Paper 1)

Course Name: Inorganic Chemistry-II

Course Outcome:

CO1-This course focuses on further extending the concepts of coordination chemistry along with the chemistry of main group of elements, noble gases .

CO2-Students shall understand the preparation, structure and properties of main group elements and noble gases. They will also learn about organometallic compounds, their bonding, stability and reactivity.

CO3: The laboratory experiments will enable students to separate and estimate individual ions in multicomponent systems.

SEMESTER V: (Paper II)

Course Name: Organic Chemistry-II

Course Outcome:

CO1-This course aims at introducing students to stereo chemical aspects of organic reactions and their mechanisms.

CO2-Students will also learn the chemical aspects of carbohydrates and terpenoids.

CO3-Students will be familiarize with qualitative analysis of carbohydrates and small organic compounds with functional groups.

SEMESTER V: (Paper III)

Course Name: Reaction Dynamics

Course Outcome:

CO1-Aim of the course to teach students reaction dynamics with emphasis on order and molecularity of reactions, rate laws and rate equations.

CO2-Students will learn how to mathematically model chemical reactions and evaluate the necessary rates of the reaction.

CO3-Students will be able to visualize complex reaction mechanism via mathematical modelling.

SEMESTER V: (Paper IV)

Course Name: Light-Matter Interactions

Course Outcome:

CO1-The paper is focused on fundamental theory and application of photochemistry and various spectroscopic techniques such as rotational, vibrational, electronic and Raman Spectroscopy.

CO2- Students shall use the knowledge gained from the quantum theories to identify unknown chemical compounds using modern techniques.

SEMESTER VI: (Paper I)

Course Name: Inorganic Chemistry-III

Course Outcome:

CO1-This course aims at giving students the introduction to inorganic reactions mechanisms and bioinorganic chemistry.

CO2-The course emphasizes on organometallic chemistry with reference to transition metal-π bound complexes, metal-carbenes and organometallic complexes.

CO3- The laboratory course intends to introduce students to preparation and characterization of co-ordination complexes and double salts.

SEMESTER VI: (Paper II)

Course Name: Organic Chemistry-III

Course Outcome:

CO1-This course aims at introducing the students to photo-chemical and pericyclic organic reactions.

CO2-Students will be able to recognize the chemistry of polynuclear aromatic hydrocarbons, organometallic compounds and their reactions.

CO3-Students will develop the skill set to extract important organic components from natural samples, estimate organic compounds and perform photochemical conversion.

SEMESTER VI: (Paper III)

Course Name: Equilibria and Electrochemistry

Course Outcome:

CO1-The aim of this course is to introduce students to primarily two areas of physical chemistry-equilibria and electrochemistry. Discussion of equilibria encompasses chemical, ionic and phase equilibria.

CO2-Students are expected to learn various laws of electrochemistry, measurement of conductance, applications of electrolysis in industry.

CO3-The laboratory course is designed to introduce students to various experiments using pHmetry, conductometry, calorimetry etc.

SEMESTER VI: (Paper IV)

Course Name: Industrial chemistry

Course Outcome:

CO1-The course provides an introduction to the various industrial gases and inorganic chemicals.

CO2-Students are expected to learn the manufacturing processes, applications, storage and hazards of handling the industrial gases.

CO3-Students will learn the synthetic processes, properties and the utility of the industrially important inorganic materials.

****