

Department of Chemistry Nalbari College, Nalbari



Course Outcome for FYUGP under NEP

Semester-I: Chemistry I (3L- OT-IP)

Learning outcome:

On successful completion, students would have clear understanding of the concepts related to atomic and molecular structure, chemical bonding, periodicity and states of matter. Students will be able to work in a chemical laboratory following standard safety protocols.

Semester-II: Chemistry II (3L- OT-IP)

Learning outcome:

Students shall understand and apply the concepts of chemical bonding, coordination chemistry, acids and bases and the reactive intermediates. They shall also understand the chemistry from a thermodynamic point of view. Students will acquire preliminary training on quantitative analysis, synthesis of coordination compounds, qualitative analysis of organic compounds and measurement of a few basic thermodynamic parameters.

Semester-III: Chemistry III (3L- OT-IP)

Learning outcome:

On successful completion of the course students will have significant knowledge of acids/bases as well as an overview of bonding in coordination compounds, principles of redox chemistry, solutions and their properties. Students will also be able to describe and classify organic compounds in terms of their functional groups and reactivity. Further experiments on acid/base and redox titrations will enable the students to consolidate their skills on quantitative analysis. In addition, qualitative analysis of organic compounds having common functional groups will give the students an idea about functional groups and their reactivities. Physical chemistry experiments will introduce the students to physical property measurements and kinetics of chemical reactions.

Semester-IV: Inorganic Chemistry-I (3L -OT-IP)

Learning outcome:

On successful completion the students will be able to assign the point groups of molecules, explain bonding in coordination compounds, explain their various properties in terms of CFSE and predict reactivity.

Students will have an overview of the metallurgical and nuclear processes as well as the chemistry of *d* and f-block elements.

Students in general will learn the use of concepts like solubility product, common ion effect, pH etc. in the analysis of ions. They will also appreciate how a clever design of reactions makes it possible to identify the components in a mixture.

Semester-IV: Organic Chemistry I (3 L- 0 T- 1 P)

Learning outcome:

On successful completion students will be able to explain and correlate the structure and reactivity of oxygen and nitrogen containing organic molecules having relevance to bioorganic systems. Students will be able to perform simple organic transformations and purifications following conventional/green pathways.

Semester-IV: Theoretical Chemistry (3L-0T-1P)

Learning outcome:

Students shall understand the fundamentals of atomic structure and its relation to quantum mechanics. They will be able to formulate the basic structural properties of atoms in terms of mathematical theories. Students shall be able to plot, and program equations related to simple chemical systems using computers.

Students shall be solving chemical problems using complex mathematics. This will develop a critical thinking ability to treat simple systems.

Semester-IV: Magnetic Resonance Spectroscopy and Analytical Techniques (3L-0T-1P)

Learning outcome:

Students shall learn about spectroscopy and how chemical compounds are identified and separated using contemporary methods and instruments.

Semester-V: Inorganic Chemistry II (3L-0T-1P)

Learning outcome:

Students shall learn about electronic and magnetic properties of coordination complexes. They shall understand the preparation, structure and properties compounds of main group elements and noble gases. Students will also learn about organometallic compounds, comprehend their bonding, stability and reactivity. The laboratory experiments shall enable the learners to separate and estimate individual ions in multicomponent systems.

Semester-V: Organic Chemistry II (3 L- 0 T- 1 P)

Learning outcome:

Students will be able to predict and recognize reactivity of organic molecules by their functional groups, and utilize this understanding for the construction of complex molecules.

Learners will be able to qualitatively analyze organic molecules and identify the functional groups by interpreting the IR spectra.

Semester-V: Reaction Dynamics (3L-0T-1P)

Learning outcome

Students shall learn how to mathematically model chemical reactions and evaluate the necessary rates of chemical reactions. They shall also be able to comprehend enzyme action in human physiology. Student shall be able to visualize complex reaction mechanisms via mathematical modeling and develop an analytical thinking ability.

Semester-V: Light-Matter Interaction (3L-0T-1P)

Learning outcome:

Students shall learn about the theory of photochemistry, spectroscopy and their application in chemistry. They shall use the knowledge gained from the quantum theories to identify unknown chemical compounds using modern techniques. The experiments performed in the laboratory course shall enable the learners to analyze/estimate various analytes using different techniques.

Semester-VI: Inorganic Chemistry III (3L-0T-1P)

Learning outcome:

Students shall understand the mechanisms of inorganic reactions and the role of metal ions in biological processes and therapeutic activities. They will be acquainted with the synthesis, structure and reactivity of various organometallic compounds, and their application in organometallic catalysis. Furthermore, the students will understand the importance of organometallic catalysis in the synthesis of industrially important compounds. The laboratory experiments will enable the learners to synthesize metal complexes and double salts and their characterization by various analytical techniques.

Semester-VI: Organic Chemistry III (3 L- 0 T- 1 P)

Learning outcome:

Students will be able to recognize and explain the mechanisms of photochemical and pericyclic reactions and apply mechanistic concepts to predict the outcome of synthetic reactions. Students will be introduced to the preparation, structure and reactivity of polyaromatic hydrocarbons and organometallic compounds.

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

Semester-VI: Equilibria and Electrochemistry (3L-0T-1P)

Learning outcome:

Students shall understand how dynamic equilibrium works in chemical reactions. They shall be introduced to ionics, phases and electrochemical systems.

Semester-VI: Industrial Chemistry (3L-0T-1P)

Learning outcome:

Students shall acquire knowledge of industrially important chemical processes. They shall know the extraction processes and the chemistry of firecrackers, ceramics, glass and cements.