

Chemistry 101: Fundamentals of Chemistry from Atoms to Materials

Course description : Introduction to theories of atomic and molecular structure. Description of materials properties with a focus on phases, intermolecular forces, band structure and conductivity. Introduction to organic materials, including polymers. Laboratory emphasizes chemical techniques typically needed in a scientific environment including observing, recording and discussing experimental data.

Pre-requisites :

Core Chemistry Goals
Develop an understanding of all types of chemical bonding and molecular structure
Develop an understanding of the quantum atomic model in relation to electronic configuration
Develop a critical understanding of the different theoretical frameworks for bonding and structure
Develop the ability to use the Periodic Table of the Elements
Develop an understanding of the reductionist approach to complex molecules, and how atoms and small collections of atoms relate to chemical properties.
Develop an understanding of the theory of electronic spectroscopic and spectrometric techniques
Develop the ability to apply spectroscopy to the concept of energy quantization
Acquire knowledge of organic functional groups and descriptive organics with a focus on structure and polymers
Develop an understanding of the systematic naming of chemical compounds
Develop the ability to apply models of bonding and intermolecular interactions to molecules and materials
Develop an understanding of the conceptual differences between a wide variety of bonding types
Develop an understanding of the different types of non-covalent interactions
Develop an understanding of the properties and phenomena of interfaces and surfaces
Develop an understanding of phase changes
Develop the ability to use standard chemical techniques
Chemistry Program Goals
Develop competence in problem solving.
Develop the ability to design, conduct and observe chemical experiments and to record and critically analyze data from chemical experiments.

Develop the ability to work competently, independently and safely in a laboratory environment.

Develop the ability to apply error analysis and determine significant figures.

Develop the ability to represent chemical information.

Develop the ability to apply mathematics to chemistry.

Develop an understanding of the use of models, their premises, advantages and limitations.

Develop the ability to disseminate scientific information orally and in writing.

Develop an understanding of the impact and relevance of chemistry in society.