Chemistry 150: Engineering Chemistry

Course description : Atomic and molecular structure; periodicity, chemical bonding; gases, liquids, and solids; phase equilibria; equilibrium; thermochemistry; chemical thermodynamics; electrochemistry.

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 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
Develop the ability to apply models of bonding and intermolecular interactions to molecules and materials
Develop an understanding of the phenomenological thermodynamics and its consequences for chemistry
Develop an understanding of the first and second laws of thermodynamics and its applications
Develop an understanding how heat and work are measured in chemical processes
Develop an understanding of the concept and applications of standard states
Develop an understanding of phase changes
Develop an understanding of the concept of reversibility and its relation to equilibrium
Develop the ability to apply the concepts of acidity and basicity to aqueous systems with respect to equilibria
Develop the ability to apply the concepts of electron transfer between atoms and molecules with respect to equilibria and energy
Develop an understanding of how models and approximations are used to allow prediction of chemical and other behaviour of systems and how this predictive behaviour facilitates design
Develop an understanding of the significance of chemically-informed engineering decisions on society and the environment, including human and environmental health

Develop an understanding of the chemical aspects of energy production, storage, and usage by society
Develop an understanding of the chemical aspects of the effect of society on the environment
Develop the ability to use standard chemical techniques
Develop the ability to perform chemical measurements and analysis
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.