

**C: Compulsory Subject, E: Elective Subject**

First Semester (Fall 2014)				
Code	Subject	Credit	C/R	Description
0530002-GS	Chemical Thermodynamics I-GS	2	C	1. Introduction 2. Perfect gases 3. Real gases 4. Work, energy, and heat 5. Concept of statistical thermodynamics 6. Principle of the conservation of energy 7. Thermochemistry 8. Second Law of thermodynamics 9. Third Law of thermodynamics 10. Chemical potential 11. Phase diagrams 12. Thermodynamics relations 13. Real systems and multi-component systems 14. Ideal solutions
0530003-GS	Quantum Chemistry I-GS	2	C	In this course, students learn basic principles of quantum mechanics through a variety of examples in atomic physics and molecular science. They learn about a particle in a box from optical transitions of dye molecules, harmonic oscillators from vibrational spectra of molecules, angular momenta from rotational spectra of molecules, and a hydrogen atom from its atomic spectra. As a text book, "Quantum Mechanics of Molecular Structures" by K. Yamanouchi published in 2012 from Springer will be used.
0530004-GS	Inorganic Chemistry I-GS	2	C	In this lecture, important and basic points of inorganic chemistry are introduced. In the zeroth chapter, origins, abundance, and distribution of elements on the Earth are told. In the first chapter, characteristics of multi-electron atoms are overviewed. In the second chapter, periodical characteristics of elements associated with atomic radius, ionization potential, electron affinity, and so on, are explained. From the third chapter to the fifth chapter, different types of bonds are explained. Especially in the third chapter where covalent bonds are explained, molecular symmetry is analyzed by using group theory, and the relation between the symmetry and the physical and spectroscopic property of a molecule is stated. In the sixth chapter, thermodynamics of inorganic compounds is overviewed. In the seventh chapter, acids and bases are explained.
0530005-GS	Analytical Chemistry I-GS	2	C	General analytical chemistry of the analysis of organic, inorganic and biomolecules. The lecture includes a summary of basic analytical chemistry, chemical analysis, bioanalysis, physical analysis, etc.
0530006-GS	Organic Chemistry I-GS	2	C	Organic chemistry is related with structures and properties of organic compounds supporting from all the biological activities on the Earth to our general social lives. Organic chemistry is also applied to wide area from pharmacy to organic light emitting device and transistor. In this lecture, first, notion of valence and molecular orbital and chemical bonds which make organic compounds, which are needed for understanding systematically molecular structure and reactivity, are learned. Further, property, synthesis, and interconversion of functional group, which is a group of structural units with functions, are learned. The aims are that at the end of this lecture the students can estimate the property of an organic compound only when they see the structural formula and can understand systematically organic reaction mechanisms following electron flow.
	Laboratory Work & Seminar	7.5	C	Coming soon