Faculty	**Ingegneria**
Bachelor	**Mechanical Engineering (La Spezia)**
Year/Semester	**1/II**

Course Title	**Chemistry**
ID Course Code	**56537**
Course Credits (CFU)	**6**
Scientific-Disciplinary Sector	**CHIM/07**
Course Type	**mono-disciplinary course**
Lecturer-in-charge	**RAMIS Gianguido**

Learning Outcomes:

Chemical and physical basic knowledge of atomic structure, chemical bond, thermodynamic and kinetic needed to interpret and to describe the fundamental aspects of the materials structure and transformation, of the natural and environmental phenomena and of the main technological chemical processes.

Course Organisation Details

Nature of the matter: quantization of energy and wave nature of the matter; Schrodinger equation an atomic structure; periodic properties of the elements; valence bond theory and molecular orbitals; band structure theory in the solids; amorphous and crystalline structure of solids; properties of liquids; perfect and imperfect gases; mechanical, electric and magnetic properties.
Fundamentals of the chemical reactivity: first law of thermodynamic; enthalpy in chemical reactions; second law of thermodynamic and spontaneous change; entropy and third law of thermodynamic; spontaneous chemical reaction and Gibbs function; chemical equilibrium; phase diagrams of pure and mixed compounds; aqueous solutions, strong acids and bases, weak acids and bases, solubility of salts; electrochemistry and Nernst law; reduction potentials, electrolytic cells and faraday law; voltaic cells and storage battery; metallurgy and metal corrosion, rate of reaction and kinetic models; Arrhenius law, transition complex and catalysis.

Numerical applications: units; nomenclature of chemical compounds; mole; formulas; atomic and molecular weight; chemical reactions; gas laws; concentrations; colligative properties; thermodynamics and thermochemistry; electrochemistry; shift of the chemical equilibrium; pH.

Assessment	hours
Lectures	**45.0**
Practice	**15.0**
Laboratory	**0.0**
Integrative activities	**0.0**

References

Autore/i, *Titolo*, Editore, anno R. Chang, *Fondamenti di chimica generale*, McGrow-Hill, Milano, 2009;

P. Atkins e L. Jones, *Principi di chimica*, Zanichelli, Bologna, 2005;

M.S. Silberberg, *Chimica*, McGrow-Hill, Milano 2004;

V. Lorenzelli, *Elementi di Chimica per le Facoltà di Ingegneria*, Genova, Ed. Univ., 1994;

M. Panizza e G. Cerisola, *Esercizi di Chimica per Ingegneria*, ECIG, Genova, 2003.

Organization and examinations

Practical abilities are tested during numerical exercises.

Written and oral examinations.

Pre-requisites

Basic physical and mathematical fundamentals.