



COURSE: Chemistry

TEACHER: Francesco Tramutola

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website:

Language: italian

ECTS: 9

n. of hours: 90

Academic year: 2014/2015

Campus: Potenza

Semester: I

TOPICS

This course aims to introduce the states of matter and the reactions involving matter.

TEACHING METHODS (please tick one or more options)

Theoretical lessons 54

Tutorials in classroom 36

Tutorials in laboratory

Project works

Technical visits

Other activities (please specify) _____

TEXTBOOKS

Chimica, Steven S. Zumdahl, Zanichelli

ON-LINE EDUCATIONAL MATERIAL

web address: oldwww.unibas.it/chimica_ingegneria/index.html

LEARNING OUTCOMES

Good basic learning of Chemistry to effectively solve issues involving matter and its transformations.

REQUIREMENTS

EVALUATION METHODS (please tick one or more options)

Intermediate verifications

Written examination

Discussion of a project work

Practical test

Oral examination

Other methods (please specify) _____

DETAILED CONTENT

Classification of matter. Elements, compounds. Dalton atomic theory. Atomic models: J. J. Thomson, Rutherford, fundamental particles. Atomic number. Electromagnetic radiation and Planck quantization of energy. Bohr-Sommerfeld model of the atom. Quantum numbers, Pauli exclusion principle. Compton effect. De Broglie hypothesis of wave-particle duality. G. Thomson experiment. Heisenberg uncertainty principle. Schrodinger equation, atomic orbitals. Hund's rule, aufbau principle, electronic configuration. Valence. Mass number, isotopes, atomic mass. Ions. Periodic table, elements periodic properties. Effective nuclear charge, atomic radius, ionization energy, electron affinity, electronegativity. Ionic and covalent bonds. Molecules, molecular mass, empirical formula and molecular formula. Mass percent composition. The mole concept, Avogadro's number. Oxidation number. Binary, ternary and quaternary compounds. Law of conservation of mass. Stoichiometry of chemical reactions, limiting reagent. Lewis structures, VSEPR model. Valence bond theory, hybrid orbitals. Molecular orbital theory. Redox. State of matter. Intermolecular forces. Gase. Boyle's law, Charles's law, Gay-Lussac's law of ideal gas, gas mixtures. Real gas. Liquids. Solutions, expression of concentration, dilutions. Strong and weak electrolytes. Colligative properties. Thermodynamics, enthalpy, Hess's law, entropy, free energy, spontaneity of a reaction. Chemical kinetics, reaction rate, rate law, Arrhenius equation, catalysis. Chemical equilibrium, equilibrium constant, Le Chatelier's principle. Equilibrium reactions in gas phase and in solution. Acids and bases. Acid-base reactions, titration, pH, buffer solutions, Henderson-Hasselbalch equation. Solubility and precipitation of solids.



Università degli Studi della Basilicata
Scuola di Ingegneria

Electrochemical, galvanic cells , standard potentials, Nernst law, electrolysis. Solids . Organic chemistry, main classes and functional groups .

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION
