Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Chemistry			
ACADEMIC YEAR: 2018/2019			
TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characteristic, Affine, Free choiche, Other) Basic			
TEACHER: Lelario Filomena			
e-mail: filomenalelario@hotmail.com		web: www2.unibas.it/filomenalelario	
phone:		mobile (optional): 3283289986	
Language: Italian			
ECTS: (lessons e tutorials/practice) 6	n. of hours: (lessons e tutorials/practice) 60	Campus: Potenza Dept./School: Engineering School Program:	Semester: I

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES
Good basic learning of Chemistry to solve effectively issues involving matter and its transformations

PRE-REQUIREMENTS
Good understanding of arithmetic calculus, fundamentals of analytic geometry

SYLLABUS
1° Unit: 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 (4 hours)
2° Unit : 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. (4 hours)
3° Unit : 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. (4 hours)
4° Unit: Lewis structures, VSEPR model. Valence bond theory, hybrid orbitals. Molecular orbital theory. Redox. (4 hours)
5° Unit: State of matter. Intermolecular forces. (2 hours)
6° Unit: Gas. Boyle's law, Charles's law, Gay-Lussac's law of ideal gas, gas mixtures. Real gas. (2 hours)
7° Unit: Liquids. Solutions, expression of concentration, dilutions. Strong and weak electrolytes. Colligative properties. (2 hours)
8° Unit: Chemical equilibrium, equilibrium constant, Le Chatelier's principle. Equilibrium reactions in gas phase and in solution. (4 hours)
9° Unit: Acids and bases. Acid-base reactions, titration, pH, buffer solutions, Henderson- Hasselbalch equation. (4 hours)
10° Unit: Solubility and precipitation of solids. (2 hours)
11° Unit: Galvanic cells, standard potentials, Nernst law, electrolysis. Solids. (4 hours)

Classroom tutorials: 24 hours

TEACHING METHODS
Theoretical lessons (36 hours)
Classroom tutorials (24 hours)

EVALUATION METHODS

Intermediate verifications or witten examination, oral examination

The written examination concerns the resolution of six exercises on all the units of the programs. It has a duration of 2 hours. The evaluation is expressed in thirtieths (15/30 minimum threshold for overcoming). The oral examination covers all the units of the program. The evaluation is expressed in thirtieths (18/30 minimum threshold for overcoming). The vote of the exam is given as the arithmetic average of the two scores obtained in the two oral and written examinations.

During the course, two intermediate verifications are carried out. They can substitute the written and oral examinations. The first intermediate verification takes place at the end of November and concerns the resolution of six exercises on the units 1-5. It has a duration of 2 hours. The evaluation is expressed in thirtieths (18/30 minimum threshold for overcoming). The second intermediate verification (only for the students who have passed the first): It takes place at the end of february and it concerns the resolution of six exercises on the units 5-11. It has a duration of 2 hours. The evaluation is expressed in thirtieths (18/30 minimum threshold for overcoming). To students who are sufficient in both these intermediate verifications, it is given the vote of the exam as the arithmetic average of the two scores obtained in the verification tests. The following oral examination must take place by the end of July

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Chimica, Steven S. Zumdahl, Zanichelli

Fondamenti di chimica, Brown, Lemay, Bursten, Murphy, Woodward , EdiSES

Materials distributed in the classroom and available on www2.unibas.it/filomenalelario.

INTERACTION WITH STUDENTS

All the notices concerning the course, the examinations, the educational materials are distributed in the classroom and are made available on-line through the teacher's web site.

Office hours: Monday from 15.30 to 17.30 at the office 23, V floor, Engineering School, Macchia Romana campus, Potenza. Students also may use email address of the teacher for further contacts.

EXAMINATION SESSIONS (FORECAST)[1]

15/02/2020, 14/03/2020, 18/04/2020, 19/06/2020, 17/07/2019, 20/09/2020, 27/11/2020

SEMINARS BY EXTERNAL EXPERTS YES □ NO X

FURTHER INFORMATION

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.