



UNIVERSITÀ DEGLI STUDI DI PALERMO

SCHOOL	POLYTECHNIC SCHOOL
ACADEMIC YEAR	2016/2017
FIRST CYCLE COURSE	BIOMEDICAL ENGINEERING
SUBJECT	CHEMISTRY
TYPE OF EDUCATIONAL ACTIVITY	A
AMBIT	50293-Fisica e chimica
CODE	01788
SCIENTIFIC SECTOR(S)	CHIM/07
HEAD PROFESSOR(S)	PALMISANO LEONARDO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	144
COURSE ACTIVITY (Hrs)	81
PROPAEDEUTICAL SUBJECTS	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	<p>PALMISANO LEONARDO</p> <p>Tuesday 10:30 12:30 Ufficio Prof. Leonardo Palmisano 2° piano Edificio 6, Viale delle Scienze.</p> <p>Thursday 10:30 12:30 Ufficio Prof. Leonardo Palmisano 2° piano Edificio 6, Viale delle Scienze.</p>

TEACHING METHODS	Frontal lessons and exercises
ASSESSMENT METHODS	<p>Assessment methods</p> <p>Learning of the contents presented during the course will be evaluated using two tests: one written and one oral.</p> <p>The written examination, which tends to verify the skills and the knowledge relating to the disciplinary scope of the course, will be composed of ten questions, numerical and theoretical, with open answers that meet constraints that make them comparable with the predetermined correction criteria. The total score of the written tests will be out of thirty and will result from the sum of the scores given to each question depending on its complete resolution, partial or no. The expected duration of the written examination is two hours and to pass the written examination is a condition needed to access to the oral examination. The oral examination consist of an interview to ascertain the possession of the skills and the knowledge provided by the course, the computing capacity and an adequate display capacity. The candidate will have to answer at least to three topics concerning the program, with reference to the recommended texts. The assessment is expressed in thirtieths.</p> <p>Final assessment aims to evaluate whether the student has knowledge and understanding of the topics, and has acquired an independent judgment on specific cases.</p> <p>Description of the evaluation methods</p> <p>Evaluation Vote Outcome</p> <p>Excellent 30 - 30 and lode Excellent knowledge of the topics, excellent properties of language, good analytical ability, the student is able to apply the knowledge to solve problems proposed</p> <p>Very good 26-29 Good mastery of the subjects, full ownership of the language, the student is able to apply the knowledge to solve problems proposed</p> <p>Good 24-25 Basic knowledge of the main topics, discrete properties of language, with limited ability to independently apply the knowledge to the solution of the proposed problems</p> <p>Satisfactory 21-23 The student does not have full command of the main teaching subjects but it has the knowledge, satisfactory property language, poor ability to independently apply the acquired knowledge</p> <p>Sufficient 18-20 Minimum basic knowledge of major teaching and technical language issues, very little or no ability to independently apply the acquired knowledge</p> <p>Insufficient It does not have an acceptable knowledge of the contents of the topics covered in the teaching</p>
LEARNING OUTCOMES	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> • The student at the end of the course, will have acquired the basic knowledge about: Atoms and atomic structure; Theory of chemical bonds; Phase equilibria; States of aggregation; Chemical equilibria; Thermodynamic functions; Electrochemistry; Nomenclature of organic and inorganic compounds. <p>Applying knowledge and understanding</p> <ul style="list-style-type: none"> • Capacity in solving problems regarding combustion, molecular, ionic and acid-base equilibrium. • Ability to understand the transformations of the matter according to chemical reactions. <p>Making judgements</p> <ul style="list-style-type: none"> • The student will have gained autonomy in the application of the basic concepts of Chemistry and in the resolution of problems regarding the combustion, molecular, ionic and acid-base equilibria, electrochemical cells and electrolytic phenomena. <p>Communication skills</p> <ul style="list-style-type: none"> • The student will be able to communicate with competence and properties of language about the problems relating to the matter structure and its transformations in order to better understand the behavior of the materials. <p>Learning skills</p> <ul style="list-style-type: none"> • The student will be able to deal independently the study of problems concerning all aspects presented during the course.
EDUCATIONAL OBJECTIVES	<p>At the end of the course the student will be able to understand how the knowledge of some basic concepts of General Chemistry is the basis of almost all technologies and how they can be used in the performance of their profession. An important example concerns the graduated in biomedical engineering for which the basic concepts of Chemistry are fundamental for the study of biomaterials. However, the main goal is to provide the students with awareness of the vital role that the discipline has in the production of all types of materials used in the engineering field.</p>
PREREQUISITES	

	To address the study of Chemistry, knowledges of basic mathematics are required (calculation of percentages, solution of quadratic and logarithmic equations)
SUGGESTED BIBLIOGRAPHY	M. Schiavello e L. Palmisano "Fondamenti di Chimica" Ed. Edises. L. Palmisano e M. Schiavello "Elementi di Chimica" Ed. Edises (in alternativa al primo). F. Cacace, M. Schiavello "Stechiometria" Ed. Bulzoni (facoltativo).

SYLLABUS

Hrs	Frontal teaching
3	Introduction to the course. Fundamental laws of chemistry
3	Atomic theory
2	Periodic table of the elements
2	Inorganic compounds nomenclature
3	The chemical bond
1	The gaseous state
1	The liquid state
1	The solid state
3	Thermodynamics
4	Chemical kinetics
1	Phase diagrams for one-component systems
2	Two-component systems
2	Colligative properties
2	Chemical equilibrium
3	Ionic equilibria
1	Buffer solutions. Titration curves
1	Conductimetry
2	Electrochemistry
4	Organic chemistry

Hrs	Practice
2	Atomic theory of the matter. Fundamental laws of chemistry
2	The mole. Empirical and molecular formulas. Equivalent weight
2	Stoichiometry. Limiting reactant
2	The chemical bond. The hybrid orbitals
2	Red-ox reactions
3	Inorganic nomenclature. Structure formulas
3	The gaseous state
3	Thermodynamic's elements
4	Two-component systems. Colligative properties
4	Chemical equilibrium
4	Ionic equilibria
2	Buffer solutions. Titration curves
1	Solubility product
3	Electrochemistry
2	Background of organic chemistry: nomenclature