



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Fisica e Chimica - Emilio Segrè
ACADEMIC YEAR	2021/2022
BACHELOR'S DEGREE (BSC)	PHYSICS
SUBJECT	CHEMISTRY
TYPE OF EDUCATIONAL ACTIVITY	A
AMBIT	50160-Discipline chimiche
CODE	01788
SCIENTIFIC SECTOR(S)	CHIM/03
HEAD PROFESSOR(S)	GIANNICI FRANCESCO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	GIANNICI FRANCESCO Tuesday 16:00 18:00 edificio 17 di Viale delle Scienze, stanza 1/A3. Contattare il docente via email per concordare l'orario del ricevimento. Thursday 16:00 18:00 edificio 17 di Viale delle Scienze, stanza 1/A3.

DOCENTE: Prof. FRANCESCO GIANNICI

PREREQUISITES	None
LEARNING OUTCOMES	Knowledge and understanding of basic concepts in inorganic chemistry, physical chemistry and analytical chemistry: in particular, knowledge of the main topics of interest to physical sciences (e.g. chemical bonding, thermochemistry, electrochemistry) will be a primary outcome. Applying knowledge and understanding of the structure of matter, on the basis of the principles of chemistry; solving numerical exercises dealing with stoichiometry. Making judgments: Provide and interpret structure and properties of elements and of chemical compounds. Communication skills: Expose, in written and oral form, unexplained phenomena through the topics covered in the course. Learning skills: Designing laboratory experiments involving the preparation of known quantities of solid, liquid or gaseous samples.
ASSESSMENT METHODS	The final examination consists of a written test and of an oral exam. The written test, of the duration of about 2 hours, concerns the resolution of exercises on stoichiometry. The oral test consists of an interview on theoretical and practical aspects of the topics covered in the course. The final assessment, properly graded, will be made on the basis of the following conditions: a) sufficient knowledge of subjects and theories addressed in the course and sufficient explanation ability; sufficient degree of awareness and autonomy in the application of theories to solve chemical problems (rating 18-21); b) Good knowledge of subjects and theories addressed in the course and discrete explanation ability; fair degree of awareness and autonomy in the application of theories to solve chemical problems (rating 22-25); c) Good knowledge of subjects and theories addressed in the course and good explanation ability; good degree of awareness and autonomy in the application of theories to solve chemical problems (rating 26-28); d) Excellent knowledge of subjects and theories addressed in the course and excellent explanation ability; excellent level of awareness and autonomy in the application of theories to solve chemical problems (rating 29-30L).
EDUCATIONAL OBJECTIVES	The course aims at providing the student with basic knowledge and skills in the framework of general chemistry, to approach the study of matter in relation to its composition and to correlate its properties to molecular structure, from both theoretical and practical points of view. During practice, the student will learn to solve numerical problems of stoichiometry.
TEACHING METHODS	Lectures and numerical exercises
SUGGESTED BIBLIOGRAPHY	Il corso si svolge secondo la sequenza di argomenti di: Oxtoby, "Chimica Moderna", Edises (ISBN: 8879599704). In alternativa, può essere usato un altro testo di Chimica generale: ad es. 1) Petrucci, "Chimica generale", Piccin (ISBN: 8829929336); 2) Atkins, "Chimica generale", Zanichelli (ISBN: 9788808670120). Qualsiasi edizione moderna dei testi è adatta. Gli studenti che volessero usare altri testi sono invitati a consultare il docente per verificarne i contenuti. Il materiale a supporto delle esercitazioni di stechiometria è fornito dal docente. Eventuali approfondimenti facoltativi sulla risoluzione degli esercizi possono essere trovati in: Giomini, "Fondamenti di Stechiometria", Edises (ISBN: 887959351X). (English version: Recommended textbooks. One of the following: 1) Oxtoby, "Principles of Modern Chemistry"; 2) Petrucci, "General chemistry: Principles and Modern Applications"; 3) Atkins, "Chemical Principles". Practice problems of stoichiometry are provided by the instructor. Facultative further exercises can be found in "Schaum's Outline of College Chemistry".)

SYLLABUS

Hrs	Frontal teaching
4	Constitution of matter. Atoms and atomic theory. Elements and compounds. Chemical reactions. Reactions in aqueous solution. Periodic table. Metals and non metals.
6	Chemical bond: introduction. Modern atomic theory. Chemical bond: insights and models.
2	Atomic and molecular orbitals. Essentials of computational methods in chemistry.
2	Main classes of compounds and functional groups in Organic Chemistry
4	The solid state. Crystal lattices. Ionic bonding in solids. X-ray diffraction. Electronic structure of solids.
2	Ideal gases and real gases. Liquids, solids and phase diagrams. Solutions and their properties.
6	Thermochemistry. Gibbs free energy. Spontaneous reactions. Chemical equilibria: principles. Homogeneous and heterogeneous equilibria.
6	Acid-base equilibria. Solubility equilibria. Electrochemistry. Chemical kinetics.

Hrs	Practice
8	Isotopic composition. Writing balanced chemical equations. Molecular structure. Ideal gases. Colligative properties.
10	Thermochemistry. Entropy and Gibbs free energy. Homogeneous and heterogeneous equilibria. Acid-base equilibria. Solubility equilibria. Electrochemistry.
6	Exercises on the final exam questions