



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2016/2017		
BACHELOR'S DEGREE (BSC)	BIOLOGICAL SCIENCES		
INTEGRATED COURSE	PHYSICS AND PHYSICAL CHEMISTRY		
CODE	12538		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	FIS/07, CHIM/02		
HEAD PROFESSOR(S)	EMANUELE ANTONIO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	AGLIOLO GALLITTO AURELIO	Professore Associato	Univ. di PALERMO
	EMANUELE ANTONIO	Professore Associato	Univ. di PALERMO
	CHILLURA MARTINO DELIA FRANCESCA	Professore Ordinario	Univ. di PALERMO
	LOMBARDO RENATO	Ricercatore	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>AGLIOLO GALLITTO AURELIO</p> <p>Tuesday 14:00 16:00 Via Archirafi 36, studio del docente (per gli studenti di Scienze Fisiche). Viale delle Scienze, Ed.18 (per gli studenti di Ottica e Optometria e gli studenti di Scienze Biologiche). Modalita a distanza. Su appuntamento.</p> <p>Thursday 14:00 16:00 Via Archirafi 36, studio del docente (per gli studenti di Scienze Fisiche). Viale delle Scienze, Ed.18 (per gli studenti di Ottica e Optometria e gli studenti di Scienze Biologiche). Modalita a distanza. Su appuntamento.</p> <p>CHILLURA MARTINO DELIA FRANCESCA</p> <p>Monday 15:00 16:00 Studio Prof. Chillura. Ed. 17 - Viale delle Scienze</p> <p>EMANUELE ANTONIO</p> <p>Monday 16:00 18:00 DIFC Emilio Segre, via Archirafi, 36</p> <p>LOMBARDO RENATO</p> <p>Tuesday 10:00 12:00 Dipartimento STEBICEFStudio 1/B4, edificio 17, viale delle Scienze</p> <p>Thursday 10:00 12:00 Dipartimento STEBICEFStudio 1/B4, edificio 17, viale delle Scienze</p>		

DOCENTE: Prof. ANTONIO EMANUELE

PREREQUISITES	Prerequisites are the topics of Maths, Physics and Chemistry requested to access the Course. Attendance of first semester subject of Maths and General Chemistry are necessary to fully achieve the learning outcomes.
LEARNING OUTCOMES	<p>Knowledge and understanding Knowledge of the basic concepts of classical physics, thermodynamics, physical chemistry and chemical kinetics. Knowledge of the scientific method.</p> <p>Applying knowledge and understanding Students become capable of solving simple problems of general physics, classical thermodynamics and chemical kinetics as samples of rigorous application of the scientific method.</p> <p>Making judgements Students are able of autonomous choice of physical laws and solving method to simple problem of general physics. They are able to evaluate energy balance and mechanism of simple chemical reactions and biological processes.</p> <p>Communication Students are able of explain clearly and concisely the fundamental laws of classical physics, of thermodynamics and chemical kinetics.</p> <p>Lifelong learning skills Students are able of understand and deepen the grounds of classical physics, of thermodynamics and chemical kinetics. They are able of understand the physical bases of the operation of instrumentation used in biological and biomedical laboratorie.</p>
ASSESSMENT METHODS	<p>Final assessment consists of an oral examination preceded by written resolution of simple problems of Physics. The written resolution of exercises consists of doing, without the aid of textbooks or notes, five basic problems that involve the main laws of mechanics (2 problems), of fluids (1 problem), of classical thermodynamics (1 problem), of electromagnetism (1 problem). The written resolution of problems is done to check, at equal conditions for all candidates, the degree of knowledge of the physical laws and the ability to apply them in simple situations. Students who have had a positive assessment of the ongoing evaluation have not to carry out the written resolution of problems. The oral test consists of an examination-interview concerning discussion of the problems, with particular reference to the mistakes and the shortcomings highlighted in the resolution of the problems. This test is done to evaluate, in addition to knowledge of the candidate and his ability to apply it, also his scientific language skills and his ability of clear and direct wording.</p> <p>The final assessment, properly graded, will be drawn on the basis of the following conditions:</p> <p>a) basic knowledge of the topics studied, limited language skills (18-21 rating); b) good knowledge of the topics studied and sufficient ability to apply the laws in simple situations, even in a guided way, sufficient presentation and language skills (22-25 rating); c) In-depth knowledge of the topics studied and good ability to apply the laws in simple situations autonomously, good language skills (26-28 rating); d) In-depth knowledge of the topics studied and good ability to apply the laws to new situations autonomously, excellent language and communication skills (29-30L rating).</p>
TEACHING METHODS	The whole subject is scheduled on first semester of the second year and contains two subject: Physics and Physical-Chemistry. Students have to attend frontal teaching during which simple exercises are resolved. A break is done at 3/5 of the semester to do an ongoing evaluation (not mandatory) on mechanics (2 problems), fluids (1 problem) and thermodynamics (1 problem). Only Physics lectures are done before break. Chemical-Physics lectures start after the break.

MODULE PHYSICS

Prof. ANTONIO EMANUELE - Lettere A-K, - Lettere A-K

SUGGESTED BIBLIOGRAPHY

R.A. Serway, J. W. Jewett Jr, Principi di Fisica, V Ed., Edises
 P.L. Kesten, D.L. Tauck, Fondamenti di Fisica, Zanichelli
 J.S. Walker, Fondamenti di Fisica, Pearson - Addison Wesley
 E. Ragozzino, Principi di Fisica, EdISES
 A. Bartolotta, Meccanica dei Fluidi, EdISES

AMBIT	50025-Discipline matematiche, fisiche e informatiche
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48
EDUCATIONAL OBJECTIVES OF THE MODULE	
The subject is devoted to acquire basic knowledge of classical physics, also by resolving simple problems and exercises.	

SYLLABUS

Hrs	Frontal teaching
8	Physical quantities, units of measurement, errors, plots. Vectors. Kinematics of a particle in one, two and three dimensions. Motion with constant velocity, motion with constant acceleration and uniform circular motion. Basics of rotational kinematics.
6	Dynamics of a particle: Newton's laws of motion. Gravitational force, normal force, frictional forces, centripetal force, tension, spring forces. Torque. Elements of rotational dynamics.
8	Kinetic energy. Work-energy theorem. Conservative and non-conservative forces. Potential energy. Conservation of mechanical energy. Momentum. Conservation of momentum. Center of mass. Elastic and inelastic collisions. Simple harmonic oscillations.
8	Fluid statics: pressure, laws of Pascal and Stevin, Archimedes' principle. Fluid hydrodynamics: flow of an ideal fluid, equation of continuity, Bernoulli's equation. Viscous fluids. Sedimentation. Surface tension.
8	Thermodynamics. Thermal equilibrium. Temperature scales. Thermal expansion. Heat capacity and specific heat. The ideal gas law. Kinetic theory of gases. The first law of thermodynamics. Internal energy of an ideal gas. Reversible and irreversible thermodynamic transformations. Thermodynamic cycles. Performance of a thermal engine. The second law of thermodynamics and entropy.
10	Electric charge, conductors and insulators, Coulomb's force, superposition principle. Electrostatic field. Electric dipole. Electrostatic potential energy, electrostatic potential. Capacitor. Electric current. Ohm's law. DC circuits. Lorentz's force. Magnetic field. Faraday induction. Electromagnetic waves. Introduction to the interaction of electromagnetic waves with biological matter. Newtonian optics.

MODULE PHYSICS

Prof. AURELIO AGLIOLO GALLITTO - Lettere L-Z, - Lettere L-Z

SUGGESTED BIBLIOGRAPHY

R.A. Serway, J. W. Jewett Jr, Principi di Fisica, V Ed., Edises
 P.L. Kesten, D.L. Tauck, Fondamenti di Fisica, Zanichelli
 J.S. Walker, Fondamenti di Fisica, Pearson - Addison Wesley
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**MODULE
PHYSICAL CHEMISTRY**

Prof. RENATO LOMBARDO - Lettere L-Z, - Lettere L-Z

SUGGESTED BIBLIOGRAPHY

Atkins, P.W.; De Paula, J. Physical Chemistry for the Life Sciences, Oxford University Press, 2011
Atkins, P. W.; Paula, J. D. Chimica fisica biologica: 1; Zanichelli: Bologna, 2008.
Atkins, P.W.; De Paula, J Chimica Fisica, Zanichelli, 2012

AMBIT	10665-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	51
COURSE ACTIVITY (Hrs)	24

EDUCATIONAL OBJECTIVES OF THE MODULE

To provide the cultural tools to connect the atomic-molecular vision with that at the macroscopic level and to interpret biomolecular phenomena in terms of energy by means of thermodynamic principles.

SYLLABUS

Hrs	Frontal teaching
4	Matter at the atomic scale and intermolecular interactions: phenomena and applications
4	First law of thermodynamics
4	Second First law of thermodynamics
4	Gibbs energy
4	Multiple components systems and chemical equilibrium
4	Rate and mechanism of chemical and biochemical reactions

**MODULE
PHYSICAL CHEMISTRY**

Prof.ssa DELIA FRANCESCA CHILLURA MARTINO - Lettere A-K, - Lettere A-K

SUGGESTED BIBLIOGRAPHY

Atkins, P.W.; De Paula, J. Physical Chemistry for the Life Sciences, Oxford University Press, 2011
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