



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2017/2018		
BACHELOR'S DEGREE (BSC)	BIOMEDICAL LABORATORY TECHNIQUES		
INTEGRATED COURSE	BIOCHEMISTRY AND PHYSICS - INTEGRATED COURSE		
CODE	17558		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	FIS/07, BIO/10		
HEAD PROFESSOR(S)	DI GAUDIO FRANCESCA Ricercatore	Univ. di PALERMO	
OTHER PROFESSOR(S)	SAVOCA GAETANO Professore a contratto	Univ. di PALERMO	
	DI GAUDIO FRANCESCA Ricercatore	Univ. di PALERMO	
CREDITS	6		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	DI GAUDIO FRANCESCA Friday 13:00 14:00 DIPARTIMENTO PROMOZIONE DELLA SALUTE, MATERNO INFANTILE DI MEDICINA INTERNA E SPECIALISTICA DI ECCELLENZA - PROMISE - "GIUSEPPE D'ALESSANDRO" - CQRC Via del Vespro n. 133, primo piano		

DOCENTE: Prof.ssa FRANCESCA DI GAUDIO

PREREQUISITES	In order to be admitted to this Degree Course, students must pass a compulsory examination based on a general culture test that includes basic but basic topics. The course does not provide a course for chemistry either for the general part or for the organic chemistry absolutely propedeutic for Biochemistry. Therefore, to understand the themes of the Biochemistry Course, it is necessary for students to undertake a thorough in-depth study of at least organic chemistry.
LEARNING OUTCOMES	The student at the end of the course will acquire a good knowledge of the chemical and physical principles at the basis of human metabolism and laboratory tests that allow to evaluate metabolic function. Knowledge and understanding: The student must know and understand the molecular and chemical physical basis of matter, the characteristics of the elements and molecules and the principles underlying their chemical-physical behavior, the structure and properties of organic compounds And macromolecules of biological interest. Students will also need to know the biochemical and molecular basis of cellular activity and understand the mechanisms that regulate metabolic processes. In particular, they will need to know the molecules of biological interest and the main metabolic processes involved, know and understand the mode of action of the enzymes, the bases of their regulation and catalysis, the basics of bioenergetics and the general mechanisms of transduction Of extracellular signals.
ASSESSMENT METHODS	Learning of the student will be assessed through an oral examination at the end of the course. It will assess the acquired knowledge, processing and presenting capabilities. The evaluation is expressed in thirtieths. The threshold of sufficiency will be achieved when the student will have shown knowledge and understanding of the course topics, at least in general terms, and that they have a sufficient capacity to convey his knowledge to the examiner. The sufficiency threshold will be reached if the student shows knowledge and understanding of the issues at least in broad outline, and has application skills sufficient; he must also have presentation and argumentative skills allowing the transmission of his knowledge to the examiner. Below this threshold, the examination will be insufficient. The more the candidate will be able to interact with the examiner with his argumentative and presentation skills, and the more his knowledge and application capabilities will go into detail on the subjects under evaluation, the more the judgement will be positive. The evaluation is expressed using a 30-point scale. ECTS grades: A – A+ Excellent (30-30 cum laude) - Grade descriptors : Excellent knowledge of teaching contents for Integrated Course and laboratory activities; students should show high analytical and synthetic capabilities and should be able to apply their knowledge to solve highly complex problems. ECTS grade : B Very good (27-29) - Grade descriptors: Good knowledge of the teaching contents and excellent language control; students should show analytical and synthetic skills and be able to apply their knowledge to solve problems of medium and, in some cases, even higher complexity. ECTS grade: C Good (24-26)- Grade descriptors: Good knowledge of teaching contents and good language control; the students should be able to apply their knowledge to solve problems of medium complexity ECTS grade: D Satisfactory (21-23)- Grade descriptors: Average knowledge of the teaching contents, in some cases limited to the main topic; acceptable ability to use the specific discipline language and independently apply the acquired knowledge. ECTS grade: E Sufficient (18-20) - Grade descriptors: Minimum teaching content knowledge, often limited to the main topic; modest ability to use the subject specific language and independently apply the acquired knowledge. ECTS grade: F Fail (1-17) - Grade descriptors: Lack of an acceptable knowledge of the main teaching content knowledge; very little or no ability to use the specific subject language and apply independently the acquired knowledge. Exam failed.
TEACHING METHODS	Lectures, exercises and laboratory activities at the Regional Reference Center for Level II Laboratory Surveys and Quality Control (U.O.C. CQRC).

MODULE APPLIED PHYSICS

Prof. GAETANO SAVOCA

SUGGESTED BIBLIOGRAPHY

D. C. Giancoli, Fisica: principi e applicazioni, Casa Editrice Ambrosiana
E. Ragozzino, Elementi di Fisica Per studenti di scienze biomediche, EdiSES

AMBIT	10337-Scienze propedeutiche
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Acquire the basic and general principles of the mechanics, thermodynamics, optics and fluids physics, Acquire the ability to apply these physics laws to solve exercises and examples

SYLLABUS

Hrs	Frontal teaching
2	Kinematics and Dynamics. Physical quantities. fundamental and derived quantities sizes. Units' measurement systems. Carriers. Vector and scalar. Sum of vectors. Product of vectors.
4	Kinematics of motion. material point. Speed. Acceleration. Trajectories and timing laws of motion. Motion in one and in two dimensions. Uniform rectilinear motion, uniformly accelerated motion, uniform circular motion, circular motion uniformly accelerated.
4	Dynamic. Force. Mass. gravitational forces. Force-Weight. Voltage of a rope. elastic forces. force of friction. Static and dynamic Attrition. Dynamics of circular motion.
6	Work and Energy. Work of a force. mechanical energy of a physical system. Kinetic energy. Potential energy. Forces and conservative systems. Difference between isolated and non-isolated systems. Conservation of mechanical energy. Potency and performance. Quantity 'of motion. Impulse of a force. Elastic and inelastic collisions
6	Fluids. Properties of liquid. Density. Specific weight. Stevin law. Pascal's Law. Archimede force. Fluid Dynamics. A fluid flow rate. Bernoulli's law. Biological and technical applications of the Bernoulli law.
4	thermodynamic bases. temperature. Thermometers based on expansion. clinical thermometer. Quantity of termic energy. Thermal Capacity of a body. Specific heat at constant volume or pressure of a substance. Heat, work and internal energy: first law of thermodynamics. metabolic power, energy value of foods. thermoregulation
4	Optics. luminous energy, refraction, reflection, diffraction, diffusion, frequency and wavelength, photoelectric effect.

MODULE BIOCHEMISTRY

Prof.ssa FRANCESCA DI GAUDIO

SUGGESTED BIBLIOGRAPHY

Biochimica Medica, Siliprandi Tettamanti ed. Piccin
Principi di Biochimica di Lehninger, Nelson e Cox ed. Zanichelli

AMBIT	10338-Scienze biomediche
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Detailed knowledge of molecules of biologic interest and principal metabolic processes in which they are involved. Knowledge and understanding of enzyme action modality, regulation and catalysis. Knowledge and understanding of bioenergetic basis.

SYLLABUS

Hrs	Frontal teaching
3	Organic chemistry elements
2	Main food components
2	Basic cell functions
2	Membrane transport Simple and facilitated diffusion. Active transport. Glucose transporters (GLUT). Na ⁺ -glucose symport. Na ⁺ /K ⁺ -dependent ATPase. Ca ⁺⁺ dependent ATPase. Other transport systems for calcium.
2	Amino acids and proteins
2	Role of the mineral component
2	Processes of catalysis, enzymes, enzymatic kinetics
2	Regulatory mechanisms, signal transduction
2	Protein metabolism
2	Glucid metabolism
2	Lipid metabolism
3	Nucleotide metabolism Purine e pyrimidine nucleotides biosynthesis. thymidilic acid biosynthesis. Recovery nucleotides biosynthesis. Purine nucleotide catabolism Alterations of uric acid metabolism. Hyperuricemia.
2	Vitamins General considerations. Features and functions of liposoluble and hydrosoluble vitamins. B1, B6 e B12 vitamins. Folic Acids. Monocarbon unit metabolism.
Hrs	Practice
2	Metabolic Diseases and Laboratory Evaluation of Metabolic Functionality