UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Promozione della Salute, Materno-Infantile, di Medicina Interna e Specialistica di Eccellenza “G. D’Alessandro”		
ACADEMIC YEAR	2018/2019		
BACHELOR'S DEGREE (BSC)	MIDWIFERY (QUALIFYING FOR PROFESSIONAL PRACTICE)		
INTEGRATED COURSE	PHYSICS AND COMPUTER SCIENCE- INTEGRATED COURSE		
CODE	10729		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	FIS/07, INF/01		
HEAD PROFESSOR(S)	MICELI MARCO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	FRANCHINI SILVIA GIUSEPPINA	Professore a contratto	Univ. di PALERMO
	MICELI MARCO	Professore Associato	Univ. di PALERMO
CREDITS	7		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**FRANCHINI SILVIA GIUSEPPINA** Friday 11:00 12:00 Su appuntamento **MICELI MARCO** Wednesday 14:30 16:30 Dipartimento di Fisica e Chimica, via Archirafi 36 (con prenotazione via email) Thursday 14:30 16:30 Dipartimento di Fisica e Chimica, via Archirafi 36 (con prenotazione via email)		

DOCENTE: Prof. MARCO MICELI

PREREQUISITES	basic knowledge of algebra, geometry, and trigonometry
LEARNING OUTCOMES	Knowledge and understanding: organic knowledge of the fundamental laws of Newtonian mechanics, hydrodynamics, classical thermodynamics and electromagnetism. Applying knowledge and understanding: The student will develop the capability to describe the physical phenomena analytically and to apply them to medicine. Making judgments: students will be able to recognize and classify physical processes, to independently choose the best strategy for the resolution of physical problems and the laws to apply. The student will be able to critically evaluate the results obtained. Communication: Special care will be dedicated to the acquisition of a rigorous scientific language. The student will be able to articulate clearly and concisely the fundamental laws, pinpointing the connections with the other courses. Lifelong learning skills: the students will acquire a method for the study of physical processes which will be useful in subsequent applications to medicine. In particular, they will know how to describe the observed phenomena in quantitative terms, by adopting appropriate physical quantities. They will also be able to decompose complex phenomena into their elementary terms and will interpret them, by using the laws of classical physics.
ASSESSMENT METHODS	The oral exam consists on a minimum of two/three questions on the course program. The student must demonstrate, with adequate language skills, his knowledge and understanding of the course program. The evaluation criteria are as follows: i) Excellent (30-30 cum laude): excellent knowledge and understanding of the topics, excellent language skills, advanced capability of applying the notions acquired for problem solving; ii) Very good (26-29): good knowledge of the course program and good language skills, good capability of applying the notions acquired for problem solving; iii) Good (22-25): good knowledge of the course program, but without a deep understanding of all its aspects, limited capability of independently applying the notions acquired for problem solving iv) Fair (18-21): modest understanding and minimum basic knowledge of the course program, difficulties in the resolution of the exercises, limited language skills; v) Poor: lack of understanding of basic subjects, limited knowledge of the course program.
TEACHING METHODS	Lectures and exercises.

MODULE
APPLIED MEDICAL PHYSICS

Prof. MARCO MICELI

SUGGESTED BIBLIOGRAPHY	
- D. Halliday, R. Resnick, K. Krane, FISICA 1, Editrice Ambrosiana- Milano - E. Ragozzino, ELEMENTI DI FISICA, Edises	
AMBIT	10303-Scienze propedeutiche
INDIVIDUAL STUDY (Hrs)	60
COURSE ACTIVITY (Hrs)	40
EDUCATIONAL OBJECTIVES OF THE MODULE	
knowledge and understanding of classical physics (mechanics, hydrodynamics, thermodynamics, electromagnetism); knowledge of the scientific method; capability to address and discuss problems of classical physics and their application to medicine.	

SYLLABUS

Hrs	Frontal teaching
4	Physical quantities, definition and measures. Scalars and vectors. Particle kinematics
4	Newton's laws and particle mechanics. Inertial and non-inertial systems
5	Work and kinetic energy. Conservative forces, potential energy and mechanical energy. Momentum and collisions
7	Hydrostatics. Hydrodynamics. Applications to the blood flow in the circulatory system
6	Thermometry and calorimetry. Ideal gas. Thermodynamic processes. First and second law of thermodynamics. Heat engines.
2	Introduction to sound waves and to the principle of operation of ultraound diagnostics
5	Electrostatics: Coulomb's law and Gauss theorem. Voltage. Capacitors. Electrical networks and Ohm's law
3	Magnetic field. Lorentz force. Cyclotron frequency. Magnetic field and electric currents. Introduction to electromagnetic waves. Introduction to X-ray diagnostics in medicine

Hrs	Practice
4	Solving excercises and problems

MODULE
COMPUTER SCIENCE

Prof.ssa SILVIA GIUSEPPINA FRANCHINI

SUGGESTED BIBLIOGRAPHY

R.C. Davidson – Metodi matematici per un corso introduttivo di fisica, Edises 1998, ISBN: 8879591363.
E. Ragozzino – Elementi di Fisica, Edises 2008, ISBN: 9788879594639.
G. Miele, O. Pisanti – Introduzione alla fisica, Edises 2011, ISBN: 9788879596800.

AMBIT	10315-Scienze interdisciplinari
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to convey to the student some fundamental notions of computer science both from the theoretical point of view and from the point of view of application.

SYLLABUS

Hrs	Frontal teaching
2	ntroduction; Information concept ; Evolution of Computers ; Von Neumann architecture ; Definition of Computer ; Algorithm definition ; well- ordered set ; Operations unambiguous and calculable ; 2. Information and Computer Science , Computer Science and Telecommunications ; Information and support ; Configuration and Codes ; Define a code ; Information coding ; Encoding Data and Instructions
2	Information and Informatics ; Binary -encoding -encoding ASCII -Conversion Binary / Decimal - Conversion Decimal / Binary Tutorial conversions Binary / Decimal Decimal and Binary ;
2	The development and structuring information ; Problems , algorithms , solutions and Executors ; Instruction , elementary actions , Effective Solutions ; Break it down into sub-problems ; Executors and languages ; Property ' elementary action ; Automatic solution ; Basic concepts, algorithm , program , program development ; Encoding algorithms , algorithms and variables ; Data and instructions ; Excel Tutorial - Spreadsheet
3	Algorithm Representation (natural language , pseudocode , block diagram , programming language) ; Flow diagrams ; The control structures (conditional statements , cyclical repetitions of instructions) ; -Selection Simple (if) , two-way selection (if then else) , selecting a more ' ways (if then else if , else if ... then) ; -Cycle To initial condition (While - do) ; Examples conditional statements If then else is and permanent instructions Do While Examples Block Diagrams
2	Cycle end condition (Do- while) ; Iterative loop (For loop) ; Practical examples of conditional statements , loops and iterative 4. Programming ; Programming language syntax and semantics ; Machine language ; Assembly language ; High-level language ; Language of II and III generation ; Translators , interpreters and compilers ; The fundamental parts of a program : the program identification, declaration of the variables used , specification of the executive part of the program (the body of the program) ; examples of algorithm .
2	Software; the S.O. functions (Operating system); Advantages of S.O. Elements of a S.O. applications ; Process and Program ; Organization of a S.O .; Core (or kernel) of a S.O .; Memory management; Thing and ' the System File . Excel Spreadsheet Tutorial