UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare
ACADEMIC YEAR	2021/2022
BACHELOR'S DEGREE (BSC)	GEOLOGY
SUBJECT	PHYSICS
TYPE OF EDUCATIONAL ACTIVITY	A
AMBIT	50193-Discipline fisiche
CODE	08557
SCIENTIFIC SECTOR(S)	FIS/05
HEAD PROFESSOR(S)	IARIA ROSARIO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	145
COURSE ACTIVITY (Hrs)	80
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**IARIA ROSARIO** Wednesday 15:00 17:00 Dipartimento di Fisica e Chimica - Via Archirafi 36- secondo piano - stanza 204 Friday 15:00 17:00 Dipartimento di Fisica e Chimica - Via Archirafi 36- secondo piano - stanza 204

DOCENTE: Prof. ROSARIO IARIA

PREREQUISITES	The prerequisites for profitable teaching and achieve the objectives which it is intended is the knowledge of basic mathematics and algebra, differential and integral calculus and trigonometry. It is also desirable that the students have attended actively the course of Mathematics expected in the first half and possibly taken the course exam
LEARNING OUTCOMES	-- Knowledge and ability to understand The student will acquire basic knowledge that is the necessary cultural background for understanding the phenomena concerning the Earth system. - Knowledge of the basis of classical physics, ability to explain simple phenomena by observing them. - Ability to describe phenomena through the mathematics language that leads to quantitative solutions of the discussed phenomena and that leads to quantitative predictions of similar phenomena. - Acquisition of the scientific method, both for interpretation of the typical geological phenomenology, both for consolidating the ability to understand other disciplines in scientific field. - Knowledge of the specific language of scientific disciplines - Ability to identify examples in which the studied laws can be applied --- Ability to apply knowledge and understanding At the end of the course the student will be able to solve exercises and answer questions in order to clarify the theoretical arguments developed . The student will able to apply the studied laws by solving simple issues of general physics. The aim is the developing of the ability for applying the scientific method by analyzing natural phenomena and identifying and describeing the fundamental mechanisms of the observed phenomena in terms of order of magnitude and level of approximation necessary --- Autonomy of judgment The student at the end of the course must be able to choose in autonomous way the solution modality of simple physics issues concerning the studied topics. He must also know how to use the dimensional analysis, and to make a critical comparison between the value of the obtained quantities and expectations based on his experience of studied phenomena, to evaluate correctness in the first approximation of the result found. The student will also know how to recognize the variety and charm of discoveries and theories of Physics, identifying the main applications in everyday life. --- Communication skills The student will acquire the ability to exhibit with appropriate language even to an untrained public, of the basic concepts learned. --- Learning skills The student will acquire: - a method of study based on a critical and never prioristic approach a new concepts. - ability to understand of physics classical and their application in the study of subsequent disciplines.
ASSESSMENT METHODS	The exam consists of a written test and an oral test. The written test consists of 5 simple exercises. At the same condition for each student, the exam allows to verify both the degree of knowledge of the basic law sand the ability to apply them to specific situations with the aim to obtain quantitative results. Each of the exercises is evaluated with a score from 0 to 6 points. The student is admitted to the oral examination only if the assessment in writing is at least 15/30 and if the student gets at least 1/30 in each of the 5 exercises. - The oral exam consists of an interview concerning the enunciation and the discussion of the studied physical laws and their use in the resolution of simple problems proposed to the candidate. This test allows to evaluate, in addition to the knowledge of the candidate and his ability to apply them, also the possession of scientific language and exhibition capacity clear and direct. The oral exam is optional for the students who obtained the written test a rating of at least 20/30. Five written exams in itinere (optional) are foreseen during the course. Each one consists of one exercises. Each exercise will be given a score from 0 to 6. If the student passes the test in itinere and then he is exempted from carrying out the part of the writing that

	concerns the part of the program included in the ongoing test. Each proof in itinere results exceeded if the student achieves an evaluation of at least 3/6. The rules for the oral examination are the same as those applied to those who have not played (or did not pass) the test in itinere. The final evaluation is in thirtieths: failed examination (0-17) and passed exam (18-30 cum laude). The final evaluation will be referred to the knowledge of the physical laws and to the ability to apply them autonomously. To pass the exam, the student must have enough ability to analyze the presented phenomena and show the procedures followed.
EDUCATIONAL OBJECTIVES	Aim of the course: -Introduce the student to the study of General Physics and provide the first knowledge on the subject. At the end of the course the student will acquire knowledge concerning the fundamental principles of classical physics. Furthermore will develop the skills necessary to face and solve problems and simple applications on the same topics. - Provide a method for the study of physical processes that may also be useful in subsequent applications and further details. - To develop the capacity of analysis and the criticism of the results of the student provided by the resolution of proposed problems.
TEACHING METHODS	The course aims to provide an introduction to the fundamentals of classical physics and includes basic knowledge useful for future studies. The course is held every six months and takes place during the second semester of first year of the Degree in Geological Sciences. The teaching activity develops through lectures and exercises in which problems are solved examples. Lectures are mainly carried out by developing arguments and calculations on the blackboard: this method allows a better e more 'gradual understanding of the topic by the students and a better one interaction with them. Discussions are solicited with the students during the explanation. The lessons and numerical exercises aim to develop e verify the ability to apply the student's knowledge and they constitute a useful training for the final exam. About half of the course an ongoing test is scheduled (not mandatory).
SUGGESTED BIBLIOGRAPHY	TESTO DI BASE Halliday, Resnick, Walker Fondamenti di Fisica Casa Editrice Ambrosiana - Settima edizione - ISBN: 9788808182296 TESTO DI BASE Kesten, Tauck Fondamenti di fisica , Zanichelli - ISBN: 9788808263582 TESTO DI BASE Giancoli, Fisica, Casa Editrice Ambrosiana - Terza edizione - ISBN: 9788808186102

SYLLABUS

Hrs	Frontal teaching
2	What is physics, the scientific method, the concept of measurement. The physical units. Scalars and vectors.
5	kinematics of a point-like body in one, two and three dimension: the references systems, position, displacement, velocity and acceleration. Uniform motion along a line, uniformly accelerated motion, parabolic motion, circular uniform motion.
6	Dynamics: Force and motion of a point-like body. Newton's laws: gravity, friction, centripetal force, Tension force in an ideal rope, elastic forces.
7	Work and energy in physics. Work associated with a force, the kinetic energy. Work and potential energy: the conservative forces. Conservation of the mechanical energy. Work of the external forces. Balance point.
3	Dynamics of a system of point-like bodies. Centre of mass. Momentum, Impulse, Conservation of the momentum associated with a system. Collisions in physics.
3	Hints of rotational mechanics: the torque, the angular momentum, static equilibrium of a rigid body.
6	Fluid mechanics: pressure, Pascal's law, Stevin's law, The buoyant force of Archimedes, motion of an ideal fluid, continuity equation, Bernoulli's equation.
3	Oscillations: definition. Harmonic motion. Presentation of several systems showing harmonic motion.
7	Waves: unidimensional waves: wave function and wave speed. Sinusoidal waves. Superposition principle. Interference. Reflection and transmission. Acoustic waves.
7	Concept of temperature. Kinetic theory of ideal gas.Thermodynamics systems. Thermal equilibrium. Temperature. Heat, thermal dilatation. Thermal capacity and specific heat. State function in thermodynamics. Ideal gas. Equation of state of ideal gas. Work in thermodynamics. Thermodinamical transformations: reversible and irreversible. The first principle of Thermodynamics. Transformations in thermodynamics: isovolumetric, isobar, isothermal, adiabatic transformation. The second principle of Thermodynamics: Cyclic transformations. Thermal machine. the second principle of thermodynamics. Carnot Cyle. Efficiency of the thermodynamical cycle. Entropy.

SYLLABUS

Hrs	Frontal teaching
7	Electrostatics. The electric charge, electrical conductors and insulators. The Coulomb's force. The electric field. The electrical dipole. The electrical potential energy, the electrical potential. Equipotentials surfaces, Electric current. Ohm's law. Hints on magnetic phenomena: magnetic fields and electromagnetism. Ampere's law, Faraday's Law, Lenz's law. Electromagnetic waves.

Hrs	Practice
24	Solving problems of the discussed issues.