UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Fisica e Chimica - Emilio Segrè		
ACADEMIC YEAR	2018/2019		
BACHELOR'S DEGREE (BSC)	PHYSICS		
INTEGRATED COURSE	PHYSICS I		
CODE	15540		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	FIS/01		
HEAD PROFESSOR(S)	GELARDI FRANCO MARIO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	GELARDI FRANCO MARIO	Professore Ordinario	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	Annual		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**GELARDI FRANCO MARIO** Monday 15:00 17:00 il proprio studio (stanza n.054, in via Archirafi 36)		

DOCENTE: Prof. FRANCO MARIO GELARDI

PREREQUISITES	The prerequisites for a profitable learning and the achieving the prefixed objectives is the knowledge of mathematics required to be admitted to the degree course and verified through the entrance tests.
LEARNING OUTCOMES	Knowledge and understanding Knowledge of the physical laws regulating mechanics and thermodynamics of macroscopic physical systems. Applying knowledge and understanding Capacity of applying the scientific method in general; Ability in investigating physical processes through a proper mathematic systematization leading to quantitative solutions of the problems and able to predict the evolution of similar processes. Making judgments Capacity to plan measurements in order to experimentally verify the studied physical laws and to evaluate their results in the light of the adopted approximations and of the experimental limits. Communication skills Acquisition of a "scientific" language based on a correct presentation of the addressed problem, a detailed explanation of the procedures applied for its resolution and a critical discussion of the results obtained. Learning skills Acquisition of a method of study, based on a critical and not notionistic approach to new concepts, which provides for an independent investigation of the topics of study, through, for example, the search for further material bibliographic and / or the use of additional mathematical or computer aids.
ASSESSMENT METHODS	Final assessment consists of two written tests and an oral test. The written tests regard the resolution, without the aid of textbooks or notes, of two non-elementary problems recalling some of the main laws of classical mechanics and thermodynamics. The written test allows to verify, in the same conditions for all candidates, both the knowledge of the physical laws addressed in theaching, and the ability to apply them to new physical situations. In particular, it allow to evidence the capacity of analyzing a physical phenomenon and of mathematically systemizing it as well as the capacity to obtain quantitative results. The verification test carried out at the end of the first period and concerning mechanical topics, if passed, completely replaces the first of the final written tests, allowing the student to address, in the final exam, only the written on thermodynamics and the oral test. The oral test consists of an examination-interview concerning the enunciation and discussion of the studied physical laws and their use in solving simple problems proposed to the candidate. This test allows you to evaluate, besides the knowledge of the candidate and his ability to apply it, even the possession of a proper scientific language and a clear and direct exposure. The final evaluation, suitably mediated on written and oral tests, will be graded on the basis of the following results: a) Basic knowledge of the studied physical laws and limited ability to independently apply them in new situations, sufficient ability in analyzing physical phenomena and in exposing used procedures (18-21 rating); b) good knowledge of the studied physical laws and ability to autonomously apply them in situations similar to those studied, discrete ability in analyzing physical phenomena and in exposing used procedures (22-25 rating); c) deep knowledge of the studied physical laws and ability to apply them to each proposed physical phenomenon, but not always readily and by means of a direct approach, good ability in analyzing physical phenomena and in exposing used procedures (26-28 rating); d) deep and widespread knowledge of the studied physical laws and ability to promptly and correctly apply them to each proposed physical phenomenon, excellent ability in analyzing physical phenomena and excellent communication skills(29-30L rating).
TEACHING METHODS	The course is annual and takes place in two periods of the first year of the degree in Physical Sciences. The didactic activity is developed through lectures and numerical exercises where standard physical problems are solved. Approaching the end of the two teaching periods, several written tests are

	carried out in the classroom that simulate the final exam. Both numerical exercises and simulations aim to test the ability to apply knowledge and provide a useful training for the final exam. The final exam includes two written tests concerning the topics developed in the first and second teaching modules, and an oral exam. After the first teaching period a written test (not mandatory) is planned which, if passed, can replace the written exam test concerning the topics of the first teaching module.

MODULE
MECHANICS (*)

Prof. FRANCO MARIO GELARDI

SUGGESTED BIBLIOGRAPHY

Testo di riferimento:
- D. Halliday, R.Resnick, K.Krane: Fisica - Vol.1, Ed.: Casa Editrice Ambrosiana
Testi di approfondimento:
R.A.Serway, R.J.Beichner: Fisica per Scienze ed Ingegneria – Vol.1 – Ed EDISES
P. Mazzoldi, M. Nigro, C. Voci: Fisica vol.1, Ed: EDISES
R.P.Feynman, R.B.Leighton, M.Sands: La Fisica di Feynman - Vol.1 Parte1; Ed. Masson

AMBIT	50159-Discipline fisiche
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

have a good basic understanding of various phenomena of the mechanics of material points, systems of material points and extended rigid bodies;
Acquire familiarity with the scientific method of investigation and, in particular, with the modeling of the real physical phenomena and the model verification;
Acquire skills for critically evaluating the physical models used, pointing out their descriptive limits and their operational benefits;
Have adequate understanding of mathematical tools as well as capability to use them in solving physical problems.

SYLLABUS

Hrs	Frontal teaching
2	Introduction to physical quantities, their measurement and graphic representation
4	Linear kinematics of a particle
4	Kinematics of oscillatory and circular motions of a particle
4	Translational dynamics of the material point
4	Oscillatory and rotational dynamics of the material point
6	Mechanical energy, momentum, angular momentum of the particle and their conservation principles
2	Mechanics of systems of particles
6	Statics and dynamics of rigid bodies

Hrs	Practice
5	Applications of the kinematics laws
7	Applications of the dynamics laws
8	Applications of the conservation principles in mechanics
4	Solving complex problems in mechanics (training activity for the examination written tests)

MODULE
FLUIDS, WAVES AND THERMODYNAMICS

Prof. FRANCO MARIO GELARDI

SUGGESTED BIBLIOGRAPHY

Testo di riferimento:
D. Halliday, R.Resnick, K.Krane: Fisica - Vol.1, Ed.: Casa Editrice Ambrosiana
Testi di approfondimento:
-R.A.Serway, R.J.Beichner: Fisica per Scienze ed Ingegneria – Vol.1 – Ed EDISES
- P. Mazzoldi, M. Nigro, C. Voci: Fisica volume 1, ed. EDISES;
- E. Fermi: Termodinamica, ed. Boringhieri

AMBIT	50159-Discipline fisiche
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

have a good basic understanding of various phenomena of wave mechanics, fluid statics and dynamics and classical thermodynamics;
Acquire familiarity with the scientific method of investigation and, in particular, with the modeling of the real physical phenomena and the model verification.
Acquire skills for critically evaluating the physical models used, pointing out their descriptive limits and their operational benefits;
Have mastery of adequate mathematical tools to be used in analyzing and solving problems of classical physics.
possess adequate skills and tools for communication and information management;

SYLLABUS

Hrs	Frontal teaching
6	Elements of statics and dynamics of fluids
6	Material waves: waves in an elastic string and sound waves
5	Thermometry and calorimetry
4	Kinetic theory of gases
4	Thermodynamic transformations ond first law of thermodynamics
4	Second law of thermodynamics
3	Entropy

Hrs	Practice
4	Applications of the laws of fluid mechanics
4	Examples of wave phenomena
3	Applications of calorimetry laws
8	Applications of first and second law of thermodynamics
5	Solving complex problems in thermodynamics (training activity for the final exams)