

ACADEMIC YEAR: 2017-2018

COURSE: Physics

Type of educational activities: 3 year degree course in Forestry and Environmental Science, Food technology, Agricultural Technology.

TEACHER: Giuseppina Lacava

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Language: Italian	

ECTS n°6 (n° 20 frontal lesson; n° 8 exercises)	N° of hours: 40 hours frontal lessons 16 hours exercises	Campus: Potenza School: School of agriculture, forestry, food and environmental sciences 3 year degree in Forestry and Environmental Science, Food Technology, Agricultural Technology	Semester: I
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EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course of Physics is a teaching based on the scientific method for the treatment of Newtonian mechanics, thermodynamics, electrostatics and magnetism.

- **Knowledge and understanding:** the main objective of the course is to provide students with the foundation for studying and carrying out numerical problems related to all of the debated topics. Students must demonstrate knowledge and understanding the elements of the unit of measurement, dimensional analysis and vector calculus, knowledge of the unidirectional and bidirectional motion, basic knowledge needed to deal with the energy studies, key features of the dynamics of the point particle, basic knowledge needed to deal with the study of static and dynamic fluids, key Features of Thermodynamics, fundamentals of Electrostatic, magnetism and electromagnetic waves.
- **Applying knowledge and understanding:** Ability to analyze questions related to each topic by schematizing, simplifying the problem and identifying a valid reasoning for the resolution of the problem.
- **Making judgements:** Ability to deepen the topics dealt with by using them of physics to develop and resolve the question.
- **Communicative skills:** Ability to describe and interpret natural phenomena by using the scientific method with the schematization, modeling and measurement of the phenomenon.
- **Learning skills:** Ability to refine knowledge through a training course based on the development of numerical applications.

PRE-REQUIREMENTS

For the understanding of the course content, you must have acquired and assimilated the following basic knowledge derived from analytic geometry and trigonometry courses:

- Basic knowledge of geometry;
 - Basic knowledge of mathematics;
 - Knowledge of the basic concepts on the units of measurement and in particular those relating to the conversion of the same;
 - Knowledge of the trigonometric functions, and especially the theorems associated with right triangles and any triangles;
 - Mathematical methods for solving equations and systems of grade I and II
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SYLLABUS

ECTS N°1:

Scientific Method (2 [hours])

Fundamental and derivative quantities, the International System of Units, Dimensional Analysis.

Scalar and vector quantities (4 [hours] +2 hours of exercises)

Difference between scalar and vector, unit vector, vectors and operations of sum, difference between scalar and vector product, scalar and vector components.

ECTS N°2:

Kinematics (8 hours) +4 tutorials)

Average and instant velocity and acceleration, constant velocity, Linear uniform motion, Uniformly accelerated linear motion, equation of a falling body, projectile motion, uniform circular motion

ECTS N°3:

Dynamic (6 [hours] +4 tutorials)

Principles of dynamics, gravitational force, normal reaction, static and dynamic friction force, elastic force, Study of the inclined plane.

Work and Energy (4 [hours])

Mechanical work of a constant force (Weight Force), work of the elastic force, Kinetic Energy, Potential Energy, Mechanical Energy, Theorem of Live forces, mechanical energy theorem.

ECTS N°4:

Fluid Mechanics (6 [hours] +4 tutorials)

Ideal Fluid, Stevin Law, Principle of communicating vessels, the Pascal principle, Archimedes' principle, Continuity equation, volumetric and mass flow, Bernoulli's Theorem..

ECTS N°5:

Thermodynamics (6 [hours] +2 exercises)

Thermodynamic system, zeroth law of thermodynamics, Heat and Energy, heat capacity, calorimetry, specific heat, First Law of Thermodynamics, thermodynamic Job, Ideal gas, Gay Charles Law, Boyle's Law, The ideal gas law, thermodynamic transformations: Isochore, isobaric, Isothermal, Adiabatic.

ECTS N°6:

Electrostatic (2 [hours])

Coulomb's law for point charges, electric field and electric potential, capacitors and resistors in series and in parallel, equivalent electrical capacity.

Magnetism (2 [hours])

Magnetic field, Interaction between moving charge and magnetic field, Faraday's law of induction, electromagnetic waves.

TEACHING METHODS

The course includes 56 hours of teaching in frontal lectures and exercises.

EVALUATION METHODS

The aim of the examination is to test the level of achievement of educational targets through the following tests:

- Written test based on the resolution of 4 numerical exercises and open answer of two theoretical questions on all topics of the course. The maximum score of the first application is equal to 4/30, the vote of each of the other three applications is equal to 8/30 respectively, while every theoretical question is worth 1/30. To pass the test you must acquire at least a vote equal to 18/30. The written test will last two hours and during the same is not permitted to use handouts, smartphones and PC, with the exception of scientific calculator.
- Oral test designed to assess the student's ability to link and compare different aspects covered during the course, through three questions each with maximum vote equal to 10/30.

The final grade is derived from the arithmetic mean between the written test score and that of the oral test, and if the end result is less than 18/30 the written test should be done again.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Reference books and online learning materials

- D. Halliday, R. Resnick, J. Walker, *Fondamenti di Fisica*, sesta edizione, casa editrice Ambrosiana;
 - Philip R. Kesten, David L. Tauck, *Fondamenti di Fisica: Meccanica, Termodinamica, Onde, Elettromagnetismo*, casa editrice Zanichelli.
 - Guida allo studio e alla soluzione dei problemi, *Principi di Fisica*, Terza Edizione, Serway & Jewett, Casa Editrice Edises.
 - Lecture notes available on the teacher's web site:
<https://sites.google.com/a/agrariaunibas.net/giusy-lacava/>
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INTERACTION WITH STUDENTS

During the presentation of the course of Physics, the teacher, after collecting a list of students who intend to enroll in the course, together with name, serial number and e-mail, will set out the objectives, the program, the methods of examination. He will make students aware of the existence of their own Web site, from which students can find all the material exposed during lectures, numerical applications and examples of written tests solved by the teacher.

Office hours: *Tuesday* from 15:30 to 17:00

The students can also communicate with the lecturer via E-mail:

giusy.lacava@unibas.it

EXAMINATION SESSIONS

12/12/2017, 16/01/2018, 13/02/2018, 20/03/2018, 17/04/2018, 15/05/2018, 19/06/2018, 17/07/2018, 25/09/2017, 16/10/2017, 20/11/2018

EVALUATION COMMISSION

Giuseppina Lacava (President);

Michele Perniola (Member);

Raffaele Pace (President for the CDL TA).

SEMINARI DI ESPERTI ESTERNI NO
