COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Industrial Design and Production Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**1002**	**SEMESTER**	**1**
COURSE TITLE	General Physics		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	4
Laboratory	1	1
	4	**5**

COURSE TYPE	General background
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/IDPE185/

(2) LEARNING OUTCOMES

Learning outcomes

The course belongs to Level 6 of the European Qualifications Framework. Therefore, upon completion of the course students will have:

- Thorough knowledge and critical understanding of the basic principles and laws of Physics (in issues of engineering, waves and thermodynamics) and will have acquired a knowledge base that is necessary for attending Technology courses and in general monitoring the evolution of modern technology.
- Knowledge and skills in handling simple relations of differential and integral calculus to calculate physical quantities (position, velocity, acceleration, energy, power, torque, heat, etc.) to predict the behavior of physical quantities, to compare and draw conclusions.
- Knowledge and skills in using the methods and the most basic techniques of Experimental Physics.
- Ability to operate measuring devices to take measurements, process them, evaluate them and correlate physical quantities.

In detail, students will be able to:

- Calculate physical quantities (position, velocity, acceleration, energy, power, torque, etc.).
- Predict the behavior of physical quantities, and select the appropriate parameters to achieve the desired behavior.
- Operate instruments and experimental devices for measuring physical quantities.
- To take measurements autonomously, to process them, to correlate physical quantities as well as to calculate or estimate errors. To decide if their measurements are within the framework of experimental uncertainties or if there is a systematic error in part or the whole experimental setup.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of new research ideas
- Production of free, creative and inductive thinking

(3) SYLLABUS

The course also includes a laboratory part, where they are designed, solved issues of:

- Introduction - System of Units, Accuracy - Significant Digits, Reference Systems, Elements of Differential and Integral Calculus.
- Vectors - Motion in one and two dimensions, Relative motion, Galilean Transformations.
- Material point dynamics, Newton's laws.
- Momentum, Work, Power, Energy, Conservation of Energy.
- Kinematics and Dynamics of Rotational Motion, Torque, Rotation, Moment of Inertia, examples - applications, correspondences of physical quantities between Translational and Rotary Motion, Rolling, work-energy theorem for rotational motion applications. Connection of natural quantities with sensor technology.
- Equilibrium and Elasticity - Young Measure.
- Fields of forces - gravitational field, satellites, Kepler Laws.
- Oscillations - differential equations of oscillating systems, correspondences between mechanical and electrical systems.
- Mechanical Waves, differential wave equation, Sound, Wave superposition, wave properties applications. Introduction to electromagnetic waves. Applications.
- Temperature, Heat Dissipation, Thermal properties of matter, correspondences between mechanical, electrical, magnetic and thermal systems. Laws of Thermodynamics, applications.

A series of laboratory exercises on Mechanics - Heat.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face and distance learning.	
USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY	ICT is used in both parts of the course, theoretical and laboratory, both for teaching and for communicating with students.	
TEACHING METHODS	***Activity***	***Semester workload***
	Theoretical part with Lectures	39
	Laboratorial part with Exercises and practical applications	33
	Individual study	78
	Course Total (30h/ECTS)	**150**

STUDENT PERFORMANCE EVALUATION	**Language of Assessment:** Greek The assessment of students is done with written exams at the end of the semester that include theory questions in various forms (e.g., multiple choice, short answer, filling in the gap, etc.) as well as exercises that require detailed problem solving. Final written exam: 80% Laboratory work/exercises: 20% The assessment criteria are announced to the students at the beginning of the semester and are posted on the course's website in eClass.

(5) **ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:

1. Κωνσταντινίδης Σ., Ντρίβας Ν. & Πρελορέντζος Λ.: «Φυσική Ι: Μηχανική & Σύγχρονη Φυσική», Πανεπιστημιακές Εκδόσεις «Αράκυνθος», Αθήνα 2007 (Εύδοξος: 1358).
2. H.D. YOUNG: «Πανεπιστημιακή Φυσική» Α Τόμος, Εκδόσεις ΠΑΠΑΖΗΣΗ (Εύδοξος: 68387875).
3. R.Serway : «Φυσική για Επιστήμονες και Μηχανικούς» Α΄ΤΟΜΟΣ) (Εύδοξος: 22750100).
4. Halliday-Resnick-Walker: «Φυσική » Α Τόμος, Εκδόσεις Gutenberg (Εύδοξος: 33074351).

- Related academic journals:

1. Solid-State Physics, Elsevier
2. Applied Physics A
3. Applied Physics B
4. Institute of Physics