COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**10YKO01**	**SEMESTER**	**1**
COURSE TITLE	**PHYSICS I**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures (theory and exercises)	6	7

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, in the English language for Erasmus students
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PHYS153/

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course is the first systematic introduction to the basic concepts of Newtonian Mechanics and Fluid Mechanics by using Vector and Differential / Integral Calculus. It also includes introductory concepts of the Special Theory of Relativity.

With the successful attendance and completion of the course, the student is in position to:
• Describe the basic physical quantities and units of Mechanics in the context of Vector and Differential / Integral Calculus.
• Understand the relative dependencies of these physical quantities.
• Identify the conservation principles and the fundamental symmetries that govern the various mechanical systems.
• Explain the static or kinematical state of a system by all the forces applied to it.
• Calculate dynamical characteristics of the rigid body (moment of inertia) with basic integration techniques.
• To formulate the basic differential equations for the motion of a body.
• Explain and calculate the basic quantities of length, time or speed in different inertial systems.
• Organize systematically the data of a problem to find the solution for more complicated physical systems.
• Plot graphically the data and the results of a problem.
• Evaluate critically the results.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

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 international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course aims at the following general competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Production of free, creative and inductive thinking
- Analytical and synthetic thinking
- Critical thinking
- Problem solving

(3) SYLLABUS

- Linear motion. Curvilinear motion. Relative motion. Introduction to the Special Theory of Relativity.
- Impulsive forces. Collisions.
- One-body dynamics.
- Work. Energy. Dynamics of many-body systems.
- Rigid body rotation around a fixed axis.
- Rolling. Angular momentum and torque. Oscillations.
- Law of Universal Gravitation. Fluid mechanics.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Yes

Electronic communication with the students using ICT (Information and Communications Technology)
Computer-aided lectures, use of video Projectors,
eclass platform</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td></td><td></td></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Exercises</td><td>26</td></tr>
<tr><td>Individual Study/ Study and Analysis of bibliography / Preparation</td><td>97</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course Total</td><td>175</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Final written exams in Greek</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Fundamentals of Physics (Volume A) by David Halliday, Robert Resnick, Jearl Walker
- University Physics (Volume A) by Hugh D. Young; Roger A. Freedman
- Physics for Scientists & Engineers (Volume A) by Douglas Giancoli
- Introduction to Newtonian Physics by K. Farakos
- Fundamental University Physics by Alonso-Finn

- Related academic journals:

- American Journal of Physics
- Nature
- Physics Education
- Physics Today
- Physics World
- Science
- The Physics Teacher