COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**11**	**SEMESTER**	**1**
COURSE TITLE	Mechanics		

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**
	5	7
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=1386 http://ecourse.uoi.gr/course/view.php?id=145

(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*

The purpose of the course is for the students to understand the meaning of several physical quantities related with the motion of mass points as well as rigid bodies. Such quantities are the displacement, the velocity, the acceleration, the inertial mass, the force, the work, the energy, the momentum, the torque and the angular momentum. In addition, the student will learn to apply the three Newton's laws, the laws of energy, momentum and angular momentum conservation, in order to solve problems and explain phenomena of the everyday life. More specifically, after the successful attendance of the course, the student will be able:

- to know and understand in depth, the basic concepts, principles and laws related with the kinetics of dimensionless particles, three-dimensional objects and fluids. To apply this knowledge in solving problems.
- To use basic elements of vectors, differentials and integrals, in order to study the position, the velocity and the acceleration of moving bodies.
- To explain and understand how the laws of energy and momentum conservation are related with the Newton's laws.
- To apply the laws of energy, momentum and angular momentum conservation in solving

problems of dynamics.
- To apply the laws of Mechanics in fluids for solving problems.

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

Search for analysis and synthesis of data and information, with the use of the necessary technology.
Working independently and team work.
Production of free, creative and inductive thinking.

(3) SYLLABUS

Models, measurements, vectors in Physics. Motion in one dimension. Motion in plane and space. The particle dynamics. The Newton's laws. Work and energy. The conservation of energy and momentum. Collisions. Kinematics and dynamics of rotation. The conservation of angular momentum. Equilibrium of rigid bodies. Oscillations. Gravitation. Fluids mechanics.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY
Face-to-face, Distance learning, etc.

Face-to-face

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students

Use of the e-learning Moodle system, with uploaded notes, lectures in videos, exercises for practice and communication with students.

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

Activity	*Semester workload*
Lectures	39
Tutorials	26
Study of bibliography	85
Non-directed study	20
Exams	5
Course total	**175**

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,

Homework for solving exercises and their evaluation in a weekly base. The corrected homework is returned to students. Intermediate examination (35%). Final writing examination in the end of the semester (65%).

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.*	

(5) ATTACHED BIBLIOGRAPHY

"Πανεπιστημιακή Φυσική με Σύγχρονη Φυσική" Τόμος Α (2η Ελληνική Έκδοση) Μηχανική- Κύματα H.D. Young και R.A. Freedman Μετάφραση από Ομάδα Πανεπιστημιακών Εκδόσεις Παπαζήση ΑΕΒΕ 2009 Αθήνα

- Φυσική για Επιστήμονες και Μηχανικούς Μηχανική, Ταλαντώσεις και μηχανικά κύματα. Θερμοδυναμική. Σχετικότητα (8η αμερ. Έκδοση) Reymond R. Serway. John W.Jewett Εκδόσεις Κλειδάριθμος 2012 Αθήνα
- Φυσική Τόμος Α. Halliday D, Resnick R., Walker J. Εκδόσεις Gutenberg 2012 Αθήνα
- Φυσική για Επιστήμονες και Μηχανικούς Τόμος ΙΑ (Εκδ. 2η) Randall D. Knight (Μετάφραση: Κων/νος Κρίτσης- Ιωάννα Παρασκελίδη Ίων - ΜακεδονικέςΕκδόσεις 2010 Αθήνα
- Φυσική για Επιστήμονες και Μηχανικούς, Τόμος Α, (Εκδ. 4η) Giancoli, μετ. Τζιόλα Εκδόσεις Τζιολα 2013 Θεσ/νικη