ETY501 – Classical Mechanics

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETY501	**SEMESTER**	5
COURSE TITLE	Classical 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**
Lectures / Case Studies	4	3
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Specialized general knowledge
PREREQUISITE COURSES:	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	LECTURES IN GREEK, PRESENTATION IN ENGLISH/GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/enrol/index.php?id=874

(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 main objective of the course is to familiarize the students with the fundamental concepts of Classical Mechanics and their applications to engineering problems.

The course provides a background mathematical knowledge for the understanding of specialized courses in the field of Materials Science and Engineering that follow.

By completing the course, the students are expected to have acquired the following:

Knowledge:

- Have a good **understanding** of the fundamental principles that govern the equilibrium and motion of a point particle or system of point particles in 3-d physical space

Abilities:

- To analyze the various practical problems in applied engineering mechanics based on the theoretical principles acquired in the course.
- To collect, organize and evaluate interdisciplinary information obtained from various sources
- To organize scientific information and present it effectively
- To solve problems in an organized way using brainstorming meetings
- To work in groups, manage meetings, write agenda and minutes

Skills:

- To model simple problems in Dynamics. That is to say analyzes a real problem, to choose the appropriate equations of motion and initial conditions so as to construct a simple mathematical model corresponding to it.
- Around organizing interdisciplinary meetings
- Around teamwork, capturing key information, selecting appropriate actions for optimal scientific and technological 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	*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…*
	…….

- Good understanding and treatment of physical problems
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Production of free, creative and inductive thinking
- Team work
- Decision-making
- Adapting to new situations
- Project planning and management
- Criticism and self-criticism

(3) SYLLABUS

- Position and its derivatives, Vector analysis
- The First, Second and Third Newton's Law
- The equation of motion for a point particle and applications
- Energy and Angular momentum
- Equilibrium of a system particles, Static and Hyperstatic systems
- Work and the Conservation of Energy
- Constrained Motion
- Principle of Virtual Work, D' Alembert Principle and applications
- Variational principles in Mechanics and Lagrange Equations

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face in the class
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of PC for data and information, preparation of deliverables, communication of the team using email/social media/ecourse platform

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<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>Lectures</td><td>39</td></tr>
<tr><td>Practices</td><td>13</td></tr>
<tr><td>Self-study</td><td>23</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>75</td></tr>
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<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>LANGUAGE OF EVALUATION: Greek

METHOD OF EVALUATION:
Written exam (solving problems) at the end of the semester.</td>
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(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Kittel, C, et al, ΜΗΧΑΝΙΚΗ
- Παιπέτης Σ.Α., ΤΕΧΝΙΚΗ ΜΗΧΑΝΙΚΗ