## COURSE OUTLINE

### (1) GENERAL

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>ENGINEERING SCHOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPARTMENT</td>
<td>MECHANICAL ENGINEERING DEPARTMENT</td>
</tr>
<tr>
<td>LEVEL OF STUDIES</td>
<td>UNDER GRADUATE</td>
</tr>
<tr>
<td>COURSE CODE</td>
<td>270106</td>
</tr>
<tr>
<td>SEMESTER</td>
<td>1</td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>Mechanics</td>
</tr>
</tbody>
</table>

#### 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.

<table>
<thead>
<tr>
<th>WEEKLY TEACHING HOURS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>5.5</td>
</tr>
</tbody>
</table>

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

#### COURSE TYPE

Specialized Knowledge, skills development

#### PREREQUISITE COURSES:

- 

#### LANGUAGE OF INSTRUCTION and EXAMINATIONS:

- **Greek (official)**- **English (optional)**

#### IS THE COURSE OFFERED TO ERASMUS STUDENTS

- **YES**

#### COURSE WEBSITE (URL)

- **-**
(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

Upon completion of the course, students will be able to:
1. They have acquired the knowledge and the understanding of issues related to statics and kinematics of rigid bodies
2. Be able to use all the scientific knowledge in order to understand and solve static problems
3. To have the ability to analyze the problems of mechanisms and resolve them

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...

Search, analysis and synthesis of data and information, using the necessary technologies. During this course, the study of statics and mechanics of materials is based on the understanding of a few basic concepts and on the use of simplified models. This approach makes it possible to develop all the necessary formulas in a rational and logical manner, and to clearly indicate the conditions under which they can be safely applied to the analysis and design of actual engineering structures and machine components.

(3) SYLLABUS

1. Statics of Particles
2. Rigid Bodies: Equivalent Systems of Forces
3. Equilibrium of Rigid Bodies
4. Distributed Forces: Centroids and Centers of Gravity
5. Analysis of Structures
6. Distributed Forces: Moments of Inertia of Areas
7. N,Q,M Diagrammes
8. Distributed Forces: Centroids and Centers of Gravity
9. Analysis of Structures
10. 7 Forces in Beams and Cables
11. 8 Friction
12. 9 Distributed Forces: Moments of Inertia
13. 10 Kinematic equations of rigid body.
14. 11 Mechanisms’ problems
15. 12 Mechanisms and Simple Machines
16. 13 Basic Kinematics of Constrained Rigid Bodies
17. 14 Degrees of Freedom of a Rigid Body
**15 Planar and Spatial Mechanisms**

**16 Kinematics and Dynamics of Mechanisms**

**17 Links, Frames and Kinematic Chains**

**18 Skeleton Outline**

**19 Pairs, Higher Pairs, Lower Pairs and Linkages**

**20 Kinematic Analysis and Synthesis**

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**4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<thead>
<tr>
<th>DELIVERY</th>
<th>Lectures, laboratories, distance learning methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td>
<td>Teaching using ICT, Communication and Electronic Submission</td>
</tr>
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<table>
<thead>
<tr>
<th>TEACHING METHODS</th>
<th>Activity</th>
<th>Semester workload</th>
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<td>Lectures</td>
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<tr>
<td></td>
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<td></td>
<td>Preparation for Homework on case studies (individual or group work)</td>
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<tr>
<td></td>
<td>Personal study</td>
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<tr>
<td></td>
<td>Course total</td>
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</tr>
</tbody>
</table>

**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.

Written examination: 100%

Optional job preparation and presentation of up to 20%, less than the proportion of written examination

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**5) ATTACHED BIBLIOGRAPHY**
1. Μηχανική του απαραμόρφωτου στερεού, Στατική, Βουθούνης, Παναγιώτης Α., εκδ. ιδίου
2. Στατική: Μηχανική του στερεού σώματος, ασκήσεις I, Εμμανουήλ Ε. Γδούτος, Χρ. Ν. Κάλφας, εκδ. Συμμετρία
3. Στατική των ισοστατικών φορέων Διαγράμματα [N], [Q], [M]: Γραμμές επιρροής: Αρχή δυνατών έργων, Γιάννης Β. Γκαρούτσος, εκδ. SPIN
4. Τεχνική μηχανική Μηχανική I: Στατική των στερεών και ειδικά κεφάλαια, Νικόλαος Αραποστάθης, Δημήτριος Αραποστάθης, εκδ. Ίων
5. Στατική Τεχνική μηχανική, Ferdinand P. Beer, Russell E. Johnston, Elliot R. Eisenberg, εκδ. Τζιόλα
6. Εφαρμοσμένη στατική, Walter Wagner, Gerhard Erlihof, εκδ. Κλειδάριθμος
7. Στατική, Εμμανουήλ Ε. Γδούτος, εκδ. Συμμετρία
8. Μηχανική του απόλυτου στερεού, Κινηματική και δυναμική, εκδ. Συμμετρία
9. Theory of Elasticity, Stephen Timoshenko, Mcgraw-Hill College