Course guide

340077 - ELRM-D4037 - Elasticity and Strength of Materials

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering.
Degree: BACHELOR’S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Compulsory subject).
Academic year: 2023  ECTS Credits: 6.0  Languages: Catalan

LECTURER

Coordinating lecturer: ELSA PÉREZ GUINDAL
Others: Junquera Fernández, Jose Luis
Perez Guindal, Elsa

PRIOR SKILLS

Knowledge of mechanical physics, especially static equilibrium of mechanical sets.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONtributes

Specific:
2. G1. Ability to solve arithmetic problems related to engineering. Aptitude to apply knowledge concerning: linear algebra, geometry, differential geometry, differential and integral calculus, numerical methods, statistics technology.
4. D5. Ability to carry out and analyze experiments of mechanism and resistant elements.
6. D8. Ability to dimension and to select machines and structure elements.

Transversal:
1. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
07 AAT N3. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

The hours of guided learning will be distributed in theoretical classes with the large group in which the concepts of the subject and direct applications will be taught, as well as the problems of the subject; and in the small group, 5 laboratory practices were carried out individually, constituting a test in which the theoretical knowledge acquired is evaluated, as well as, the results obtained in the experimentation carried out.
After each session, tasks are proposed to be worked out of the classroom individually or in the group to reinforce knowledge. All the necessary material for the subject is provided through Athena, where you will find theoretical materials, practical problems, ordered by course topics, and recommended bibliography, and thus promote self-learning through readings and problem solving.
LEARNING OBJECTIVES OF THE SUBJECT

Set the general equations that govern the phenomena that occur inside an elastic body when it is subjected to external actions, to determine the strain and strength state of a body (elasticity). Learn to find the critical differential points of real pieces where the stress and strain are maximum and apply the equations of the strength of materials to calculate such stresses, and use the elasticity equations to find the 2D or 3D state of tensions of those differential points in the space. All this is applied to the learning of dimensioning and design of mechanical elements from the point of view of the strength of the materials (resistant capacity, deformation, rigidity, etc. depending on the materials applied).

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>45,0</td>
<td>30.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15,0</td>
<td>10.00</td>
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</tbody>
</table>

Total learning time: 150 h

CONTENTS

(ENG) - ELASTICITAT: Vector Tensió i estat tensional pla.

Full-or-part-time: 19h
Theory classes: 3h
Practical classes: 2h
Laboratory classes: 2h
Self study : 12h

(ENG) - ELASTICITAT: Estat de deformacions en el sòlid elàstic

Full-or-part-time: 5h 20m
Theory classes: 1h
Practical classes: 1h
Self study : 3h 20m

(ENG) - ELASTICITAT: Relacions entre tensions i deformacions

Full-or-part-time: 12h 40m
Theory classes: 1h
Practical classes: 2h
Laboratory classes: 2h
Guided activities: 1h
Self study : 6h 40m

(ENG) - RESISTÈNCIA DE MATERIALS: Tracció i compressió

Full-or-part-time: 20h
Theory classes: 4h
Practical classes: 2h
Laboratory classes: 2h
Self study : 12h
(ENG) - RESISTÈNCIA DE MATERIALS: Torsió

Full-or-part-time: 18h
Theory classes: 2h
Practical classes: 4h
Self study: 12h

(ENG) - RESISTÈNCIA DE MATERIALS: Forces tallants

Full-or-part-time: 10h 40m
Theory classes: 1h
Practical classes: 3h
Self study: 6h 40m

(ENG) - RESISTÈNCIA DE MATERIALS: Flexió

Full-or-part-time: 22h
Theory classes: 4h
Practical classes: 4h
Laboratory classes: 2h
Self study: 12h

(ENG) - RESISTÈNCIA DE MATERIALS: Sol·licitacions combinades

Full-or-part-time: 24h
Theory classes: 4h
Practical classes: 4h
Self study: 16h

GRADING SYSTEM

EXAMINATION RULES.

Electronic devices, such as mobile phones, cannot be carried. During the tests, the documentation previously established by the teacher in class and prepared by the student himself individually and in handwriting will be able to be consulted.

BIBLIOGRAPHY

Basic:

RESOURCES

Other resources:
Teaching material (theory and exercises) will be hang on the Atenea during the course.