340083 - DIME-D6O12 - Mechanism Design

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering
Academic year: 2017
Degree: BACHELOR’S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Spanish

Teaching staff
Coordinator: AMELIA NÁPOLES ALBERRO

Prior skills
Previous concepts on which the subject has been planned:
- The academic contents of the subject "Mechanics" (MECA).
- The academic contents of the subject "Computer Assisted Design" (DIAO).

Requirements
Have satisfactiation achieved the subjects:
"Mechanics" (MECA)
"Computer Assisted Design" (DIAO).

Degree competences to which the subject contributes

Specific:
1. D6. Ability to analyze and model kinematics and dynamic behavior of mechanical systems.
2. D7. Ability to simulate and design mechanisms as a solution for specific mechanical problems.
3. D8. Ability to dimension and to select machines and structure elements.

Transversal:
5. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Teaching methodology
The face-to-face sessions are divided in theory classes, problems and laboratory practices. The classes of theory and problems integrate the expositions of the basic theoretical concepts of the thematic contents of the subject and describe examples applied in the form of exercises. In the classes of laboratory practices, the behavior of machine models of mechanisms, individually or in group, is studied through activities marked by the teacher. In addition, an exercise proposed in the SORAP application is solved.

Learning objectives of the subject
When finishing the subject, the student has to be able to:
- Analyze and relate the solicitations, efforts and motion in mechanical systems.
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- Analyze and design mechanisms as a result of a specific problem of motion.

### Study load

<table>
<thead>
<tr>
<th></th>
<th>Hours large group:</th>
<th></th>
<th>Hours medium group:</th>
<th></th>
<th>Hours small group:</th>
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<tbody>
<tr>
<td><strong>Total learning time:</strong></td>
<td>150h</td>
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<td>45h</td>
<td>30.00%</td>
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<td>0h</td>
<td>0.00%</td>
<td>15h</td>
<td>10.00%</td>
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<tr>
<td>Guided activities:</td>
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<td></td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td>Self study:</td>
<td>90h</td>
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## Content

### 1-Geometry of mechanisms

**Description:**

**Learning time:** 45h
- Theory classes: 45h

### 2-Synthesis of Mechanisms.

**Description:**
Analytical methods and graphic methods. Synthesis of positional relationships and driving synthesis.

**Learning time:** 36h
- Theory classes: 11h 15m
- Laboratory classes: 3h 45m
- Self study : 21h

### 3-Kinematic and dynamic analysis of mechanisms.

**Description:**
3.1 Structural analysis of mechanisms.
3.2 Speed and acceleration in mechanisms.
   - The Raven method.
3.3 Static mechanisms.
   - Graphical decomposition of forces.
3.4 Dynamics of mechanisms.
   - The reduction method at one point and one axis.

**Related activities:**
93/5000
A1 = Assessment of learning.
A2 = Laboratory practices.
A3 = Presentation of reports.

**Specific objectives:**
At the end of this teaching unit, the student must be able to:

- Perform cinematic and dynamic study of mechanisms.
4-Transmission of forces into mechanisms. 

**Description:**
Graphical decomposition of forces.

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<th>Learning time: 45h</th>
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<td>Theory classes: 45h</td>
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5-Dynamic analysis of flat mechanisms. 

**Description:**
Application of the energy theorem, D'Alembert's method and analysis of vibrations

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<th>Learning time: 45h</th>
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<td>Theory classes: 45h</td>
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**Planning of activities**

<table>
<thead>
<tr>
<th>A1. AVALUACIÓ DE L'APRENGENTATGE</th>
<th>Hours: 6h</th>
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<tr>
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<td>Theory classes: 6h</td>
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<tr>
<th>A2. PRÀCTIQUES</th>
<th>Hours: 12h</th>
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<td>Practical classes: 12h</td>
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<tr>
<th>A3. PRESENTACIÓ D'INFORMES</th>
<th>Hours: 1h</th>
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<tr>
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<td>Guided activities: 1h</td>
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**Qualification system**

Practices -3%
Sorap Exercise 7%
Partial Evaluation 1 -42%
Partial Evaluation 2 -48%

**Regulations for carrying out activities**

The conditions for each test will be specified, in each case, with sufficient anticipation.
Bibliography

Basic:


Complementary: