240624 - The History of Applied Mathematics in Engineering

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2019
Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 3
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Mª Rosa Massa Esteve

Prior skills
Students with the knowledge of mathematics of first course could follow easily the course.

Degree competences to which the subject contributes

Transversal:
1. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
3. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

Teaching methodology

Learning objectives of the subject
The history of sciences gives a dynamic and humanist view that contribute to the integral formation of students and besides complement the thematic study of the textbooks. The course complements the scientific formation of students, analysing the treats more relevant in the history on the relationship between mathematics and engineering.
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### Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group:</th>
<th>0h</th>
<th>0.00%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>30h</td>
<td>40.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>0h</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>45h</td>
<td>60.00%</td>
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## Content

### Tema 1. Mathematics and engineering in the Antiquity

**Description:**
The origins of mathematics and technology; The cuneiform tablets of Babylon and the papyrus of Egypt. Greek science: Elements of Euclid. Mathematics and astronomy at Aristarchus of Samos. Arquimedes mathematic and engineer. The first texts on engineering.

**Learning time:** 10h
- Theory classes: 4h
- Self study: 6h

### Tema 2. Engineers-Artists in the Renaissance

**Description:**

**Learning time:** 20h
- Theory classes: 8h
- Self study: 12h

### Tema 3. The algebrization of mathematics. Scientific Revolution

**Description:**

**Learning time:** 15h
- Theory classes: 6h 20m
- Self study: 8h 40m

### Tema 4. Applied Mathematics and engineering in the Ilustration

**Description:**
The works of Leonhard Euler, mathematic and engineer of the eighteenth century: Mechanics of the science of motion 2 volumes (1736). The Encyclopedie and the Ilustration. D'Alembert and the applied mathematics.

**Learning time:** 20h
- Theory classes: 10h
- Self study: 10h
ADDENDA. During the spring semester of the 2019-2020 school year, and as a consequence of the health crisis caused by the Covid19, the qualification method will be 

The final grade is obtained, with the activities carried out in class, and the end-of-year work, broken down as explained below.

50% from the written or oral practices of each week. Each week the students develop an activity. The activity consists of reproducing a demonstration of some text that relates mathematics and engineering, a dossier prepared about a mathematical engineer that they must fill in (from some text) or a summary of some short text with prepared questions. They can answer them in writing, they can complete, revise or write down the text, during the practice. The clarity of the explanations and the degree of scientific understanding of the activity are valued.

50% from the analysis of a text or significant demonstration of the history of mathematics related to engineering. In the evaluation (written presentation) the clarity in the exposition of the ideas of the chosen author will be valued, as well as the capacity to connect the text with the history of mathematics applied to engineering that we will have been elaborating. In case of analysing some demonstration, the degree of scientific understanding will also be valued.

Bibliography

Basic:


