820037 - BIB - Biomedical Implants

**Degree competences to which the subject contributes**

**Specific:**
1. Understand biomechanics and biomaterials.

**Transversal:**
2. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

**Teaching methodology**

The course is divided up as follows:
- 30% face-to-face expository classes (theory)
- 15% face-to-face directed classes (problems and seminars)
- 55% self-directed learning (group project and study)

An important component of the course is based on the performance of a group project done through the course. It corresponds to an activity initially oriented by the teacher, but developing afterwards more autonomously, with mentoring support.

**Learning objectives of the subject**

After completing the course the student should be able to:
- Understand the principles and concepts of the application of biomedical implants and be able to use them in projects
within biomedical engineering.
- Understand the fundamental criteria to be met by a biomedical implant for its use.

### Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 45h</th>
<th>30.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group: 15h</td>
<td>10.00%</td>
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<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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</table>
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## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Specific objectives</th>
<th>Learning time</th>
<th>Theory classes</th>
<th>Laboratory classes</th>
<th>Self study</th>
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</thead>
<tbody>
<tr>
<td><strong>Biomaterials. Types and properties.</strong></td>
<td>Presentation of the characteristics of biomaterials: what is a biomaterial, how is it classified and what are their most important properties.</td>
<td>Definition of biomaterial. Classification of biomaterials. Properties of biomaterials.</td>
<td>9h</td>
<td>4h</td>
<td></td>
<td>5h</td>
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<tr>
<td><strong>Biomedical implants. Types and properties.</strong></td>
<td>Presentation of the characteristics of biomedical implants: how are they defined, classified and what are their most important properties.</td>
<td>Definition of biomedical implants. Classification of biomedical implants. Properties of biomedical implants.</td>
<td>36h</td>
<td>14h</td>
<td>2h</td>
<td>20h</td>
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<tr>
<td><strong>Biological response to biomedical implants.</strong></td>
<td>Study of the biological response and biocompatibility of biomedical implants.</td>
<td>Study of the biological response to an implant insertion in the human body. Study of the biocompatibility of the biomedical implants.</td>
<td>20h</td>
<td>8h</td>
<td>2h</td>
<td>10h</td>
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</table>
### Design of biomedical implants.

**Description:**
Methodologies and techniques used in the design and calculation of biomedical implants.

**Specific objectives:**
- To understand the main stages of the design flow of biomedical implants.
- To understand the methodologies used for the calculation of biomedical implants.

**Learning time:**
- Theory classes: 14h
- Laboratory classes: 2h
- Self study: 40h

### Legal framework and standards for biomedical implants.

**Description:**
Regulations and legal framework that affects biomedical implants.

**Specific objectives:**
Understand the legal issues affecting the design, manufacture and use of biomedical implants.

**Learning time:**
- Theory classes: 8h
- Laboratory classes: 1h 30m
- Self study: 10h

### New trends in the development of biomedical implants.

**Description:**
Presentation of the current lines of research in biomedical implants, objectives and future trends of design.

**Specific objectives:**
To acquire a knowledge of the future trends of design of biomedical implants.

**Learning time:**
- Theory classes: 4h 30m
- Self study: 5h

### Qualification system

Partial exams (2): 25%
Final exam: 35%
Problems and participation in seminars: 20%
Group project (Generic competence): 20%
This subject does not include a reevaluation test.
Regulations for carrying out activities

The use of any electronic equipment with wireless communication capabilities is strictly forbidden in the evaluations.

Bibliography

Basic:


Complementary: