## Degree competences to which the subject contributes

### Specific:
- CEBIO-260. Analyse and reduce the loads applied to a biomechanical system. Assess the kinematic behaviour and strength of a joint and the strength behaviour of human tissue.

### Transversal:
- 5. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
- 6. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
- 7. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.

## Teaching methodology

There are 15 master sessions. Each one is dedicated to one of the content blocks. In the lectures the student adopts a receptive role.
Lab practices and problems will be conducted in seminar sessions. Problems are individual and practices are made in teams.

## Learning objectives of the subject

1. Acquire the basic concepts and knowledge of biomechanics.
2. To know the structure, function and movement of the human body and the various joints.
3. To know the kinematic behavior of human joints and tissues.
4. To know the bioinstrumentation used for the analysis of biomechanics.

<table>
<thead>
<tr>
<th>Study load</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong> 150h</td>
<td>Hours large group:</td>
<td>45h</td>
</tr>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>15h</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
</tr>
</tbody>
</table>
# 820023 - BMB - Biomechanics

## Content

| Introduction | Learning time: 2h 30m  
|--------------|------------------------|  
|              | Theory classes: 1h  
|              | Self study: 1h 30m     |  

**Description:**  
Introduction to the subject.  

**Specific objectives:**  
Learn the key elements that make up the knowledge of mechanical physics.

| Fundamentals of biomechanics | Learning time: 15h  
<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study: 9h</td>
</tr>
</tbody>
</table>

**Description:**  
Kinematics.  
Kinetics.  
Control of the movement.  
Joint stability.  

**Related activities:**  
Lab practice.  
Experimental work.  
Problems.  

**Specific objectives:**  
Learn the basics and dynamic mechanical analysis and its application to the human body movement and the measurement tools.

| Tissue biomechanics of the musculoskeletal system | Learning time: 22h 30m  
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 9h</td>
</tr>
<tr>
<td></td>
<td>Self study: 13h 30m</td>
</tr>
</tbody>
</table>

**Description:**  
Bone biomechanics  
Biomechanics of cartilage  
Biomechanics of tendon and ligament  
Biomechanics of muscle  
Biomechanics of nervous tissue  
Biomechanics of blood  

**Related activities:**  
Lab practice and experimental work.  

**Specific objectives:**  
Learn the key elements that make up the basics of biomechanics of tissues and be able to apply the methods to the study of musculoskeletal biomechanics.
Joint biomechanics

<table>
<thead>
<tr>
<th>Learning time: 32h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 7h</td>
</tr>
<tr>
<td>Laboratory classes: 6h</td>
</tr>
<tr>
<td>Self study: 19h 30m</td>
</tr>
</tbody>
</table>

**Description:**
- Biomechanics of the hip
- Biomechanics of the knee
- Ankle Biomechanics
- Foot Biomechanics
- Shoulder Biomechanics
- Biomechanics of the elbow
- Biomechanics of the wrist

**Related activities:**
- Lab practices
- Problems
- Experimental work

**Specific objectives:**
Learn the key elements that make up the basics of biomechanics of the joint structures and be able to apply the methods to the study of musculoskeletal biomechanics.

Biomechanics of the spine

<table>
<thead>
<tr>
<th>Learning time: 12h 30m</th>
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<tbody>
<tr>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td>Laboratory classes: 2h</td>
</tr>
<tr>
<td>Self study: 7h 30m</td>
</tr>
</tbody>
</table>

**Description:**
- Biomechanics of the spine

**Related activities:**
- Lab practices
- Problems
- Experimental work

**Specific objectives:**
Learn the key elements that make up the basics of biomechanics of the spine and be able to apply the methods of biomechanics to study the locomotor system.
### Human gait

**Description:**
Normal human gait

**Related activities:**
Lab practices
Experimental work

**Specific objectives:**
To learn the cycle of normal human gait and to determine, based on the same patterns, the role of each of the joints and tissues.

### Applied biomechanics

**Description:**
Pathological human gait
Analysis of forces and pressures. Parameters of human gait
Motion analysis system. Parameters of human gait
Electromyography. Parameters of human gait

**Related activities:**
Lab practices.

**Specific objectives:**
To learn about the instruments and biomechanical analysis of human gait and analyze their results.

### Qualification system

The grade is based on:
- Participation in seminars: 10%
- Evaluation of practices and problems: 40%
- Parcial test: 15%
- Final test: 35%
This subject does not include a reevaluation test.

### Regulations for carrying out activities

Attendance at practices and seminars is mandatory.
The use of devices with communication capabilities is not allowed.
Bibliography

Basic:


Complementary: