Course guide
820021 - BB - Biology

Unit in charge: Barcelona East School of Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.
Degree: BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: ELISABET ENGEL LOPEZ
Others: Primer quadrimestre: SOLEDAD GRACIELA PEREZ AMODIO - M21, M22, M23, M24

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. Understand physiology and biology.
CEBIO-200. Identify the functions of the human organism as a whole and by systems.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

TEACHING METHODOLOGY
The course uses expository methodology (theory) in 29%, individual or group classroom (lab) in 10%, individual distance in a 47% non-attendance and work in another group 14 %.

LEARNING OBJECTIVES OF THE SUBJECT
To provide students an overview of aspects of normal cell function to be able to understand the basics of integrating cells into tissues and their functional specialization, and also diseases at the molecular and cellular level.

STUDY LOAD

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

Total learning time: 150 h
## CONTENTS

### 1. An evolutionary framework for Biology

**Description:**
Organisms have changed over hundreds of millions of years. Evolutionary mechanisms. Speciation that has led to diversity

**Full-or-part-time:** 5h 30m  
Theory classes: 1h 30m  
Self study: 4h

### 2. Introduction to molecular and cellular biology

**Description:**
Water properties, relation of life with water, acids, bases, pH, blocked cellular ion balance.

**Full-or-part-time:** 5h 30m  
Theory classes: 1h 30m  
Self study: 4h

### 3. Macromolecules: Their chemistry and biology

**Description:**
Condensation reactions: Proteins: polymers of amino acids, carbohydrates, polymers of sugars, nucleic acids: polymers, lipids, water-insoluble molecules

**Full-or-part-time:** 9h  
Theory classes: 3h  
Laboratory classes: 2h  
Self study: 4h

### 4. Cell Organization

**Description:**
The Cell: basic unit of life, Prokaryotes, Eukaryotes. Information processing organelles that process energy, cytoskeleton, extracellular structures.

**Full-or-part-time:** 9h  
Theory classes: 3h  
Laboratory classes: 2h  
Self study: 4h

### 5. Cell membranes

**Full-or-part-time:** 7h 30m  
Theory classes: 1h 30m  
Self study: 6h
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topic</th>
<th>Full-or-part-time</th>
<th>Theory classes</th>
<th>Laboratory classes</th>
<th>Self study</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Energy and metabolic enzymes</td>
<td>12h</td>
<td>3h</td>
<td>2h</td>
<td>7h</td>
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<tr>
<td>7</td>
<td>Cellular pathways that produce chemical energy</td>
<td>14h</td>
<td>3h</td>
<td>2h</td>
<td>9h</td>
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<tr>
<td>8</td>
<td>Chromosomes, cell cycle and cell division</td>
<td>11h</td>
<td>3h</td>
<td>2h</td>
<td>6h</td>
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<tr>
<td>9</td>
<td>Genetics: Mendel's Laws</td>
<td>9h 30m</td>
<td>1h 30m</td>
<td>2h</td>
<td>6h</td>
</tr>
<tr>
<td>10</td>
<td>The DNA and its role in heredity</td>
<td>11h</td>
<td>3h</td>
<td>2h</td>
<td>6h</td>
</tr>
<tr>
<td>11</td>
<td>Of the DNA to Protein: Genotype to phenotype</td>
<td>11h</td>
<td>3h</td>
<td>2h</td>
<td>6h</td>
</tr>
<tr>
<td>12</td>
<td>The genome of eukaryotes and their expression</td>
<td>12h</td>
<td>4h</td>
<td>2h</td>
<td>6h</td>
</tr>
</tbody>
</table>
13. - Development: Differential expression of genes

**Full-or-part-time:** 11h  
Theory classes: 3h  
Laboratory classes: 2h  
Self study: 6h

14. - Recombinant DNA and biotechnology

**Full-or-part-time:** 11h  
Theory classes: 3h  
Self study: 8h

15. - Molecular Biology and Medicine

**Full-or-part-time:** 11h  
Theory classes: 3h  
Self study: 8h

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**GRADING SYSTEM**

The evaluation will be conducted through the assessment by teachers of student work, individual and / or group performed on a face and, appropriately weighting the following activities:

- 2 individual tests conducted face-off along the course.
- Guided laboratory exercises.

Weight in the final evaluation:

- Two partial checks: 35% + 35%
- Lab practices exam: 15%
- Oral presentation: 10%
- Generic skills: Effective oral and written communication: 5%

**BIBLIOGRAPHY**

**Basic:**