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:
ELISABET ENGEL LOPEZ - Grup: M41, Grup: M42, Grup: M43, Grup: M44, Grup: M45
EVA GONZALEZ FLO - Grup: M45
JORDI GUILLEM MARTI - Grup: M41, Grup: M42
SOLEDAD GRACIELA PEREZ AMODIO - Grup: M41, Grup: M42, Grup: M43, Grup: M44, Grup: M45

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>
</tr>
</tbody>
</table>

Total learning time: 150 h
## CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Full-or-part-time:</th>
<th>Theory classes:</th>
<th>Laboratory classes:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. - An evolutionary framework for Biology</strong></td>
<td>Organisms have changed over hundreds of millions of years. Evolutionary mechanisms. Speciation that has led to diversity.</td>
<td>5h 30m</td>
<td>1h 30m</td>
<td></td>
<td>4h</td>
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<tr>
<td><strong>2. - Introduction to molecular and cellular biology</strong></td>
<td>Water properties, relation of life with water, acids, bases, pH, blocked cellular ion balance.</td>
<td>5h 30m</td>
<td>1h 30m</td>
<td></td>
<td>4h</td>
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<tr>
<td><strong>3. - Macromolecules: Their chemistry and biology</strong></td>
<td>Condensation reactions: Proteins: polymers of amino acids, carbohydrates, polymers of sugars, nucleic acids: polymers, lipids, water-insoluble molecules</td>
<td>9h</td>
<td>3h</td>
<td>2h</td>
<td>4h</td>
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<tr>
<td><strong>4. - Cell Organization</strong></td>
<td>The Cell: basic unit of life, Prokaryotes, Eukaryotes. Information processing organelles that process energy, cytoskeleton, extracellular structures.</td>
<td>9h</td>
<td>3h</td>
<td>2h</td>
<td>4h</td>
</tr>
<tr>
<td><strong>5. - Cell membranes</strong></td>
<td></td>
<td>7h 30m</td>
<td>1h 30m</td>
<td></td>
<td>6h</td>
</tr>
</tbody>
</table>
### 6. - Energy and metabolic enzymes

**Full-or-part-time:** 12h  
Theory classes: 3h  
Laboratory classes: 2h  
Self study: 7h

### 7. - Cellular pathways that produce chemical energy

**Full-or-part-time:** 14h  
Theory classes: 3h  
Laboratory classes: 2h  
Self study: 9h

### 8. - Chromosomes, cell cycle and cell division

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

### 9. - Genetics: Mendel’s Laws

**Full-or-part-time:** 9h 30m  
Theory classes: 1h 30m  
Practical classes: 2h  
Self study: 6h

### 10. - The DNA and its role in heredity

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

### 11. - Of the DNA to Protein: Genotype to phenotype

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

### 12. - The genome of eukaryotes and their expression

**Full-or-part-time:** 12h  
Theory classes: 4h  
Laboratory classes: 2h  
Self study: 6h

**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

**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:**