### Degree competences to which the subject contributes

1. Design of processes and facilities for production of biological materials.

### Teaching methodology

The class hours of the large group will consist of the introduction, by the teacher, of the concepts necessary to achieve the objectives of the subject. A teaching methodology, expositive and participatory expositive class will be used mainly. The work in small groups will consist of sessions of exercises and / or resolution of cases. In these sessions students will work in teams and the teacher will direct them during the activity. The capacity for teamwork and case resolution will be enhanced. Autonomous learning will focus on actions basically aimed at the resolution of exercises and cases. Subject support material includes exercise collections, work scripts and notes. This material will be available on the Virtual Campus (ATENEA).

### Learning objectives of the subject

With the follow-up of this subject, students are expected to achieve a series of knowledge, skills and abilities that allow them to approach the integral design of an installation for the production of biological material. After completing this course, the student must know the key parameters that define an installation for the production of biological material, plan the activity according to the production objectives and know the basic technologies and facilities necessary to achieve planned planning. Likewise, it will be necessary to know the normative aspects that affect the different types of facilities considered. When taking this course you will have to be able to evaluate and quantify the needs of spaces, facilities, energy, etc ... and know certain productive technologies of these types of activities.

### Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 40h</th>
<th>26.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 20h</td>
<td>13.33%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
390433 - DIB - Design of Biosystems Facilities
## Content

<table>
<thead>
<tr>
<th>STUDY AND DESIGN OF BIOLOGICAL PRODUCTIONS</th>
<th>Learning time: 8h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 2h</td>
</tr>
</tbody>
</table>

**Description:**

**Related activities:**
Task 1: Class theoretical explanation
Task 2: Resolution of exercises and application examples

<table>
<thead>
<tr>
<th>CASE STUDY I. PROCESSING DAIRY PRODUCTS</th>
<th>Learning time: 48h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 12h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study: 30h</td>
</tr>
</tbody>
</table>

**Description:**
In this first case of study, the planning of a food industry is addressed. By means of computer tools (Solver d'Excel) the production that maximizes the profit is decided, based on a series of conditions. Next, productive technology is studied and, from the corresponding mass balance, the selection of the main process equipment (engineering) is studied. After calculating the electrical and cold installations that allow the operation of the selected equipment. Finally, the planning of the processes is done through the Project software.

**Related activities:**
Task 1: Class theoretical explanation
Task 3: Study of the parameters for the dimensioning of a dairy industry
## CASE STUDY II. CONTROL AND PROGRAMMING ACTIVITIES OF A PROJECT

**Learning time:** 25h  
- **Theory classes:** 6h  
- **Practical classes:** 4h  
- **Self study:** 15h

**Description:**  

**Related activities:**  
- Activity 1: Classes theoretical explanation  
- Activity 3: Case studies

## CASE STUDY III. PRODUCTION OF AQUATIC ORGANISMS

**Learning time:** 26h  
- **Theory classes:** 7h  
- **Practical classes:** 4h  
- **Self study:** 15h

**Description:**  

**Related activities:**  
(ENG) Task 1: Theoretical explanation  
Task 3: Study of the parameters for the dimensioning of a production facility for aquatic organisms

## CASE STUDY IV. DESIGN OF A BIOFILTER

**Learning time:** 27h  
- **Theory classes:** 8h  
- **Laboratory classes:** 4h  
- **Self study:** 15h

**Description:**  
Design of a biofiltre. The installation of a biofiltre is designed with the hydraulic calculations of the elements that form part of the installation (pipes, filters, pumps, etc ...). The preparation of a budget and the plans of the elements are included.

**Related activities:**  
Task 1: Theoretical explanation  
Task 3: Study of the case
Planning of activities

<table>
<thead>
<tr>
<th>TASK 1: LECTURES</th>
<th>Hours: 6h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TASK 2: SOLVING EXERCISES AND APPLICATION EXAMPLES</th>
<th>Hours: 8h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 8h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TASK 3: CASE STUDY I TO IV</th>
<th>Hours: 136h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Practical classes: 20h</td>
</tr>
<tr>
<td></td>
<td>Theory classes: 26h</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
</tr>
</tbody>
</table>

Qualification system

Four deliveries are made throughout the course that correspond to its content. The weight of each delivery on the final grade is in the same proportion as the duration of the classes of each teacher who participates.

\[ N_{\text{final}} = 0.40N_1 + 0.20N_2 + 0.20N_3 + 0.20N_4 \]

N1: note part Case study I Planning an ind. milky
N2: note part Case study II Programming and control of project activities
N3: note part Case study III Production of aquatic organisms
N4: note part Case study IV Design of a biofilter

Only students who do not pass the course is expected to recover on the final exam.

Bibliography

Basic: