COURSE: ADVANCED EXPERIMENTAL TECHNIQUES

SUBJECT MATTER: Biochemical analysis

MODULE: Biochemistry

PROGRAM: Degree in Biotechnology

GENERAL FEATURES *
Type: ☐ Basic training, ✓ Compulsory, ☐ Elective
☐ Final Degree Project, ☐ Practicum

Duration: Semestral

Semester / s: 6

Number of ECTS credits: 5

Language / s: Spanish, Catalan, English

DESCRIPTION

SHORT DESCRIPTION AND JUSTIFICATION (of the meaning of the course in relation to the studies. Between 100 and 200 words)

This subject presents practical cases where basic and advanced techniques are applied in biosciences, both for biomolecules and biological samples. In the context of the Degree in Biotechnology this subject contributes the knowledge of the different techniques, when and how to apply them.

COMPETENCES (of the course placed in relation to the pre-assigned competences in the subject matter)

- That students have the ability to gather and interpret relevant data (normally within their area of the study) to think over and make judgments on relevant social, scientific or ethical issues. (CB3)

- Be able to understand and apply advanced knowledge of Biosciences and Engineering to the field of Biotechnology. (E3)

- Be able to use tools, systems or processes to carry out the activities in the field of Biotechnology according to the established requirements. (E4)

PREVIOUS REQUIREMENTS * (modules, subject matters, courses or knowledge necessary for the follow-up of the subject. State previous courses required to be completed)

The following subjects are required to be studied: Structure and function of biomolecules and Biochemical Analysis and Bioassays.

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CONTENTS (List the content of the course, with up to two level detail)

Spectroscopy applied to biomolecules. Electrophoretic, chromatographic techniques and separation procedures. Infrared. NMR Immunological techniques Calorimetry techniques. SPR. Isotopic techniques. Microscopy techniques. Raigs X.

1. Advanced UV-VIS spectroscopy.
2. Integrated progress of electrophoretic and chromatographic techniques.
3. Hydrodynamic techniques.
4. Immunological techniques.
5. Infrared. Applications to biomolecules.
6. NMR. Applications to biomolecules.
7. Calorimetry techniques. ITC, DSC
8. SPR. Applications to biomolecules.
9. Isotopic techniques.
10. Microscopy techniques.
11. X-rays of proteins.

METHODOLOGY

LEARNING ACTIVITIES * (Complete the table relating activities, workload in ECTS credits, and competences.)

<table>
<thead>
<tr>
<th>Learning Activities</th>
<th>ECTS Credits</th>
<th>Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1,2</td>
<td>E3, B3</td>
</tr>
<tr>
<td>Case and Problem-Solving Sessions</td>
<td>0,2</td>
<td>E3</td>
</tr>
<tr>
<td>Seminars</td>
<td>0,1</td>
<td>E4</td>
</tr>
<tr>
<td>Practical and Lab Work</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Presentations</td>
<td>0,1</td>
<td>E4</td>
</tr>
<tr>
<td>Personal Study</td>
<td>3,3</td>
<td>E3, E4</td>
</tr>
<tr>
<td>Assessment Tasks (Exams, Continuous Assessment...)</td>
<td>0,1</td>
<td>E3, E4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,0</td>
<td>B3, E3, E4</td>
</tr>
</tbody>
</table>

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TEACHING METHODOLOGY (justify the teaching methodology in relation to the competences and course contents. Between 100 and 200 words)

- Lectures - Presentation and explanation of contents by a teacher (possibly including demonstrations).
- Case and Problem-Solving Sessions - Resolution of exercises and problems, and exposition / discussion of cases by a teacher with the active participation of students.
- Seminars - Period of instruction carried out by a teacher with the aim of reviewing, discussing and resolving doubts about the materials and topics presented in the lectures and in the case and problem-solving sessions.
- Presentations - Oral presentation by a student to a teacher and/or other students. The presentation can be a work prepared by the student through searches in published bibliography, or a summary of a practical work or a project.
- Personal study activities - Personal work of the student necessary to acquire the competences of each subject matter, and to assimilate the knowledge exposed in lectures and case and problem-solving sessions, using the recommended reference materials. They also include the preparation of tasks related to the other activities, and the preparation of exams.
- Assessment Tasks - Oral and / or written tests made during the academic period of a course, or once it has finished (final exams, follow-up controls).

ASSESSMENT

ASSESSMENT METHODS * (Complete the table relating assessment methods, competences, and weight percentage in the course qualification)

<table>
<thead>
<tr>
<th>Assessment methods</th>
<th>Weight</th>
<th>Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>40%</td>
<td>E3, E4</td>
</tr>
<tr>
<td>Midterm Exam/s</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Continuous Assessment Activities</td>
<td>35%</td>
<td>E3, E4</td>
</tr>
<tr>
<td>Reports and Presentations</td>
<td>20%</td>
<td>E3, E4</td>
</tr>
<tr>
<td>Lab or Field Work</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Host Student Evaluation</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Participation</td>
<td>5%</td>
<td>B3</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES (Explanation of the student's achievements that allow the assessment of competences, relating them to the competences and the assessment methods)

- The student must know the different basic and advanced techniques in Biosciences (E3)
- The student must be able to apply these techniques in different cases and applications (E4).

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- The student must be able to relate activities of the biotechnological sector with these techniques (B3)

QUALIFICATION (Explanation of the qualification system)

Final qualification = 40% * Final exam + 35% * Follow-up activities + 20% * Works + 5% * Participation

For the final grade, the final exam grade must be at least 5
The follow-up activities correspond to a mid-semester follow-up questionnaire.
The works correspond to exercises and their completion and delivery is mandatory for the final grade.

ASSESSMENT OF THE COMPETENCES (Describe the grading system for each competence in relation with the assessment tasks)

Competition B3 = participation
Competencies E3 = E4 = average of the evaluation of the final exam, follow-up activities and Work / presentation.

BIBLIOGRAPHY (Recommended and accessible to the student.)

García-Segura et al., Técnicas instrumentales de análisis en Bioquímica, Editorial Síntesis, 1999


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DOCUMENT HISTORY

PREVIOUS REVISIONS (Indicate date and author/s, first the most recent one)

CURRENT REVISION (Indicate date and author/s)
31st May 2019, Dr. Magda Faijes