SHORT DESCRIPTION AND JUSTIFICATION

The laboratory activity is an essential part of the work of the biotechnology professional and one of the essential ways of obtaining data in the profession. The subject aims to enable students to acquire the basic practical knowledge that is applicable in a molecular biology laboratory, which will be essential for the subsequent development of other activities in the degree, as well as for their future professional life. They will also acquire the language of this laboratory.

The subject includes as essential contents the following: Techniques of transformation, cloning and analysis of nucleic acids.

COMPETENCES

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

- Be able to work in a team. (T1)

- Be able to work in a multidisciplinary environment. (T2)

- Be able to design processes and experiments to carry out the activities in the different fields of Biotechnology according to the established requirements. (E5)

- Be able to analyse, integrate and interpret data and information in the field of Biosciences. (E7)

- Be able to assess the risks in the use of chemical and biological substances. (E8)
PREVIOUS REQUIREMENTS * (modules, subject matters, courses or knowledge necessary for the follow-up of the subject. State previous courses required to be completed)

Own competences of the fundamental modulus.

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

Molecular Biology Laboratory.

1. Methods of work and safety in the molecular biology laboratory
2. Preparation of competent cells, transformation and selection of transformants
3. Isolation and quantification of nucleic acids
4. Extraction of plasmid DNA
5. Restriction of DNA
6. Separation and observation of DNA by agarose gel electrophoresis
7. Amplification of DNA by PCR
8. Generation of recombinant DNA by ligation
9. Applications of recombinant DNA technology

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>-</td>
<td>-</td>
</tr>
<tr>
<td>Case and Problem-Solving Sessions</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Seminars</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Practical and Lab Work</td>
<td>3,5</td>
<td>T1, T2, E5, E8</td>
</tr>
<tr>
<td>Presentations</td>
<td>0,1</td>
<td>B3, T1, E5, E7</td>
</tr>
<tr>
<td>Personal Study</td>
<td>0,3</td>
<td>B3, E7</td>
</tr>
<tr>
<td>Assessment Tasks (Exams, Continuous Assessment...)</td>
<td>0,1</td>
<td>B3, E7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4</td>
<td>B3, T1, T2, E5, E7, E8</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)

Assignment of laboratory practices supervised by a teacher that students perform individually or in groups. Follow-up of the works during the practical realization and supervision of the records associated to the activity that has been carried out, through laboratory journals that will be individually provided to the students at the beginning of the course and the formulation of questionnaires associated to each practice.

Each practice will consist of an explanation about the foundation of the practice, an experimental realization of the same and a discussion of the results obtained.

Each student or group must make the pertinent reports of the practices carried out, for their subsequent evaluation.

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>30%</td>
<td>B3, E7</td>
</tr>
<tr>
<td>Midterm Exam/s</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Continuous Assessment Activities</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Reports and Presentations</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Lab or Field Work</td>
<td>70%</td>
<td>T1, T2, E5, E8</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>-</td>
<td>-</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)

- Know how to manipulate biomolecules (T1, T2, E5, E8)
- Be able to use instrumentation for analysis, extraction, separation and purification of biomolecules (T1, T2, E5, E8)
- Be able to plan and execute experiments for the detection and quantification of biomolecules (B3, T1, T2, E5, E7, E8)
- Be able to use transformation, cloning and mutagenesis techniques. (T1, T2, E5, E8)

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QUALIFICATION

(Explanation of the qualification system)

The qualification of the Molecular Biology Laboratory (CLBM) will be obtained from the experimental work note of the Molecular Biology Laboratory (TEBM) and the final exam of the Molecular Biology Laboratory (EFBM). Both notes will be over 10 and will have a maximum value of 10. The note of the experimental work of the Molecular Biology Laboratory (TEBM) will be calculated as the weighted average of the different activities carried out in the experimental work of said laboratory. The experimental work grade must be greater than or equal to 4.5 in order to pass. The final exam note of the Molecular Biology Laboratory (EFBM) will be the grade obtained in the final exam carried out by the student. The grade of that exam must be greater than or equal to 5 in order to pass. The final qualification of the Molecular Biology Laboratory (CLBM) will be obtained by calculating the weighted average of the experimental work note of the Molecular Biology Laboratory (TEBM, 70%) and the final exam note of the Molecular Biology Laboratory (EFBM, 30%). If either of the two notes is less than 5, the note from the Molecular Biology Laboratory (CLBM) will be the lowest of both. If both grades are equal to or greater than 5, the qualification of the Molecular Biology Laboratory (CLBM) is calculated:

\[
CLBM = 0.7 \times TEBM + 0.3 \times EFBM.
\]

In the case that the note of the experimental work of the Molecular Biology Laboratory (TEBM) is less than 5, it may be recovered through another exam, or another type of activity, at the discretion of the teacher. In the event that the final exam grade of the Molecular Biology Laboratory (TEBM) is less than 5, it can be recovered through another exam, or another type of activity, at the discretion of the teacher. To be able to pass the subject the final grade of the Molecular Biology laboratory (CLBM) must be greater than or equal to 5. In the case that the final grade is less than 5, it can be recovered through another exam, or another type of activity, at the discretion of the teacher.

ASSESSMENT OF THE COMPETENCES

(Describe the grading system for each competence in relation with the assessment tasks)

For the evaluation of the competencies T1 T2, E5 and E8, the note of experimental work will be used as an indicator. For the evaluation of the rest of the competences, the indicator used will be the grade of the final exam of the subject.

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BIBLIOGRAPHY (Recommended and accessible to the student.)

- BIOQUÍMICA. CURSO BÁSICO. J. Tymoczko / J. Berg / L. Stryer.

DOCUMENT HISTORY

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

CURRENT REVISION (Indicate date and author / s)
March 1, 2019, Dr. Cristina Fornaguera, Patricia Torruella

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