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

Microbiology is the science that studies viruses and simple organisms, unicellular or multicellular, which show no histological specialization. This science is one of the cornerstones of Biotechnology, broadly interdisciplinary field where chemists, biologists, doctors and chemical engineers have an important role. The subject of Microbiology provides a general knowledge of microorganisms, their benefits and harmful effects. As a basic science, provides information and develops tools for the study of life; as applied science is fundamental to the practice of medicine, agriculture and industry.

The course includes the following essential contents: Overview of Scientific and Technical Microbiology, Viruses, prokaryotic microorganisms: Archaea and Bacteria, eukaryotic microorganisms: fungi and protists, Microbial Ecology and Applied Microbiology.

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 study) to think over and make judgments on relevant social, scientific or ethical issues. (CB3)
- Be able to understand and apply basic knowledge of Mathematics, Chemistry, Physics and Biology to the field of Biotechnology. (E1)

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

According to the program planning and academic regulations.

* These features should not be modified without the approval of the academic board (subject matter, module and / or studies program).
CONTENTS (List the content of the course, with up to two level detail)

THEORETICAL CONTENT

UNIT 1: PRINCIPLES OF MICROBIOLOGY

UNIT 2: MOLECULAR BIOLOGY OF MICROORGANISMS PROKARYOTES

UNIT 3: MOLECULAR BIOLOGY OF MICROORGANISMS EUKARYOTES

UNIT 4: VIRUSES AND VIROLOGY

UNIT 5: MICROBIAL DIVERSITY

UNIT 6: MICROBIAL ECOLOGY
Microbial ecosystems. Interactions between living things.

UNIT 7: QUICK VISION APPLIED MICROBIOLOGY
Industrial Microbiology. Clinical Microbiology. Microorganisms and agriculture. Other applications.

PRACTICAL CONTENT

UNIT 1: SAFETY AT THE LABORATORY OF MICROBIOLOGY

UNIT 2: OBSERVATION OF MICROORGANISMS AND STRUCTURES
Stains (simple, differential and structures). Fresh observations. Microcultures.

UNIT 3: MICROBIAL COUNTS
Total counts. Counts of viable microorganisms in plaque. Counts according to the method of NMP.

UNIT 4: IDENTIFICATION OF MICROORGANISMS

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UNIT 5: INVESTIGATION OF THE PRESENCE / ABSENCE OF MICROORGANISMS
Application of different types of culture media (general, enrichment, selective, differential, chromogenic, etc.).

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>1,3</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>Case and Problem-Solving Sessions</td>
<td>0,3</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>Seminars</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Practical and Lab Work</td>
<td>0,8</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>Presentations</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Personal Study</td>
<td>2,5</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>Assessment Tasks (Exams, Continuous Assessment...)</td>
<td>0,1</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td>CB3, E1</td>
</tr>
</tbody>
</table>

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.
- Practical and Lab - Period where the student performs laboratory activities or similar (computer practices, projects, workshops, etc.) under the direct supervision of a teacher.
- 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).

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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>50 %</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>Midterm Exam/s</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Continuous Assessment Activities</td>
<td>20 %</td>
<td>CB3, E1</td>
</tr>
<tr>
<td>Reports and Presentations</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lab or Field Work</td>
<td>20 %</td>
<td>CB3, E1</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>10%</td>
<td>CB3, E1</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)

- Those students know how to differentiate and classify microorganisms and viruses (CB3, E1).
- Those students know the main applications of microorganisms (CB3, E1).
- Those students know the biosafety regulations (CB3).
- Those students know how to apply the basic techniques of a microbiological lab (E1).

QUALIFICATION (Explanation of the qualification system)

In the first call, the evaluation of the subject will consider the marks of the Continuous Assessment Activities (AA), lab or field work (LW), participation (P) and the final exam (FE). All these notes will be over 10 and can have a maximum value of 10.

The mark of Continuous Assessment Activities (AA) will correspond to a control carried out during class time.

The mark of lab or field work (LW) is calculated as the simple average of the various activities conducted in the laboratory.

The mark for Participation (P) is adjudicated by the teacher when the course is completed taking into account the level of involvement shown by the student during the activities.

The final exam (FE) mark must be greater than or equal to 5.0 to pass the course.

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The final mark (FM) of the subject is calculated using the following formula:

\[
FM \text{ (first call)} = 0.2 \text{ AA} + 0.2 \text{ LW} + 0.1 \text{ P} + 0.5 \text{ FE}
\]

Only if this mark is greater than or equal to 5.0 the subject is passed.

From the second call, the final mark (FM) of the subject will be calculated with the following formula:

\[
FM \text{ (other calls)} = 0.2 \text{ LW} + 0.1 \text{ P} + 0.7 \text{ FE}
\]

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

For the evaluation of the competences CB3 and E1, the final mark of the subject will be used as indicator.

BIBLIOGRAPHY (Recommended and accessible to the student.)


DOCUMENT HISTORY

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

CURRENT REVISION (Indicate date and author / s)
February 25th 2019, Dr. Montserrat Agut Bonsfills

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