

Master's Dissertation

Code: 43334
ECTS Credits: 15

Degree	Type	Year	Semester
4314579 Biological and Environmental Engineering	OB	2	1

Contact

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Use of Languages

Principal working language: spanish (spa)

Other comments on languages

This subject is entirely taught in Catalan and/or Spanish

Prerequisites

To have passed all the subjects of the first course and to be studying or to have passed all of the second course.

Objectives and Contextualisation

The objective of the TFM is students to learn, in first person, the method of developing research and/or innovation and/or engineering projects. For doing this, they must participate in the design, realization and presentation of results of a project that may be of research or industrially relevant, but always within the master's fields of knowledge. Based on the type of project (research and/or innovation or engineering) and with the advice of the director of the work, each student develops his/her own master's thesis. In this process of tutoring or direction, the original design can be modified and the rhythms and phases of the work are established until the conclusion. Students must write a report summarising the work done and adapted to the type of project. Moreover, students should defend their TFM in person and in front of an evaluation committee.

Competences

- Apply methods, tools and strategies to develop biotechnological processes and products with energy-saving and sustainability criteria.
- Apply specific methodologies, techniques and resources to conduct research and produce innovative results in the area of biological and environmental engineering.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Continue the learning process, to a large extent autonomously.
- Integrate and use biotechnology and bioprocess engineering tools to solve problems in emerging biotechnological areas for the industrial production of bioproducts.
- Integrate and use chemical, environmental and biological engineering tools to design biological systems for the sustainable processing of waste and for industrial biotechnological processes.

- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Integrate knowledge of kinetics, thermodynamics, transport phenomena and numerical methods to analyse, design, model and optimise different types of biological reactors and their operating strategy.
- Organise, plan and manage projects
- Seek out information in the scientific literature using the appropriate channels and integrate this information, showing a capacity for synthesis, analysis of alternatives and critical debate.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use IT tools to acquire further knowledge in the field of biological and environmental engineering.

Learning Outcomes

1. Apply experimental techniques in biological engineering to sample and analyse a pilot-scale fermentation
2. Apply knowledge of bioreactors to critically analyse experimental results from a pilot-scale biological process.
3. Apply specific methodologies, techniques and resources to conduct research and produce innovative results in the area of biological and environmental engineering.
4. Apply the methodology for gathering and analysing information to field or laboratory work.
5. Apply theoretical knowledge of biological engineering to characterise the performance of a pilot-scale fermentation.
6. Characterise the sustainability of a biological process pilot-scale on the basis of experimental findings.
7. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
8. Continue the learning process, to a large extent autonomously.
9. Design and manage a research project in the field of environmental and biological engineering.
10. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
11. Organise, plan and manage projects
12. Seek out information in the scientific literature using the appropriate channels and integrate this information, showing a capacity for synthesis, analysis of alternatives and critical debate.
13. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
14. Use IT tools to acquire further knowledge in the field of biological and environmental engineering.
15. Write a publishable paper in line with the regulations of the master's dissertation, drawing on the specific knowledge acquired.

Content

The objective of master's degree dissertation is to perform a research or innovation or industrial work that every student of the master's degree must do with the advice of a tutor. The dissertation will be evaluated by a evaluation committee. The evaluation of the final master's projects of the students is not only based on the content of the document, but also takes into account other essential competences, such as the ability to synthesize the information, the preparation and the oral presentation and the proper use of language (written and spoken).

In the Master's Degree in Biological and Environmental Engineering, students may base their master's thesis in some of the research lines of the Department of Chemical, Biological and Environmental Engineering, or they may do it in a company or research and/or innovation center through an agreement with the School of Engineering.

Methodology

Director and / or tutor of the TFM

1) All doctors who are actively participating in lines of research in the area of the master's degree may act as directors of the work.

- 2) The work may be directed by a maximum of two directors. In the case of codirection, only one of the directors must be a doctor.
- 3) To ensure the adequacy of the theme of the TFM to the scope of the master, when the student has a director or director from a research center and/or academic or industrial personnel different from the Department of Chemical, Biological and Environmental Engineering, The TFM must have the agreement of a professor who will act as tutor latter on.
- 4) The director must guide the students during the development of the work. At the end of the research project, the director must make a report on the work done by the student (student learning ability, integration into the dynamics of the work team, etc.). This report will be used to complete the evaluation of the students. The communication platform with the students will be the Moodle classroom of the UAB designated for that purpose.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Follow-up of the master's thesis	10	0.4	3, 4, 12, 9, 15, 11, 7, 14
Type: Supervised			
Follow-up of the tasks developed	30	1.2	3, 4, 12, 9, 11, 10, 13, 8, 14
Review of the memory and presentation	30	1.2	3, 4, 12, 15, 11, 10, 7, 13, 8, 14
Type: Autonomous			
Autonomous work	150	6	4, 12, 11, 10, 7, 13, 8, 14
Design and elaboration of dissertation and presentation	150	6	4, 12, 9, 11, 10, 7, 13, 8, 14

Assessment

For the evaluation of the final master dissertation, the student must:

- Present a written report of the work developed.
- Make a public defense of this report in from of the evaluation commission.

The qualification criteria are based: 1) on evaluation rubrics filled out by the evaluation commission, which include several aspects like the quality of the written report, the presentation and the discussion, and 2) on the evaluation of the report presented by the director and/or tutor of the work. The evaluation rubrics are in Moodleof the subject. The marks range from 0 to 10.

If some form of plagiarism or similar malpractice is detected, the director of the work and the student would be informed and the defense is impeded.

The evaluation commission consists of three professors, preferably doctors from the Department of Chemical, Biological and Environmental Engineering of the UAB, and may require the replacement of a member by an external expert when the coordinator believes it necessary. The oral presentation of the work is limited to a maximum of 15 minutes, after which the tribunal members can ask questions about the master's thesis that demonstrate that the student has learned in his/her particular field of specialization of the master. It can be presented in Catalan, Spanish or English.

Moreover, on the one hand, the evaluation of the academic tutor of the master's thesis is also done through an evaluation rubric that takes into account, among other aspects, the following: initiative, responsibility, ability to interpret the results and any other criteria that is considered relevant.

On the other hand, the tribunal members assesses, among other aspects:

- 1) Dissertation:

Appropriate use of language. The document can be written in English, Catalan or Spanish. The choice of language is not a criterion for evaluation and the tribunal members will only evaluate the correct and appropriate use of the chosen language.

Format: if the dissertation correctly follow the relevant guidelines according to the TFM typology.

Concision and ability to analyze and interpret the results or products of the work.

2) Oral defense:

The student's ability to communicate.

The conciseness and the fulfillment of the established time.

The quality of the presentation.

The ability to answer questions asked by the court.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of the presentation and oral discussion	20-60%	1	0.04	10, 7, 13, 14
Preparation of the dissertation	20-60%	3	0.12	2, 5, 3, 4, 1, 6, 12, 9, 15, 11, 10, 7, 13, 8, 14
Report of the director of the master's final project	20-60%	1	0.04	2, 5, 3, 4, 1, 6, 12, 9, 15, 11, 10, 7, 13, 8, 14

Bibliography

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