

Master's Thesis (250726)

General Information

School	ETSECCPB
Departments	Departament d'Enginyeria Civil i Ambiental (DECA)
Credits	30.0 ECTS
Programs	MÀSTER UNIVERSITARI EN ENGINYERIA ESTRUCTURAL I DE LA CONSTRUCCIÓ (pla 2015)
Course	2024/25

Main teaching language at each group

- Group 10EN1 English (Q1)
- Group 10EN2 English (Q2)

Faculty

Responsible Faculty: Jose Turmo Coderque
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Objectives of Education

Development, presentation and defense of a work performed individually and defended in front of a jury, consisting of a structural engineering project or a research project in which the student should synthesize and integrate the skills acquired in previous studies .

- Capability to analyze, synthesize and solve a problem related to structural or construction engineering, providing objectives, methodology of resolution and some results applicable to the particular case and/or to analogous cases. - Ability to communicate effectively and prepare a technical presentation. - Capability to write technical documentation

The Final Master Thesis may include: 1) Development of a research or a related product structural engineering or construction. The student must include the problem statement, objectives, state of knowledge, methodology, results, conclusions. The work should be presented in the format of a scientific-technical document. 2) Development of structural engineering or construction project with all documents and aspects that should have a project (memory and appendages, plans, specifications, budget). The Master Thesis is developed and defended individually in front of a university jury. Work must be original. Master Thesis allow students to know more deeply the area of specific knowledge of their work in the context of the general and specific areas of the Master. The Master's Thesis allow students to plan and develop properly and efficiently a new topic. The thesis should also include all stages (background, development of the state of knowledge, analysis, synthesis, discussion, writing the paper, and finally defense). Each student should have one or more directors who supervise the work of the student through the necessary meetings. The directors advise and guide the student through their work. The mark of the Master Thesis is obtained from the public presentation. The jury will have the work presented according to the rules established in the period prior to their presentation. The jury will consider the content and the formal aspects of writing and oral presentation and defense made by the student during the defense. The jury will consider all these aspects and give a mark by consensus or, each member of the tribunal may propose a mark, and if so, the Master's Thesis mark will be the arithmetic mean of the three proposed marks.

PROMOTION AND MANAGEMENT OF ENGINEERING PROJECTS: The ability to identify and study society's needs and to transform these needs into infrastructure and services projects. The ability to write, develop and implement a project using knowledge of basic subjects and technologies; decision-making

abilities; the ability to meet the needs for which it is designed; the ability to assess the social and environmental impact of the technical solutions adopted; and the ability to assess the funding and material and human resources needed to carry it out.

Competencies

Especific

To conceive and design civil and building structures that are safe, durable, functional and integrated into its surroundings.

Designing and building using traditional materials (reinforced concrete, prestressed concrete, structural steel, masonry, wood) and new materials (composites, stainless steel, aluminum, shape memory alloys?).

To evaluate, maintain, repair and strengthen existing structures, including the historic and artistic heritage.

To apply innovative and sustainable technological aspects in the management and implementation of projects and works.

Mathematically modelling structural engineering problems.

To apply methods and advanced design software and structural calculations, based on knowledge and understanding of forces and their application to the structural types of civil engineering.

To analyze the multiple technical and legal conditions arising in the construction of public works, and use proven methods and proven technologies with the aim of achieving greater efficiency in construction while respecting the environment and protecting the safety and health of workers and users of public works.

To perform, present and defend before a university tribunal an original exercise done individually, in which the skills acquired in the teachings of the Masters are synthesized.

Generic

To develop, improve and use conventional materials and new construction techniques to ensure the safety requirements, functionality, durability and sustainability.

To define construction processes and methods of organization and management of projects and works.

To design plans for safety, quality and environmental and socioeconomic impacts related to the construction process.

Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	0.0 h	0.00 %
	Medium group	0.0 h	0.00 %
	Laboratory classes	0.0 h	0.00 %
	Guided Activities	180.0 h	100.00 %
Self Study		720.0 h	

Contents

TFM

Work load

The estimated workload of TFM is 4 months full time. The development of TFM will always be guided by a supervisor. The supervisor will be always a professor of the Civil Engineering School of Barcelona when the TFM isn't developed within an exchange program at a foreign university. This supervisor must perform a function of student guidance and advice throughout the process, from the moment of topic selection. It is also responsible for authorizing or not the presentation of TFM in a panel of examiners. Only after the approval of his/her supervisor, the student can submit the TFM project. Additionally, the student may have an external supervisor (from the professional field, out of the University).

Description

1. Type of TFM

The TFM may include:

- * An engineering project, basic or constructive
- * A technical study
- * A research project

In either of these modes, it is necessary that the topic of TFM has a clear connection to civil engineering and the subjects studied in the master. It has to be an original work of the student.

2. TFM documents

Students must write a report whose structure depends on the type of TFM. This report can be written in Catalan, Spanish, English or French. The use of other languages must be approved by the Head of Studies.

2.1 Engineering Project

If TFM is a construction project, the TFM documents should include: 1. Report and Annexes 2. Maps 3. Terms of Reference 4. Budget. In this case, it will be appreciated that the project is complete in all its documents and that the student has applied knowledge of various branches of civil engineering, showing a wide overview of constructive development and the integration of constructive solution in the territory. Apart from the technical proposal, an economic sustainability study and the execution plan of the work should be addressed.

If TFM is a basic project, the documentation should include: 1. Report and Annexes 2. Maps 3. Terms of reference (may not exist) 4. Budget (there will be at least an economic assessment). The basic perspective of this TFM makes it unnecessary to reach details in all documents (as in a construction project), but requires more effort on specific aspects of this TFM as alternative studies or economic studies.

2.2 Technical Study

If TFM is a technical study, the report must contain at least the following chapters: 1. Executive Summary 2. Description of the subject of study 3. State of the art 4. The analysis and / or the proposed solution 5 . The conclusions.

2.3 Research Project

If TFM is a research project, the documents must contain at least the following points: 1. Summary 2. Introduction and Objectives 3. State of the art 4. Methodology 5. Results 6. Conclusion 7. References. It should emphasize the novel research contributions in the field.

Specific Objectives

TFM objectives are:

- * Provide an overview of the concepts addressed in the degree, which allows to integrate knowledge from different branches of civil engineering.
- * Stimulate creativity, originality, innovation, entrepreneurship and ability to face challenges and solve problems.
- * Deepen important capabilities of a Civil engineer, such as preparing studies, decision making, research, work planning, oral and written presentation, etc.

Activities

TFM

"Supervised activities" meaning the student interaction with their supervisor, estimated at about 25 hours in total.

Dedication

Teaching Methodology

The TFM will be developed under the supervision of a faculty member of the Civil engineering School of Barcelona. Therefore, student must require the necessary interviews with the supervisor to ensure the proper development and quality of the work.

If the TFM is developed in collaboration with an institution or company other than the UPC, an external tutor may act as co-director of the TFM. In any case, there must also be an internal director who will act as academic director of the work.

In case the TFM is presented and defended at a foreign university within the framework of mobility agreements signed by the Civil engineering School of Barcelona, the student must find a supervisor at the host university.

Grading Rules

() The evaluation calendar and grading rules will be approved before the start of the course.*

The grading of TFM will be based on an assessment of written documents and oral presentation about the objectives, results and conclusions of TFM to a panel of examiners. The panel will consist of three professors of the School that after the public presentation of TFM assigns a grade based on the following criteria:

Thesis content

- * Originality and innovation (30% of global mark)
- * Comprehensive / integrative / interdisciplinary scope (30% of global mark)

Thesis report

- * Quality of written report (20% of global mark)

Thesis defense

- * Clarity of oral presentation (10% of global mark)
- * Performance in the debate with the examination panel (10% of global mark)

Minimum mark to pass is 5 over 10.

In the case of performing the TFM within a mobility agreement in a foreign university, the final mark will be given by the host university if the work was done individually and has been presented to a panel of at least three faculty members (if a different grading scale was used, it will be adapted to the grading system of the UPC). If these requirements are not met, the student must present and defend TFM in the Civil Engineering School of Barcelona.

Test Rules

Students have two periods for the TFM submission and defense: February and July. Students must submit the TFM report in digital format with electronic signature (via e-secretaria). Moreover, students should provide a list of the main contributions ("highlights") with a written and graphic summary of TFM in the Open Courseware portal.

The TFM will be defended in public session with a panel of three professors from the Civil Engineering School of Barcelona. Students will have approximately 20 minutes to proceed to the oral presentation of the objectives, results and conclusions of TFM. After the presentation, the jury will start a debate with the student, answering some questions about the development and content of the TFM. In the TFM defense room, a computer and a projector will be available to display graphic documents (Microsoft Powerpoint or other).

Office Hours

To be agreed with the supervisor.

Bibliography

Basic

- Escola de Camins. Normativa acadèmica del Màster de Camins, Canals i Ports en tot allò referent al TFM (capítol 5).