UAB
Universitat Autònoma de Barcelona

Bachelor's Degree Final Project

Code: 106965
ECTS Credits: 12

2025/2026

Degree	Type	Year
Management of Smart and Sustainable Cities	TFE	4

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

The prerequisites are those included in the UAB's permanence regime (enrolment progression), which specifies that in order to enrol in the TFG, it is necessary to have passed, at a minimum, all first-year subjects and a minimum of two-thirds of the total ECTS of the plan (i.e., 160 ECTS).

In any case, it is recommended that the student enrol in the TFG when they are ready to complete their undergraduate studies in the same year in which they are doing it.

Objectives and Contextualisation

The TFG should be understood as a globalizing subject oriented to the integrated evaluation of the competencies associated with the degree, which represents the culmination of learning, where the student must show maturity in multiple competencies and learning outcomes. They must demonstrate their ability to integrate and put into practice the knowledge, skills and attitudes acquired during their studies and allow the evaluation of their professional capacity.

Learning Outcomes

1. CM28 (Competence) Develop urban innovation plans and projects in which existing assets (infrastructure, resources) and actors (society, administration) are integrated with new technologies to achieve the proposed objectives.
2. CM29 (Competence) Include social and environmental benefits in the assessment of the objectives of urban engineering projects and other areas linked to the management of cities.
3. CM30 (Competence) Design solutions with professional ethics and respect for democratic values and social equity.
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5. KM33 (Knowledge) Identify possible biases of gender, race, religion, etc. in any aspect of the management of smart and sustainable cities.
6. SM33 (Skill) Propose useful solutions to the challenges posed by the collaborating entities.
7. SM34 (Skill) Formulate solutions to management and technological integration issues that take into account social equity and sustainability.

8. SM35 (Skill) Develop information systems for decision-making in the management of smart and sustainable cities.
9. SM36 (Skill) Argue the solutions to social, economic, technological and sustainability challenges of cities, including their own and others' evaluations of work along the same lines, with the corresponding citations.

Content

What is the TFG?

It is an original exercise to be carried out individually and presented and defended before a university panel, consisting of a project in the field of specific technologies of Computer Engineering of a professional nature in which the skills acquired in the teachings are synthesized and integrated. This work represents a personal workload of the student of 300 hours.

A single type of TFG is defined, as an "applied project", which should not be seen only as a development project. The objective of this project could be any problem, system or situation that can be solved by applying techniques, practices and resources specific to the profession.

Obviously, proposals must take into account the competencies associated with the subject in which the project is framed. In addition, it must have a well-defined beginning and end, since it must be completed in 300 hours over the course of a semester. Therefore, when making the proposal and definition, both competencies and time requirements must be considered.

Each project must be considered unique. This does not mean that it must be innovative or produce an improvement over other similar solutions. It must be unique from the point of view of its resolution. From this point of view, it is possible for different students to do the same project or for a large project to be divided between several students.

The final objective of the project should not necessarily be to create a productive application or system, given the time and resource constraints. It should be ensured that the entire process has been completed in an appropriate manner and that the development of the possible application or system is viable based on the analysis and design carried out. However, it should be positively valued that the ability to develop part of the application or a prototype of the system is demonstrated.

Who can offer work?

a) Teaching staff/departments. Following the calendar approved by the School, they must propose topics/projects using the corresponding computer application. If deemed appropriate, the person responsible for the subject and/or the TFG Committee will supervise whether the proposed work is appropriate.

b) External companies or institutions. The work can be carried out within the framework of a collaboration agreement with an external company or institution. The entity must send the proposal in writing (following the model established for this purpose, on the specified dates) to the person responsible for the subject. The person responsible and/or the TFG Committee will supervise that the proposed project is appropriate (it will be assessed that the skills foreseen in the degree can be assessed and that the duration and workload are appropriate). If the proposal is accepted, a tutor teacher will be assigned and the data will be entered into the application. These projects are supervised by the school's academic tutor and by a tutor from the company.

c) Students. The student will propose a specific topic or project in writing (following the established model, on the specified dates) to the TFG supervisor. Acceptance will not be immediate, as it will be necessary to assess whether the competencies required for the degree can be assessed and whether the duration and workload are appropriate. The supervisor must accept or decline the proposal and, if accepted, inform the student that a tutor can be found. If the student cannot find a tutor, one will be assigned at the end of the assignment process.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Supervised			
Preparation of initial, follow-up and final documentation, as well as the defense	30	1.2	CM28, SM36, CM28
Follow-up meetings with the tutor	9	0.36	SM33, SM34, SM33
Type: Autonomous			
Project development	260	10.4	CM28, CM29, CM30, KM33, SM33, SM34, SM35, SM36, CM28

In the Virtual Campus Moodle classroom and/or in the TFG monitoring application, the calendar/schedule to be followed, the mechanism for consulting and selecting proposals, and the work assignment system will be specified.

Once the TFG has been assigned, the tutor and the student will meet to specify the work to be developed and to define the general guidelines for monitoring the work.

The tutor will monitor the work through a minimum of 4 tutoring/supervision sessions. Before each of them, the student must submit a document describing the state of development of the project, specifying the work carried out in each of the stages and the procedures that will be carried out for its execution. These documents will be collected in a TFG dossier, which will include both the original documents presented at each monitoring milestone, as well as the improvements introduced in the reports based on the comments and observations of the tutor.

The TFG dossier will be the compendium of all the work carried out during the course of the work (reports, feasibility study, planning diagrams, code, user manuals, data specifications, analysis and design diagrams, use cases, business plan, legal and ethical studies, ...) and must be delivered at the end of the process in digital format. It must be presented in an organized and easily accessible way. If applicable, it must also reflect the changes that have been made to the documents delivered, due to the comments that the tutor may have introduced/suggested in the different meetings. It must be possible to verify the aforementioned changes through a "change list".

Monitoring sessions:

- 1st monitoring session (week 4): the student submits an Initial Report
- 2nd monitoring session (week 9): the student submits a Progress Report (I)
- 3rd monitoring session (week 14): the student submits a Progress Report (II)
- 4th monitoringsession (week 17): the student submits the Final Report proposal and the project is closed (permission to submit).
- 5th monitoring session (week 18-19): the student submits the presentation proposal.

All reports are mandatory to submit, and on the dates specified by the coordination. Late submissions may be accepted, if there is a justified reason. This delay may result in a penalty in the grade given by the tutor.

For each of the sessions, it will be necessary to define which sections must be included in the corresponding report and, therefore, also in the TFG dossier. Some will be mandatory and others will be agreed with the tutor depending on the type of work.

Rubrics have been defined to evaluate each of the reports, with the aim of achieving that the final grades are more uniform, objective and that they can be traced. Once each of the reports has been evaluated, the corresponding rubric will be published in the monitoring application, with the guiding notes and observations

that are considered appropriate to enable its improvement (with a view to its inclusion in the TFG dossier), as well as the following reports.

Each document must include information regarding the identification of the student and the work: Student's name, Academic year, Title of the work, Name of the tutor teacher and Date. In addition, it is mandatory to use written communication resources appropriately (writing, spelling, presentation, ..) and follow, if applicable, the recommended presentation formats.

As an indication, the three reports must include (it is very important to look at the rubrics with which they will be evaluated):

Initial report. The main objective of the report is to provide a detailed proposal for the TFG, in which the objectives to be achieved and the methodology to be used to achieve the proposed goalsare proposed. Likewise, thedifferent steps to be followed in developing it must be planned in detail, both in terms of tasks to be carried out and in terms of time. This proposal therefore requires prior reflection on the part of the student, who must consult the relevant sources of information, so that he or she can justify his or her choices and work program. It must include, at a minimum:

- Preliminary information on the issue to be addressed or the problem to be solved, specifying and commenting on the sources of information used.
- A proposal for the objective of the TFG and/or the goals to be achieved in developing the proposed issue or problem.
- General explanation of the methodology to be followed to achieve the proposed goals.
- Identification of the steps to be followed for the development of the proposed project, establishing a work plan to carry it out.
- Use of generative AI in the development of the report and the work.
- Reference bibliography consulted and complementary sources.

Progress Report I. The main objective of this report is to record the progress made in the development of the TFG. At the same time, it must ratify the planning carried out at the end of the initial phase, or, if applicable, propose the changes to be introduced for an adequate conclusion of the TFG in the planned academic period. It must include, at a minimum:

- Indication of the level of monitoring of the planned planning for the development of the TFG, and of the adjustments made and/or planned, if considered pertinent, together with their justification in the latter case.
- If necessary, indication of changes introduced in the objectives set and/or in the planned work methodology, both adequately justified.
- General explanation of the methodology being followed to achieve the objectives.
- Use of generative AI in the development of the report andthe work.
- Reference bibliography consulted and complementary sources.

Progress Report II. The main objective of this last report is to record both the work carried out in this last stage, and the conclusions that can be obtained from it. At the time of submitting this report, the TFG is in its final phase in relation to its development, and the student must have practically completed the proposed project. It must include, at least:

- Indication of the level of monitoring of the planning foreseen for the development of the TFG, and of the adjustments made, together with their justification in the latter case.
- General explanation of the methodology that has finally been followed and of the changes with respect to the initial proposal.
- Presentation and assessment of the results.
- Provisional conclusions.
- Use of generative AI in the development of the report and the work.
- Sources of information consulted.

Apart from this supervision, the student will prepare his/her TFG independently.

Final Phase

The TFG will culminate in the completion of a written report (final report) in article format and a presentation and public defense of the same. Students interested in submitting and defending their work must notify the tutor in the 4th mandatory monitoring meeting. In this case, the tutor will mark the work as Completed from the TFG monitoring computer application. In week 19, the student will submit the digital TFG dossier through the application, at the corresponding milestone.

For each TFG submitted, the TFG committeewill appointan evaluationcommittee, made up of three faculty members: the academic tutor (whenever possible) and two more members. The committee will also establish, at least three calendar days in advance, the date and place where you must defend your work.

The final report. It will be in article format and must have between 8 and 10 pages of explanation of the work, acknowledgements and bibliography. Up to 4 additional pages can be added to include appendix material. It must strictly follow the published format (based on that proposed by the IEEE Computer Society) and must include, at a minimum, the contents mentioned below: objectives, state of the art, methodology, results, conclusions, use of generative AI and bibliography. It must be correct, precise and synthetic in its use of language. The evaluation of the article will be carried out by the evaluation committee (the same one that will evaluate the public defense), and the grade will be obtained from the average of the assessments made by the professors who train it. A rubric has been defined for its evaluation.

Public defense. The final phase of the TFG consists of their public defense. The student will present their work in a clear and orderly manner to the evaluation committee. This presentation may not exceed 15 minutes in any case, and will be immediately followed by a round of questions asked by the evaluation committee that will be, at most, another 15 minutes. The defenses will be organized in sessions in which members of the same committee will evaluate several presentations. For their evaluation, the professors will use a rubric. The final grade of the defense will be the average of the assessments made by the professors, and will be made public at the end of each session.

In the TFG monitoring application you will find the specifications of the formatand content of the different reports, as well as the characteristics of thepresentation. You will also find the rubrics with which each of the activities will be evaluated.

Note: 15 minutes of a class will be reserved, within the calendar established by the center/degree, for students to complete the surveys to evaluate the performance of the teaching staff and to evaluate the subject.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assessment of the tutor	40	0	0	CM28, CM29, CM30, KM33, SM33, SM34, SM35, SM36
Final report (Evaluation Committee)	30	0	0	CM28, CM29, CM30, SM35, SM36
Presentation and defense (Evaluation Committee)	30	1	0.04	SM33, SM34, SM36

The evaluation of the TFG consists of two parts:

1. Evaluation by the tutor (weight: 40% of the grade). He/she will evaluate the reports and materials that have been generated throughout the work (TFG dossier), emphasizing the evolution of the work and the fulfillment of the planned objectives. The evaluation is continuous and formative. For each of the activities delivered, an indicative grade will be obtained, which will not have a definitive weight on the grade of the subject until the last delivery. In each activity there are some items that must be evaluated compulsorily since they are necessary to give a grade to the activity, items that can be evaluated optionally to give the student guidance on how he/she is doing and items that are not evaluated. The final grade for each item will be the one that appears in the last activity where it is evaluated by the tutor. All activities are mandatory to be delivered, and on the dates specified by the coordination. Late submissions may be accepted if there is a justified reason. This delay may result in a penalty in the final grade.

2. Evaluation by the TFG evaluation committee (weight: 60% of the grade). The evaluation committee will be made up of three faculty members who will evaluate the final report (30%) and the public presentation of the work (30%). If possible, the tutor will be part of it. Each member will give their grade and the average of the grades will be calculated to obtain the final grades.

Evaluation rubrics will be used for each of the activities so that the final grades are uniform, objective and traceable. These rubrics will be available in the TFG monitoring application.

The final grade of the TFG will be the responsibility of the evaluation committee, and will also include the grade of the tutor. To pass the subject, the student must have passed at least 50% of the grade awarded by both the tutor and the evaluation committee. The final grade will be the weighted average of the two grades. Students who do not exceed 50% of the grade in each of the parts of the assessment will have a final grade in the failure report, with the corresponding numerical grade lower than 5.

The evaluation committee may propose, with justification, the awarding of the "Matrícula de Honor" (Honours) to one or more projects, provided that, in the final evaluation, they have obtained a qualitative grade equal to or higher than 9. Granting an honorary registration qualification is only the decision of the professor responsible for the subject. The UAB regulations indicate that the MH may only grant students who have obtained a final qualification equal to or greater than 9.00 and in an amount not exceeding 5% of the number of students in the subject.

This subject recognizes the growing use of generative artificial intelligence as a support tool, and therefore its use is allowed in a limited way. In general, the use of these tools will only be accepted to improve formal aspects of the work, such as writing, style, clarity of exposition, linguistic correction or translation, and to obtain timely assistance in technical aspects.

It is not acceptable to use generative artificial intelligence tools to generate content of the work that is subject to evaluation, such as methodological approaches, designs, conducting experiments, analysis or interpretation of results, development of ideas, or formulation of conclusions. These tasks must be carried out entirely by the student, as they constitute the essential part of the intellectual and creative work required to pass the subject. As there is a great diversity of work,consult with your tutor if in doubt.

In any case, students must explicitly indicate, in each of the reports and deliverables, whether generative artificial intelligence tools have been used, specifying which ones have been used, for what purpose and to what degree. Irresponsible, excessive or unnecessary use of these tools may have a negative impact on the finalgrade of the degree project. The detection of undeclared or inappropriate use of these tools may lead to the suspension of the subject.

If the TFG is not passed, the student must re-enroll and start the process again. If the student and the tutor agree, the same work can be proposed again.

The final grade will be "Not assessable" only in the event that no report has been submitted.

If it is proven that part of the TFG has been plagiarized and/or prepared by a third party other than the enrolled student, it will be automatically suspended.

Bibliography

General bibliography:

- Alley, M. (2013). The craft of scientific presentations: critical steps to succeed and critical errors to avoid. Springer-Verlag. [Recurs electrònic] (http://www.writing.engr.psu.edu/csp.html)
- Alley, M. (1996). The craft of scientific writing. 3e. Springer-Verlag. (http://writing.engr.psu.edu/csw.html)
- Dawson, C.W. (2009). Projects in Computing and Information Systems. 2e. Addison Wesley.

Specific bibliography:

It will be provided by the tutor/director depending on the work.

Software

It will depend on the work.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.