

**Bachelors Degree Final Project**

Code: 104411  
ECTS Credits: 12

| Degree                                               | Type | Year | Semester |
|------------------------------------------------------|------|------|----------|
| 2503740 Computational Mathematics and Data Analytics | OB   | 4    | A        |

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

## Contact

Name: Albert Ruíz Cirera  
Email: Albert.Ruiz@uab.cat

## Use of Languages

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

## Teachers

Joan del Castillo Franquet

## Prerequisites

The rules of permanence establish a minimum of 160 ECTS of the degree passed to be able to enroll in the Final Project.

## Objectives and Contextualisation

The Final Degree Project (TFG) is a subject of 12 ECTS (300 hours) of 4th year. This is the only compulsory subject of the course and in which all students will have to do an academic work. The training activities of the TFG are the realization of an essay and the preparation of its public defense. TFGs are not required to contain original results.

Projects, Papers and Presentations must be submitted to the Virtual Campus in pdf files. In the presentation the student must explain, at least, the approach and objectives of the work, the methodology and the sources or materials used, the state of the issue, the results obtained and the conclusions reached.

## Competences

- Apply a critical spirit and rigour for the validation or rejection of your own arguments and those of others.
- Demonstrate a high capacity for abstraction and translation of phenomena and behaviors to mathematical formulations.
- Formulate hypotheses and think up strategies to confirm or refute them.
- Make effective use of bibliographical resources and electronic resources to obtain information.
- Relate new mathematical objects with other known objects and deduce their properties.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.

- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Using criteria of quality, critically evaluate the work carried out.
- Work cooperatively in a multidisciplinary context assuming and respecting the role of the different members of the team.

## Learning Outcomes

1. Actively demonstrate a well-developed concern for quality when justifying or publicising the conclusions of one's own work.
2. Apply a critical spirit and rigour for the validation or rejection of your own arguments and those of others.
3. Develop the learning abilities necessary to undertake further studies with a high degree of autonomy.
4. Identify the essential ideas in the demonstration of certain basic theorems and know how to adapt these to obtain other results.
5. Make effective use of bibliographical resources and electronic resources to obtain information.
6. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
7. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
8. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
9. Use bibliography and electronic resources efficiently to obtain information.
10. Using criteria of quality, critically evaluate the work carried out.
11. When facing a problem or situation, distinguish what is substantial from what is merely occasional or circumstantial.
12. Work cooperatively in a multidisciplinary context, taking on and respecting the role of the distinct members in the team.

## Content

The final degree works (TFG) may be rather theoretical (some topic about the degree that is not worked on any of the studied subjects) or of a more practical nature (to study in depth a problem and / or specific data ). In the first case it will have to contain a motivation and the arguments about the adaptation of the results studied in the degree. In the second case, it must contain an adequate theoretical foundation of the results that are used.

The student and the tutor will determine the content of the TFG when this subject begins. The work can be chosen from those proposed by the teachers of the degree or can be proposed by the same student within a line of interest offered by the professors of the Department of Mathematics or Sociology. In both cases you must have the approval of the degree coordinator.

The extension of the TFG can be variable but it is recommended between fifteen and thirty pages. The work can be presented in Catalan, Spanish or English. The first page will include a title, author and tutor, place and dates where the work is carried out. It will then follow a summary that will be in the same language of the text and with its English language version. Non-original content must have been clearly referenced in the bibliography that will appear at the end of the text.

## Methodology

Each student generates three materials that we call: Project, Work and Presentation. All these materials must be delivered to the Virtual Campus with the approval of the Tutor within the deadlines that will be made public in due course.

The project

When a student reaches an agreement with a Tutor, regardless of how the agreement was initiated, the student must write a consensual work project, with the approval of the Tutor that includes (a total of one or two pages ):

1. Title of the Work (in lower case and capital letters, not in capital letters, maximum 80 characters).
2. Student and Tutor Names.
3. Objectives and approach of the Work with bibliography.

#### The job

The Work is the final document (also called memory) that will be delivered by the student after the whole process. The first page will include: Title, Author and Tutor, Date and Place where the Work takes place. It will be followed by a Summary in the same language of the text and the English language version.

The Introduction / Presentation will explain the approach and objectives of the work, the methodology and the sources or materials used, the previous state of the issue, the results obtained and the Conclusions reached. Non-original content must be clearly cited and the reference will be included in the Bibliography at the end of the text.

#### The Presentation

The Presentation is the material you will prepare for a 15 min presentation. of Labor. You will deliver it to the Campus a few days after the delivery of the Work and before the Reading.

When a student reaches an agreement with a Tutor, regardless of how the agreement was initiated, the student must write a consensual work project, with the approval of the Tutor that includes (a total of one or two pages ):

- (1) Title of the Work (in capital letters, not in capital letters, maximum 80 characters).
- (2) Student and Tutor Names.
- (3) Objectives and approach of the Work with bibliography.

#### The job

The Work is the final document (also called memory) that will be delivered by the student after the whole process. The first page will include: Title, Author and Tutor, Date and Place where the Work takes place. It will be followed by a Summary in the same language of the text and the English language version. The Introduction / Presentation will explain the approach and objectives of the work, the methodology and the sources or materials used, the previous state of the issue, the results obtained and the Conclusions reached. Non-original content must be clearly cited and the reference will be included in the Bibliography at the end of the text.

The PresentationThe Presentation is the material you will prepare for a 15 min presentation. of Labor. You will deliver it to the Campus a few days after the delivery of the Work and before the Reading.

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.

## Activities

| Title               | Hours | ECTS | Learning Outcomes                     |
|---------------------|-------|------|---------------------------------------|
| Type: Directed      |       |      |                                       |
| Tutorships          | 15    | 0.6  | 2, 10, 1, 3, 11, 4, 8, 7, 6, 12, 9, 5 |
| Work completion     | 225   | 9    | 2, 10, 1, 3, 11, 4, 8, 7, 6, 12, 9, 5 |
| Type: Autonomous    |       |      |                                       |
| Autonomous learning | 59    | 2.36 | 2, 10, 1, 3, 11, 4, 8, 7, 6, 12, 9, 5 |

## Assessment

The assessment will consist of two parts: evaluation of the memory (80%) and evaluation of the presentation (20%). In both cases, a PDF document must be submitted to the Virtual Campus.

Memory evaluation. A court consisting of the tutor and two external evaluators awards up to 8 points to the memory presented by the student. The tutor can award up to 4 points and the two external evaluators can award up to 2 points each.

Evaluation of the presentation: The presentation can be evaluated by the tutor (with a maximum of 1.5 points) or, in case the memory obtains a rating greater than 7 (over 8), with a public presentation before a single court the day scheduled for this purpose. Those that obtain 7 or more points on the memory can obtain up to 8.5 if they decide that their tutor evaluates them. Alternatively, the qualification obtained can be increased up to 2.5 points if they are submitted to the court's assessment.

## Assessment Activities

| Title        | Weighting | Hours | ECTS | Learning Outcomes                     |
|--------------|-----------|-------|------|---------------------------------------|
| Contents     | 80%       | 0.5   | 0.02 | 2, 10, 1, 3, 11, 4, 8, 7, 6, 12, 9, 5 |
| Debate       | 10%       | 0.25  | 0.01 | 2, 10, 1, 3, 11, 4, 8, 7              |
| Presentation | 10%       | 0.25  | 0.01 | 2, 10, 1, 3, 11, 4, 8, 7, 6, 5        |

## Bibliography

Paul R. Halmos. Com cal escriure en matemàtiques. Butlletí de la Societat Catalana de Matemàtiques. Vol. 21, núm. 1, 2006. Pàg. 53-79.  
<https://raco.cat/index.php/ButlletiSCM/article/view/221239>

## Software

The Final Degree Project may include using specific software.