1. BASIC INFORMATION

Course	Calculus I
Degree program	Grado en Ing. Aeroespacial en Aeronaves (English)
School	Architecture, Engineering and Design
Year	First
ECTS	6 ECTS
Credit type	Basic
Language(s)	English
Delivery mode	On-site
Semester	First
Academic year	2024/25
Coordinating professor	Dra. Ana Medina

2. PRESENTATION

This is a first-semester freshman mathematics course which covers a variety of fundamental topics, including what is commonly known as single- and multi-variable differential Calculus, integration, and mathematical optimization. Its primary objectives are to help students develop a good understanding of a variety of fundamental mathematical concepts and to improve their problem-solving skills. This will provide them with many useful mathematical tools required in subsequent subjects of their degree program and also in the modern workplace.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB1: That students have demonstrated knowledge and understanding in a field of study that part of the basis of general secondary education, and is usually found at a level that, while supported by advanced textbooks, includes some aspects that will knowledge of the forefront of their field of study.
- CB5: That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

Cross-curricular competencies:

- CT12: Knowledge of basic subjects and technologies, enabling the student to learn new methods, theories, and technologies, and endowed it with great versatility to adapt to new situations (autonomous learning)
- CT16: To communicate and convey information, ideas and skills in the student's field of specialization, either in writing or orally, both to skilled and unskilled audiences (communication skills).
- CT18: Commit to the fulfillment of the tasks (responsibility).

- CT19: Working in interdisciplinary teams, providing the most efficient on the basis of cooperation, assuming their role within the team, establishing good relationships and exchanging information (teamwork).

Specific competencies:

- CE1: Ability to solve mathematical problems arising in engineering. Ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential equations; numerical methods; numeric algorithm; statistics and optimization.

Learning outcomes:

- LO1: Be able to solve problems of applied mathematics.
- LO2: perform structured and rigorous engineering reports (based on laboratory practices).

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB1, CB5	LO1, LO2
CT12, CT16, CT18, CT19	LO1, LO2
CE1	LO1

4. CONTENT

- Real functions of real variables
- Differential calculus of functions of one and several variables
- Integral calculus of functions of one and several variables
- Optimization

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Cooperative learning
- Problem Based Learning (PBL)
- Learning assignments
- Master classes

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
TEA1: Resolution of applied exercises	25
TEA2: Master classes	25
TEA3: Academic supporting sessions	12.5
TEA4: Preparation of projects (PBL methodology)	25
TEA5: Search for information and preparation of written works and reports	12.5
TEA6: Self-studying	50
TOTAL	**150**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Exams, quizzes, and other tests of knowledge	30-35%
Preparation of articles, assessments, or reports	15-30%
Alternative evaluation techniques	15-30%
Field experiences, conferences, and visits	10%
Transversal competences (rubrics)	10-15%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you must complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must:

- Attend at least 50% of the lectures, with the exception of some special cases included in the School regulations.
- Obtain a final course grade of at least 5 out of 10 (weighted average).
- Obtain a grade greater than or equal to 5.0 out of 10 in the final exam.
- Obtain a grade greater than or equal to 5.0 out of 10 in the group project.

In any case, you will need to obtain a grade of at least 5.0 in the final exam for it to count towards the final grade along with all the grades corresponding to the other activities.

7.2. Second exam period

Students who do not pass the course during the normal assessment period will have a second chance to retake the course in the Supplementary Exam Period. The same requirements and assessment rules mentioned in the previous section (regular assessment period) hold also in this period, with the exemption of the attendance requirement.

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at least 5.0 in the final exam for it to count towards the final grade along with all the grades corresponding to the other activities.

The student must deliver all the activities corresponding to the module failed in the first exam period, that is, the individual and class activities and the group project. They will carry out new activities of similar difficulty and length. These activities will be published in the Virtual Campus at the beginning of the Supplementary Exam Period.

In the case of the **group project**, if there are enough students to form a group, a new project will be proposed. If not, the project will be an individual project with a **maximum possible grade of 8 points out of 10** (due to the lack of teamwork).

8. SCHEDULE

This table shows the tentative delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Class activities	Every 2-3 weeks
Lab session with Matlab	Weeks 4-5
Individual Activity Unit 1-2	Week 7-8
Midterm exam	Week 8-9
Lab session with Matlab	Weeks 10-11
Individual Activity Unit 3-4	Weeks 14-16
Project group presentation	Weeks 15-17
Final exam	Week 17
Visit/conference	To determine

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The main reference work for this subject is:

- STEWART J., Calculus: Concepts and Contexts. Brooks Cole, 4th edition.

The recommended Bibliography is:

- LARSON R., et al., Calculus of a single variable. Brooks Cole, 2009.
- STEWART J., Cálculo de una variable: trascendentes tempranas. Cengage Learning, 2008 (6ª edición).
- STEWART J., Cálculo multivariable. International Thomson, 1999 (3ª edición).
- APOSTOL, T. Calculus, Vol. I and Vol. 2. Editorial Reverte
- SPIVAK, M. Calculus. Editorial Reverte

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by mean of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunity for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.