

## Calculus

Academic Year: ( 2024 / 2025 )

Review date: 22-04-2024

Department assigned to the subject: Mathematics Department

Coordinating teacher: CARRETERO CERRAJERO, MANUEL

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

In terms of technical and educational matters, students are recommended to have knowledge of mathematics and physics, with the foundation of a LOGSE (Law on the General Organization of the Educational System) secondary school diploma or the equivalent.

## SKILLS AND LEARNING OUTCOMES

- ¿ Understand the concept of a function of a real variable, as well as its limits, continuity, differentiability and integrability.
- ¿ Calculate integrals and improper integrals and apply them to various problems.

## OBJECTIVES

The students should acquire the mathematical background needed to understand and apply new concepts and technical advances related to Computer Science and its practical applications.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Real numbers.
2. Sequences and series of real numbers.
3. Continuous functions.
4. Derivative.
5. Theorems about differentiable functions.
6. Taylor Expansions.
7. Applications of the Derivative.
8. Riemann Integral and Techniques of Integration.
9. Improper Integrals.
10. Applications of Integration.

## LEARNING ACTIVITIES AND METHODOLOGY

Theory (3 credits).  
Problem sessions working individually and in groups 3 credits).

## ASSESSMENT SYSTEM

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

We follow a continuous-assessment system (40%) plus a final exam (60%):

a) The continuous-assessment part consists in two mid-term exams that will be held in regular class hours, according to the current regulations. These mid-term tests allow the students to modify their own learning strategies, if necessary.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

b) The final exam will be held at the end of the semester, and allows to assess globally the knowledge of the course topics, skills, and capabilities acquired by the students.

There is an resit exam in June for those students who did not obtain the required end-of-semester mark. This resit exam has a maximum mark of 10, and the June final mark is given by  $\max(EE, 0.6 EE + 0.4 EC)$ , where EE (resp. CA) is the resit-exam (resp. continuous-assessment) mark.

#### BASIC BIBLIOGRAPHY

- D. Pestana, J. M. Rodríguez, E. Romera, E. Touris, V. Álvarez, A. Portilla CURSO PRÁCTICO DE CÁLCULO Y PRECÁLCULO, Ariel Ciencia, 2000
- Juan de Burgos Román CÁLCULO INFINITESIMAL DE UNA VARIABLE, McGraw-Hill Interamericana de España, SL, 2008
- Salas/ Hille / Etgen Calculus : one and several variables, Wiley, 10th ed.

#### ADDITIONAL BIBLIOGRAPHY

- James Stewart Calculus, Thomson Brooks/Cole cop., 2009, 6th ed.
- Juan de Burgos Román FUNCIONES DE UNA VARIABLE. LÍMITES, CONTINUIDAD Y DERIVADAS. 80 PROBLEMAS ÚTILES, García Maroto Editores, Madrid , 2006
- Juan de Burgos Román CÁLCULO INTEGRAL (UNA Y VARIAS VARIABLES). 70 PROBLEMAS ÚTILES, García Maroto editores, Madrid, 2007
- Larson / Hostetler / Edwards Calculus : with analytic geometry, Boston etc. : Houghton-Mifflin , 2006, 8th ed.