

Academic Year: ( 2022 / 2023 )

Review date: 20-06-2022

Department assigned to the subject: Department of Mathematics

Coordinating teacher: GONZALEZ RODRIGUEZ, PEDRO

Type: Basic Core ECTS Credits : 6.0

Year : 2 Semester : 2

Branch of knowledge: Engineering and Architecture

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

Calculus I  
 Calculus II  
 Linear Algebra  
 Differential equations

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Fundamentals (floating point, errors, stability, algorithms...).
2. Numerical solution of equations and systems of nonlinear equations.
3. Interpolation and approximation of functions.
4. Numerical differentiation and integration.
5. Fast Fourier Transform.
6. Methods for ordinary differential equations
7. Methods for partial differential equations
8. Numerical linear algebra.

**LEARNING ACTIVITIES AND METHODOLOGY**

AF1. THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems

AF2. TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on-site attendance.

AF3. STUDENT INDIVIDUAL WORK OR GROUP WORK. Subjects with 6 credits have 98 hours/0% on-site.

AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

AF9. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. It entails 4 hours/100% on-site

AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

MD1. THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning

MD2. PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group

MD3. TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor. Subjects with 6 credits have 4 hours of tutoring/100% on-site.

MD6. LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

**ASSESSMENT SYSTEM**

SE1. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation will be 40%.

SE2. CONTINUOUS EVALUATION. Assesses partial exams and projects throughout the course. The percentage of the evaluation will be 60% of the final grade.

<b>% end-of-term-examination:</b>	30
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	70

#### BASIC BIBLIOGRAPHY

- Kendall E. Atkinson An introduction to numerical analysis, John Wiley and Sons, 1989
- Qingkai Kong, Timmy Siau, Alexandre Bayen Python Programming and Numerical Methods\_ A Guide for Engineers and Scientist, Academic Press, 2020
- Ward Cheney y David Kincaid Numerical mathematics and computing, Thomson Brooks/Cole, 2008

#### ADDITIONAL BIBLIOGRAPHY

- J. C. Butcher NUMERICAL METHODS FOR ORDINARY DIFFERENTIAL EQUATIONS, Wiley, 2016