

Academic Year: ( 2021 / 2022 )

Review date: 06/07/2020 12:03:24

Department assigned to the subject: Mathematics Department

Coordinating teacher: MORO CARREÑO, JULIO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

**OBJECTIVES****SPECIFIC SKILLS :**

The goal of this course is to make the student familiar with the basic problems of Numerical Analysis and with the numerical algorithms employed to solve them. The approach is mostly of a practical nature, using the computer software package MATLAB as a fundamental tool. More specifically, it is to be expected that, upon completion of this course, students will

1. be familiar with the finite arithmetic models employed to perform computations on a computer.
2. employ the LU method with pivoting to solve arbitrary linear systems, and the Cholesky method to solve symmetric positive definite ones.
3. know and employ the methods of bisection and Newton to solve nonlinear equations, as well as the secant method and, more generally, the quasi-Newton methods.
4. know and employ Lagrange interpolation, as well interpolation via spline functions.
5. know and employ the basic rules of quadrature to approximate definite integrals.
6. know and employ Euler's and Runge-Kutta's methods to approximate solutions of differential equations.
7. be able to implement in MATLAB all the methods above, and apply them to specific examples.
8. be able to interpret the results obtained, making use of the concepts of condition number of a mathematical problems, and of stability of an algorithm.

**TRANSVERSAL SKILLS:**

1. The ability to analyze and synthesize
2. Modelling and problem solving
3. Oral and written communication

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Systems of linear equations
2. Interpolation.
3. Nonlinear equations (Newton's method)
4. Numerical integration
5. Ordinary differential equations.

<b>% end-of-term-examination/test:</b>	50
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<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	50
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