

Academic Year: (2022 / 2023)

Review date: 20-06-2022

Department assigned to the subject: Mathematics Department

Coordinating teacher: IBORT LATRE, LUIS ALBERTO

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Integration and measure, Complex variables, Ordinary differential equations, Partial differential equations

DESCRIPTION OF CONTENTS: PROGRAMME

1. Infinite dimensional vector spaces: Banach and Hilbert spaces.
2. Geometry of Hilbert spaces.
3. Orthonormal bases and Fourier analysis.
4. The problem of best approximation and other applications.
5. Linear operators on Hilbert spaces.
6. Self-adjoint and unitary operators on Hilbert spaces: The Fourier transform.
7. The spectral theorem.
8. Applications to signal theory: sampling.
9. Applications to physical theories: quantum mechanics.
10. Applications to numerical analysis: Sobolev spaces.

LEARNING ACTIVITIES AND METHODOLOGY

AF1.THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students must acquire. Student receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow up work. Students partake in exercises to resolve practical problems and participate in workshops and an evaluation tests, all geared towards acquiring the necessary capabilities. Subjects with 6 ECTS are 44 hours as a general rule/ 100% classroom instruction

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.

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.

ASSESSMENT SYSTEM

SE1.FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 60% and 0%.

SE2.CONTINUOUS EVALUATION. Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. The percentage of the evaluation varies for each subject between 40% and 100% of the final grade.

% end-of-term-examination: 60

% of continuous assessment (assignments, laboratory, practicals...): 40

