Universidad Zaragoza

Academic Year/course: 2021/22

29805 - Mathematics III

Syllabus Information

Academic Year: 2021/22
Subject: 29805 - Mathematics III
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
326 - Escuela Universitaria Politécnica de Teruel
Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering
444 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS: 6.0
Year: 1
Semester: 440-First semester o Second semester
107-Second semester
444-Second semester
Subject Type: Basic Education
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester. Classroom materials will be available via Moodle. These include a repository of the lecture notes used in the classroom, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

If due to special circumstances, the teaching activities indicated in this academic guide cannot be carried out presentially, they will be carried out by using telematic teaching tools.

4.2. Learning tasks

This course is organized as follows:

CAMPUS RIO EBRO

The course includes 6 ECTS organized according to:

- Lectures (1.68 ECTS): 42 hours.
- Computer laboratory sessions (0.48 ECTS): 12 hours.
- Guided works (0.24 ECTS): 6 hours.
- Autonomous work (3 ECTS): 75 hours.
- Tutorials (0.6 ECTS): 15 hours.

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Computer laboratory sessions: sessions will take place every 2 weeks (6 sessions in total) and last 2 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Guided works: students will be able to carry out guided works tutored by the teacher. The teacher will inform in detail about their delivery or evaluation and will be able to ask the questions that he deems appropriate about them.

Autonomous work: students are expected to spend about 75 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: the professor's office hours will be posted on Moodle and the degree website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

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CAMPUS DE TERUEL
In order for students to get the learning outcome, the following learning activities are offered:
1. Lectures and problem solving
One of the main resources in order for students to get the corresponding learning outcomes are lectures and problem-solving sessions.
2. Computer lab sessions
Students spend parts of their time doing a wide range of computer lab work in small groups.
3. Problem-solving for each topic of the syllabus
Students, divided into small groups, will solve a set of problems for each topic in the program. Feedback on assessment will be provided.
4. Continual assessments (written exams)
5. Tutorials
6. Final exams

4.3. Syllabus

The contents of the course can be divided into two sections: Ordinary Differential Equations (ODEs) and Partial Differential Equations (PDEs). The course will address the following topics:

Section 1: Ordinary Differential Equations (ODEs)

- First-order differential equations: basic methods of integration, existence and uniqueness of solutions.
- The Laplace transform
- Linear differential systems and linear differential equations of a higher order.
- Stability of solutions for autonomous differential systems.
- Numerical solution of ODEs systems: Runge-Kutta methods. Applications.

Section 2: Partial Differential Equations (PDEs)

- Sturm-Liouville problems and Fourier Series.
- The separation of variables method for solving second-order PDEs. Applications to boundary value problems.
- Numerical solution of boundary value problems of PDEs.

4.4. Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the EINA (https://eina.unizar.es/) and EUP de Teruel (https://eupt.unizar.es/)

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