29610 - Mathematics III

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	430 - Bachelor's Degree in Electrical Engineering
ECTS	6.0
Course	2
Period	Half-yearly
Subject Type	Basic Education
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process that has been designed for this subject is based on the following:

- *An account of the contents and problem solutions in blackboard classes, encouraging students to participate.*
- *Study and the daily personal work of the student in relation to classroom's activities.*
- *Applicatión of concepts and methods discussed in the sessions overseen by the teacher to the solving of problems, both individually or in a group.*
- *Problem solutions in practical laboratory sessions, taking advantage of the calculations and graphics offered by a*

computer.
- *Personalized attention of students during tutorial sessions that the teacher establishes.*

5.2.Learning activities

The following activities are offered to the students to help them to achieve the expected aims:

Classroom expositions.

They will spend 3 hours per week of theoretical and problems classes. Classes are designed to allow students to practise and develop a wide range of discipline-based techniques and personal skills. They are developed on the board, in which the theoretical contents will be completed with problems solution. Both activities are properly combined so that the development of the subject is carried out as clearly as possible.

Special attention is devoted to solving problems of Electrical Engineering.

Students will be provided a collection of exercises. Some of them will be solved in class, and others will be recommended as material for student work.

Laboratory sessions.

Six practical sessions will be held with computer two hours each, which will be held in one of the computer labs. The Maxima free software program allows students to work with symbolic, numerical and graphical calculation, facilitating the understanding of the proposed learning.

Students are divided into groups to be formed at the beginning of the course.

Some topics of the subject are developed in the laboratory practical classes.

Students will be provided well in advance of a script for each of the practices that will contain a brief summary of the theoretical contents that are being used and an explanation of the commands needed to solve the proposed problems, as well as a list of exercises that student must solve.

Practices are held individually and may propose activities carried out by groups of two students.

Tutored proyects.

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Students develop tutored projects individually or in groups and are guided by the teacher through interviews or seminars. During meetings with the teacher, the progress of the working group will be monitored.

5.3.Program

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

Section 1: Ordinary Differential Equations.

- *First-order equations: Geometric aspects. Existence and uniqueness of solutions of initial value problems. Basic methods of integration.*
- *Higher-order linear equations: Homogeneous linear equations with constant coefficients. Nonhomogeneous linear equations with constant coefficients. Undetermined coefficients method. Variation of parameters. Reduction of order.*
- *Linear systems: Homogeneous linear systems with constant coefficients. Nonhomogeneous linear systems. Variation of parameters. Stability of systems.*
- *Laplace Transforms. Applications to the solution of initial value problems.*
- *Numerical solution of initial value problems for ODEs. One-Step Methods.*
- *Numerical solution of boundary value problems for ODEs. Finite Difference Methods.*

Section 2: Partial Differential Equations:

- *Fourier series.*
- *Separation of variables for boundary value problems for PDEs.*
- *Numerical solutions of boundary value problems for PDEs. Finite Difference Methods.*

5.4.Planning and scheduling

Organizing theoretical and practical sessions in the laboratory and presentation of tutored projects.

The sessions in classroom and practical sessions in the laboratory are held according to the schedule and times and are available on its website.

The temporal organization of the subject is published and communicated to students at the beginning of the semester, according to the official calendar of the academic year.

The teachers of the subject inform your tutoring schedule.

As a guideline follows a distribution of the estimated 150 hours of student dedication to the activities proposed in the subject:

- *Sessions in classroom (3h / week): 42h.*
- *labs: 15h.*
-

tutored projects: 15h.

- *personal study: 75h.*
- *evaluation: 3h.*

5.5.Bibliography and recomended resources

Bibliography can be found in http://psfunizar7.unizar.es/br13/eGrados.php?id=220