

## 30005 - Mathematics III

### Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Year	1
Semester	Half-yearly
Subject Type	Basic Education
Module	---

### 1.General information

#### 1.1.Introduction

#### 1.2.Recommendations to take this course

#### 1.3.Context and importance of this course in the degree

#### 1.4.Activities and key dates

### 2.Learning goals

#### 2.1.Learning goals

#### 2.2.Importance of learning goals

### 3.Aims of the course and competences

#### 3.1.Aims of the course

#### 3.2.Competences

### 4.Assessment (1st and 2nd call)

#### 4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

### 5.Methodology, learning tasks, syllabus and resources

#### 5.1.Methodological overview

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

- Study and the daily personal work of the student in relation to what has been taught in the classroom.
- An account of the contents and problem solutions in blackboard classes, encouraging students to participate.
- Application of concepts and methods presented in the attended sessions overseen by the teacher to the solving of problems, both individually or in a group.

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- Problem solutions in practical laboratory sessions, taking advantage of the calculations and graphics offered by a computer.
- Personalized attention to students during tutorial sessions that the teacher establishes.

### 5.2.Learning tasks

### 5.3.Syllabus

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. Linear equations with variable coefficients. Variation of parameters. Nonlinear equations of order  $n$ . Reduction of order.
- Linear systems: Homogeneous linear systems with constant coefficients. Stability of systems. Nonhomogeneous linear systems with constant coefficients. Variation of parameters.
- Laplace Transforms. Applications to the solution of initial value problems.
- Numerical solution of systems of ODEs: Runge-Kutta methods.

Section 2: Partial Differential Equations:

- Fourier series.
- Separation of variables for second-order linear equations.
- Numerical solutions of boundary value problems with boundary or initial conditions for PDEs.

### 5.4.Course planning and calendar

### 5.5.Bibliography and recommended resources