

30106 - Mathematics II

Información del Plan Docente

Academic Year	2016/17
Academic center	175 - Escuela Universitaria Politécnica de La Almunia 179 - Centro Universitario de la Defensa - Zaragoza
Degree	425 - Bachelor's Degree in Industrial Organisational Engineering 563 - Bachelor's Degree in Industrial Organisational Engineering 457 - Bachelor's Degree in Industrial Organisational Engineering
ECTS	6.0
Course	1
Period	Second semester
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

Specialization in Business

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

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

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Matemáticas II is conceived as a stand-alone combination of contents, yet organized into two fundamental and complementary forms, which are: the theoretical concepts of each teaching unit and the solving of problems or resolution of questions, at the same time supported by other activities.

The organization of teaching will be carried out using the following steps:

– Theory Classes: Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.

– Practical Classes: The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.

– Individual Tutorials: Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

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The learning process designed for this subject is based on the following activities:

- Classroom learning:

1. **Activities Type I. Theory and problems lectures.**

Both the theoretical contents, with illustrative examples, and representative problems will be presented in plenary lectures.

2. **Activities Type II. Computer-lab lectures.**

Computer-lab classes will be conducted in computer-lab facilities of the centre. Students will become familiar with symbolic, numerical and graphic calculus using suitable mathematical software.

3. **Activities Type III. Evaluation tests.**

During the course, the student will carry out several evaluation tests of the following types:

- Theoretical and practical tests.
- Computer-lab tests.

- Non-classroom learning:

1. **Activities Type IV. Applied practicums.**

2. **Activities Type V. Autonomous study.**

In order to successfully overcome this subject, it is estimated that students shall expend a minimum of 65 hours of autonomous study.

5.2.Learning activities

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The programme offered to the student to help them achieve their target results is made up of the following activities...

Involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out, the activities are the following:

– Face-to-face generic activities:

– Theory Classes: The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.

– Practical Classes: Problems and practical cases are carried out, complementary to the theoretical concepts

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studied.

– Generic non-class activities:

• Study and understanding of the theory taught in the lectures.

• Understanding and assimilation of the problems and practical cases solved in the practical classes.

• Preparation of seminars, solutions to proposed problems, etc.

• Preparation of summaries and reports.

• Preparation of the written tests for continuous assessment and final exams.

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

The overall time distribution is:

– 52 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.

– 8 hours of written assessment tests.

– 90 hours of personal study, divided up over the 15 weeks of the 2nd semester.

There is a tutorial calendar timetable set by the teacher that can be requested by the students who want a tutorial.

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The subject consists of different types of activities:

1. Theory sessions.
2. Problem-solving sessions.
3. Computer-lab classes.
4. Personalized tutoring.
5. Autonomous study.
6. Realization of self-evaluation activities.

5.3.Program

Specialization in Business

1.- Introduction to Octave.

2.- Systems of Linear Equations.

3.- Determinants.

4.- Numerical linear algebra.

5.- Vector Spaces.

6.- Orthogonality and Least Squares

7.- The Geometry of Vector Spaces.

8.- Diagonalization.

9.- Singular value decomposition.

10.- Multiple integrals: double integrals.

11.- Multiple integrals: change of variables; triple integrals.

12.- Plane and space curves: curvature and torsion.

13.- Line Integrals: the fundamental theorem for line integrals; Green's theorem.

14.- Surfaces: normal vector.

15.- Surface Integrals: Stokes' theorem, Gauss' theorem.

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The contents of the subject are the following:

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- Matrices, linear systems and determinants.
- Vector spaces.
- Euclidean spaces.
- Linear maps.
- Eigenvalues and eigenvectors: Diagonal form.
- Bilinear and quadratic forms.
- Affine space.

5.4.Planning and scheduling

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A detailed schedule will be published in the Moodle page of the subject. The dates of the final exams will be those that are officially published at <http://www.eupla.es/secretaria/academica/examenes.html>.

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The specific dates for the scheduled activities are made public in the Moodle platform, <http://moodle.unizar.es>, in which students are enrolled at the beginning of the course.

Besides, the course schedule can be found in the website of the Centro Universitario de la Defensa: <http://cud.unizar.es>

5.5.Bibliography and recommended resources

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