30106 - Mathematics II

Información del Plan Docente

Academic Year	2017/18
Faculty / School	175 - Escuela Universitaria Politécnica de La Almunia 179 - Centro Universitario de la Defensa - Zaragoza
Degree	425 - Bachelor's Degree in Industrial Organisational Engineering 457 - Bachelor's Degree in Industrial Organisational Engineering 563 - Bachelor's Degree in Industrial Organisational Engineering
ECTS	6.0
Year	1
Semester	Second semester
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

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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.

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.

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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 tasks

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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,

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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 studied.
  - **Individual Tutorials** : Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.
- **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 semester, in other words, 10 hours (Lectures: 4 h.; Other Activities: 6 h.) per week for 15 weeks of class.

The overall 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 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.Syllabus

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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.

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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:

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

5.4.Course planning and calendar

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A detailed schedule will be published in the Moodle page of the subjet.

The dates of the final exams will be those that are officially published on the School website .

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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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The updated bibliography at http://psfunizar7.unizar.es/br13/eBuscar.php?tipo=a

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