28805 - Mathematics II

Información del Plan Docente

Academic Year	2016/17
Academic center	175 - Escuela Universitaria Politécnica de La Almunia
Degree	424 - Bachelor's Degree in Mechatronic 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

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.
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.

5.2.Learning activities

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 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.
A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is moderate.

Activity	Weekly school hours
Lectures	4
Other Activities	6

Nevertheless the previous table can be shown into greater detail, taking into account the following overall distribution:
— 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.

5.3.Program

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.

5.4.Planning and scheduling

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 at
http://www.eupla.es/secretaria/academica/examenes.html.

5.5.Bibliography and recomended resources

- Burgos Roman, Juan de. Algebra lineal y geometría cartesiana / Juan de Burgos Román . - 2ª ed. Madrid : McGrawHill, D.L. 1999
- Apostol, Tom M.. Calculus. Vol.1, Cálculo con funciones de una variable, con una introducción al álgebra lineal / Tom M. Apostol. - 2ª ed. reimp. Barcelona [etc.] : Reverté, cop. 2002
- Apostol, Tom M.. Calculus. Vol.2, Cálculo con funciones de varias variables y álgebra lineal, con aplicaciones a las ecuaciones diferenciales y a las probabilidades / Tom M. Apostol. - 2ª ed., 7ª reimp. Barcelona, [etc.] : Reverté, D.L. 2002
- Rojo, Jesús. Algebra lineal / Jesús Rojo . - 2ª ed. Madrid [etc.] : McGraw-Hill Interamericana, D. L. 2007
- Burgos Roman, Juan de. Fundamentos matemáticos de la ingeniería (álgebra y cálculo) : definiciones, teoremas y resultados / Juan de Burgos Román . - Ed. Estudiante Madrid : García-Maroto, D. L. 2008
- Allaire, Grégoire. Numerical Linear Algebra / Grégoire Allaire, Sidi Mahmoud Kaber. - 1ª edición New York: Springer-Verlag, 2008
- Quarteroni, Alfio. Cálculo científico con MATLAB y Octave / A. Quarteroni, F. Saleri Milano : Springer, cop. 2006
- Bradley, Gerald L.. Cálculo de varias variables / Gerald L. Bradley, Karl J. Smith ; traducción, José Luis Vicente Córdoba ; revisión técnica, Pedro Paúl Escolano Madrid [etc.] : Prentice Hall, D.L. 1998
- Matemáticas avanzadas para ingeniería / Glyn James ... [et al.] ; traducción, Elena de Oteyza de Oteyza, Carlos Hernández Garciadiego ; revisión técnica, Juan Carlos del Valle, Juan Aguilar Pascual . - 2a ed. México [etc.] : Pearson Educación, 2002