

30706 - Mathematics 2

Información del Plan Docente

Academic Year	2018/19
Subject	30706 - Mathematics 2
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	470 - Bachelor's Degree in Architecture Studies
ECTS	6.0
Year	1
Semester	Second semester
Subject Type	Basic Education

Module

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

Most of central ideas and topics are given by lectures to the whole group of students. They break up into small groups of 15 to 20 students for computer classes. The problem classes allow students to work out hand-outs under the close assistance and guideline of the teacher. In addition, there are computer sessions every two weeks which allow to emphasize numerical aspects of the subject.

4.2. Learning tasks

Lectures, computer classes, problem classes, group work

4.3. Syllabus

Linear Algebra

1. Bilinear forms. Matrix representation, change of basis. Symmetric forms and their link with quadratic forms. Diagonalization of quadratic forms. Law of inertia, classification by rank and signature.
2. Inner product spaces, orthonormal sets. Gram-Schmidt orthogonalization. QR factorization of rectangular matrices.

Differential and Integral Calculus in \mathbf{R}^n

1. Limits and continuity of real-valued functions defined on subsets of \mathbf{R}^n .
2. Partial and directional derivatives. Differentiability. The gradient. Higher-order derivatives. Local extrema. Vector-valued functions defined on subsets of \mathbf{R}^n . Differentiation, the Jacobian matrix. The chain rule.
3. Double and triple integrals. Change of variables.

Differential Geometry

1. Curves and smooth surfaces in \mathbf{R}^3 . Parameterised curves, arc length, curvature and torsion. Frenet-Serret frame. Parameterised surfaces in \mathbf{R}^3 . Area.
2. Line integrals. Surface integrals. Integration theorems.

4.4. Course planning and calendar

Schedules and classrooms for lectures, problem classes and computer classes may be found at <http://eina.unizar.es>

Scheduling of examinations is agreed by the School Board and are available at <http://eina.unizar.es>

Deadlines for intermediate examination and submission of group work will be announced in advance.

4.5. Bibliography and recommended resources

- Lay, David C.: Álgebra lineal y sus aplicaciones. México : Pearson Educación, 2007
- Salas, Saturnino L.: Calculus : una y varias variables / Salas, Hille, Etgen . 4ª ed. española, reimp. / actualización de la 4ª ed. española correspondiente a la 8ª ed. en inglés y revisión de la obra, Carles Casacuberta Vergés Barcelona : Reverté, D.L. 2005-2007
- Carmo, Manfredo P. do: Geometría diferencial de curvas y superficies. Madrid : Alianza Editorial, 1990
- Marsden, Jerrold E.: Cálculo vectorial . Jerrold E. Marsden, Anthony J. Tromba ; traducción Patricio Cifuentes Muñiz ... [et al.] ; revisión técnica Eugenio Hernández Rodríguez . 5ª ed., reimp. Madrid [etc.] : Addison-Wesley, 2005