

Información del Plan Docente

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| Academic Year | 2017/18 |
| Faculty / School | 100 - Facultad de Ciencias |
| Degree | 453 - Degree in Mathematics |
| ECTS | 15.0 |
| Year | 2 |
| Semester | Annual |
| Subject Type | Compulsory |
| 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**

There are three different types of classes received by the students.

Master classes which are dedicated to theoretical concepts and fundamental exercises.

Practical classes. Students practice and strengthen concepts and ideas which they have learnt.

Computer lessons. Students use computers to solve different types of exercises proposed in the subject.

5.2.Learning tasks

In the web pages http://www.unizar.es/analisis_matematico/docencia.html and <https://moodle2.unizar.es/> are available additional information and material.

5.3.Syllabus

Functions of several variables

1. Continuity and differentiability of real-valued and vector-valued functions. Functions of class C^p . Relative extrema.
2. Implicit and inverse function theorems, change of variables. Manifolds and the Lagrange multipliers rule.
3. Integration in \mathbb{R}^n (an approach to Lebesgue's method). Iterated integrals and differentiation under integral sign.
4. Integration of functions and of 1-differential forms on paths. Poincaré's lemma.
5. Integration of functions and differential forms on surfaces in \mathbb{R}^3 . Riemann-Green, divergence and Stokes theorems.

5.4.Course planning and calendar

Calendar

There are six hours per week in first semester and four hour per week in the second one, following the official timetable given by the Faculty of Science in the University of Zaragoza.

In these hours there are included two hours per week in the first semester and one hour and a half in the second semester dedicated to solve exercises in the classroom.

Computer lessons take place in the second semester in fixed timetable.

5.5.Bibliography and recommended resources

- Apostol, Tom M.. Análisis matemático / Tom M. Apostol . - 2a ed., [reimp.] Barcelona, [etc.] : Reverté, cop.1988
- Browder, Andrew. Mathematical analysis : an introduction / Andrew Browder New York [etc.] : Springer, cop. 1996
- Bombal Gordon, Fernando. Problemas de análisis matemático. Vol. 1, Espacios métricos y normados. El espacio \mathbb{R}^n / Bombal, Rodríguez, Vera . - [2a. ed. reimp.] Madrid : AC, D.L.1993
- Bombal Gordon, Fernando. Problemas de análisis matemático. Vol. 2, Cálculo diferencial / Bombal, R. Marín, Vera . - [1a. ed., reimp.] Madrid : AC, D.L. 1995
- Bombal Gordon, Fernando. Problemas de análisis matemático. Vol. 3, Cálculo integral / Bombal, R. Marín, Vera . - 1a ed., 2a reimp. Madrid : AC, 1994
- Demidovich, B.P.. 5000 problemas de análisis matemático / B. P. Demidóvich ; traducido del ruso por Emiliano

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- Aparicio Bernardo . - 5ª ed. Madrid : Paraninfo, 1993
- Pastor, Eduardo. Teoría y problemas de cálculo integral / Eduardo Pastor, Victor Varela . - [1a. ed.] Madrid : Crisser, D.L. 1974
 - Fleming, Wendell H.. Functions of several variables / Wendell Fleming . - 2nd. ed. New York, [etc] : Springer-Verlag, 1977