27006 - Calculus II

Syllabus Information

Academic Year: 2019/20
Subject: 27006 - Calculus II
Faculty / School: 100 -

Degree: 453 - Degree in Mathematics

ECTS: 15.0
Year: 2
Semester: Annual
Subject Type: Compulsory
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

The learning process that has been implemented in this subject is based on the following:

Lectures including theoretical concepts and fundamentall exercises.

Problem-solving sessions to practice and consolidate theoretical conceptsand ideas.

Homework based on proposed problems.

There will also be problem-solving sessions in which computers will be used in order to solve different types of exercises proposed in the course.

4.2.Learning tasks

More additional information and material is available in the links http://www.unizar.es/analisis_matematico/docencia.html and https://moodle2.unizar.es/.

4.3.Syllabus

This course will address the following topics:

- **Topic 1**. Algebraic and topological properties in $\mathbf{R}^n$
- **Topic 2**. Functions of several real variables. Limits and continuity.
- **Topic 3**. Partial derivatives and differentiability of real-valued and vector-valued functions. Higher order partial derivatives. Functions of class C^p.
- **Topic 4.** Taylor's formula. Application to the study of extreme points.
- **Topic 5**. Implicit and inverse function theorems, change of variables.
- **Topic 6**. Extreme points on manifolds and the Lagrange multipliers rule.
- **Topic 7**. Integration in R^n. Differentiation under integral sign, change of variable and Fubini's theorem.
- **Topic 8**. Integration of functions and 1-differential forms on paths. Poincaré's lemma.
- **Topic 9**. Integration of functions and 2-differential forms on surfaces in R^3. Riemann-Green, Gauss-Ostrogradski and Stokes theorems.

4.4.Course planning and calendar

The course consists of six hours per week during the first term and four hours per week during the second one, following the official timetable given by the Faculty of Science in the University of Zaragoza. Two hours per week, from the previous six, in the first term, and one hour and a half, from the previous four, in the second term, are devoted to solve exercises in the classroom.

Computer lessons will take place in the first and second term in time and form to be fixed during the course.

There will be a written exam about the subject explained in the first term, at the end of it.

Besides this, a written final exam will take place according to the schedule.

Dates and locations for exams will be programmed by the center.

Further information concerning timetable, classroom, office hours, assessment dates and other details regarding this course will be provided in class. Alternatively, information is available in the Faculty of Sciences website and Moodle.

4.5.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 Rn / 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 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

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