SUBJECT TEACHING GUIDE

G44 - Integral Calculus

Double Degree in Physics and Mathematics
Degree in Mathematics
Degree in Mathematics
Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Mathematics			Type and Year	Core. Year 1 Core. Year 1
Faculty	Faculty of Sciences				
Discipline	Subject Area: Basic Mathematics Basic Module				
Course unit title and code	G44 - Integral Calculus				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web	https://personales.unican.es/stand/				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	DANIEL LEAR CLAVERAS
E-mail	daniel.lear@unican.es
Office	
Other lecturers	RAFAEL GRANERO BELINCHON PEDRO RAMON LOPEZ GOMEZ

3.1 LEARNING OUTCOMES

- - Understanding the concept of integral and being able to work with it, geometrically, intuitively and formally.
- Using the elementary techniques of integration for one variable functions in a fluent way, as well as being able to compute areas, volumes and lengths.
- Being able to compute tangents, normals, areas, volumes, etc., for surfaces and for planar or three dimensional curves.
- Computing iterated integrals in several variables over elementary regions, determining the limits of the integrals involved and aplying the change of variables formula whenever appropriate.
- Computing line and surface integrals, both for scalar and for vector fields. Applying the classical theorems of Stokes, Green and divergence on specific settings.

4. OBJECTIVES

Within the context of the programs for bachelor degrees in Physics and in Mathematics, the subject Integral Calculus is an introduction to the main types of integrals used in classic applications of Infinitesimal Calculus. Its aims are: understanding the different types of situations where these integrals are used for modelling ; getting a working knowledge of how integrals can be evaluated, as well as their main properties and their relationships among them; getting started in mathematical language and mathematical reasoning; and getting used to intellectual work.

6. COURSE ORGANIZATION

CONTENTS	
1	The integral of a several variable function. Fundamental theorem of Calculus. Limit and integral, improper integrals. Primitives.
2	The definite integral in R. Fundamental Theorem of Calculus. Applications.
3	Definite integral in R^2 and R^3. Fubini's Theorem. Change of coordinates. Applications.
4	Line and surface integrals. The classical theorems of vector calculus. Green, Stokes, Gauss.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Final exam.	Written exam	Yes	Yes	52,00
Partial exam representing the continuous evaluation.	Written exam	No	Yes	16,00
Partial exam representing the continuous evaluation.	Written exam	No	Yes	16,00
Partial exam representing the continuous evaluation.	Written exam	No	Yes	16,00
TOTAL				100,00

Observations

GRADING PROCEDURE:

The final grade for the student in the regular exam session will be the maximum between:
(A) The grade on the final exam.
(B) The weighted average of the grades of the partial exams (16% each) and the grade on the final exam (52%).

The grading process has been designed so that, if the student demonstrates at the end of the course that they have acquired adequate mastery of the subject and obtains a good grade on the final exam, their grade in the subject will not be affected by continuous assessment. In this way, students are given an opportunity to improve their grade in continuous assessment during the regular exam session (Option A).

On the other hand, if continuous assessment through the weighted average results in an improvement in the grade obtained on the final exam, the final grade will be calculated using the weighted average (Option B).

To pass the subject, a final grade of 5 or higher (out of 10) and a grade of 3 or higher (out of 10) on the final exam are required, in both options (A) and (B).

In the extraordinary exam session, the evaluation method will be the same as in the ordinary session, taking into account the continuous evaluation.

Unless agreed otherwise with the teacher, no materials will be allowed during the evaluation tests for the subject.

Current regulations establish that when a student has not carried out assessment activities whose weight exceeds 50% of the subject's grade, they will appear as 'not presented' in their record, and when they have carried out tests that represent the referred 50% or more, the corresponding grade will appear in the record. The weighting of the different evaluation methods is set so that those who do not take the final exam receive a grade of 'not presented'.

Observations for part-time students

Partial time students can choose between either following the evaluation method explained above in this guide or doing only the final exam. In the latter case, the weight of the final exam will be 100%.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

E. Marsden y A.J. Tromba, Cálculo vectorial (edicion 3ª o posterior). Editorial Addison-Wesley.

M. Spivak, Calculus. Editorial Reverté

B. Demidovich, Problemas y ejercicios de Análisis Matemático. Editorial Paraninfo. Madrid.