SUBJECT TEACHING GUIDE

G37 - Mathematics III: Integra Calculus

Degree in Physics
Degree in Physics

Academic year 2023-2024

1. IDENTIFYING DATA				
Degree	Degree in Physics Degree in Physics		Type and Year	Core. Year 1 Core. Year 1
Faculty	Faculty of Sciences			
Discipline	Subject Area: Basic Mathematics for Science Basic Module			
Course unit title and code	G37 - Mathematics III: Integra Calculus			
Number of ECTS credits allocated	6	Term	Semester based (2)	
Web				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	BEATRIZ PORRAS POMARES
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Other lecturers	

3.1 LEARNING OUTCOMES
- Use of matrix, points, vectors, functions, polynomials, sequences, series, diferential equations and integrals.
- Knowing a relevant set of samples and situations that serve to improve intuition about concepts such as plane, movement, limit, derivative or integral, both in one and several variables.
- Improve the skills for mathematical modelitation and computation of simple phisical problems
- -The knowledge about concepts and methods of matematical languaje as a tool for modelitation.

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	1. Riemann integral for one real variable functions. Fundamental Theorem of Calculus. Computation of primitives. Improper integrals.
2	2. Integrals of functions of several real variables: Concept and fundamental properties. Riemann criteria. Iterated integrals. Fubini theorem. Integrals of functions defined over other bounded sets. Change of variables in double integrals. Change of variables in triple integrals. Some applications: mean value, center of gravity, ...
3	3.-Line Integrals: Smooth simple curves in the plane and space. Smooth piecewise simple curves. Closed curves. Curve lenght. Integral of a scalar field on a path. Integral of a vector field along a path. Green Theorem. Conservative fields. Smooth simple surfaces in parametric form. Oriented surfaces. Area of a surface. Integral of a scalar field over a surface Integral of a vector field across a surface. Stokes's and Gauss's Theorems

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Exam on the content of chapter 1	Written exam	No	Yes	30,00
Exam on the content of chapter 2	Written exam	No	Yes	30,00
Exam on the content of chapter 3	Written exam	No	Yes	30,00
Global problem on the content of the whole subject	Written exam	No	No	10,00
TOTAL				100,00

Observations

Continuous evaluation (ordinary call):
1st Partial
2nd Partial + first partial recovery
3rd Partial + second partial recovery
4rd Global problem

Extraordinary call: recovery of each of the partials

Observations for part-time students

The same evaluation type applies to part time students

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

M. Spivak, Calculus, Reverté

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

Materiales docentes en el Aula Virtual