SUBJECT TEACHING GUIDE

G37 - Mathematics III: Integra Calculus

Degree in Physics

Academic year 2020-2021

1. IDENTIFYING DATA					
Degree	Degree in Physics			Type and Year	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

- - 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	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.
4	4.- Surface Integrals. Smooth simple surfaces. Smooth piecewise simple surfaces. Surface área. Integral of a scalar field over a surface. Integral of a vector field over a surface. Stokes Theorem. Gauss Theorem.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Questionnaire about content of chapters 1	Activity evaluation with Virtual Media	No	Yes	20,00
Partial exam about content of chapters 1 and 2	Written exam	No	Yes	30,00
Questionnaire about content of chapter 3	Activity evaluation with Virtual Media	No	Yes	20,00
Second partial exam about content of chapters 3 and 4	Written exam	No	Yes	30,00
TOTAL				100,00

Observations

Continuous evaluation (ordinary call):
1st Questionnaire
First partial + recovery first questionnaire
2nd Questionnaire
Second partial + recovery 2nd questionnaire + (recovery first partial or (+1) point in first partial)
Extraordinary call: first partial recovery + second partial recovery

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