

Vector Calculus

Academic Year: (2019 / 2020)

Review date: 15-05-2020

Department assigned to the subject: Mathematics Department

Coordinating teacher: MOLERA MOLERA, JUAN MANUEL

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Linear Algebra, Differential Calculus.

OBJECTIVES

- Students have shown that they know and understand the mathematical language and abstract-rigorous reasoning as well as to apply them to state and prove precise results in several areas in mathematics.
- Students have shown that they understand the fundamental results from real, complex and functional mathematical analysis.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Topology of $\mathbb{R}^n$.
2. Functions of several variables. Limits and continuity.
3. Differentiation.
4. Unconstrained and constrained extrema of real-valued functions.
5. The inverse function and implicit function theorems.
6. Parameterized curves. Arc length.
7. Parameterized surfaces. Orientation, tangent plane.
8. Elements of differential geometry.

LEARNING ACTIVITIES AND METHODOLOGY

THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the main concepts of the subject are developed, while providing material and bibliography to complement student learning.

PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group.

TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor.

ASSESSMENT SYSTEM

- Tests (40%): Two midterm tests with a weight of 20% each.
- Final exam (60%)

% end-of-term-examination:	60
% of continuous assessment (assignments, laboratory, practicals...):	40

BASIC BIBLIOGRAPHY

- J. E. Marsden and A. J. Tromba Vector Calculus, 6th. edition, W. H. Freeman, 2012
- Manfredo P. Do Carmo Differential Geometry of Curves and Surfaces, Dover Publications; Updated, Revised (2nd) edition, 2016
- Tom M. Apostol Mathematical Analysis, 2nd ed., Pearson Education, Inc., 1974

ADDITIONAL BIBLIOGRAPHY

- J. E. Marsden and M. J. Hoffman Elementary Classical Analysis, 2nd ed., W. H. Freeman and Company, 1974
- J. Stewart Calculus, Cengage, 2008
- M. D. Weir, J. Hass, and G. B. Thomas Thomas' Calculus 12th ed, Addison-Wesley , 2006
- M. J. Strauss, G. L. Bradley, and K. J. Smith Multivariable Calculus, Prentice Hall, 2002
- R. Larson and B. H. Edwards Calculus II, 9th. edition, Cengage, 2009
- S. Salas, E. Hille, and G. Etgen Calculus. One and several variables, Wiley, 2007
- T. M. Apostol Calculus, Wiley, 1975