Vector Calculus

Academic Year: (2021 / 2022)   **Review date: 26-07-2021**

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 (First year, first semester)
   Differential Calculus (First year, first semester)

DESCRIPTION OF CONTENTS: PROGRAMME
   1. The Euclidean Space Rn.
   2. Functions.
   3. Differentiability.
   5. Taylor Polynomial and Extrema.
   6. Lagrange multipliers and the implicit function theorem.
   7. Curves.
   8. Surfaces.

LEARNING ACTIVITIES AND METHODOLOGY

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THEORETICAL-PRACTICAL CLASSES. [44 hours with 100% classroom instruction, 1.76 ECTS]
Knowledge and concepts students must acquire. Student receive course notes and
will have basic reference texts to facilitate following the classes and carrying
out follow up work. Students partake in exercises to resolve practical problems
and participate in workshops and evaluation tests, all geared towards
acquiring the necessary capabilities.

TUTORING SESSIONS. [4 hours of tutoring with 100% on-site attendance, 0.16 ECTS]
Individualized attendance (individual tutoring) or in-group (group tutoring)
for students with a teacher.

STUDENT INDIVIDUAL WORK OR GROUP WORK [98 hours with 0 % on-site, 3.92 ECTS]

FINAL EXAM. [4 hours with 100% on site, 0.16 ECTS]
Global assessment of knowledge, skills and capacities acquired throughout the
course.

METHODOLOGIES

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

PRACTICAL CLASS. Resolution of practical cases and problems, 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 a teacher as tutor.

ASSESSMENT SYSTEM

SE1 - FINAL EXAM. [60 %]
Global assessment of knowledge, skills and capacities acquired throughout the course.

SE2 - CONTINUOUS EVALUATION. [40 %]
Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course.

% end-of-term-examination: 60

% of continuous assessment (assigments, 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
 - Seán Dineen Multivariate Calculus and Geometry, 3rd Edition, Springer, 2014

 - 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. Rogawski and C. Adams. Calculus: Early Transcendentals. , W. H. Freeman and Company (Third Edition Volume I and II). , 2015
 - 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