Calculus II

Academic Year: (2024 / 2025) **Review date: 23-04-2024**

Department assigned to the subject: Mathematics Department

Coordinating teacher: CATALAN FERNANDEZ, PABLO

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Engineering and Architecture

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Calculus I; Linear Algebra

OBJECTIVES

The student will be able to formulate, solve and understand mathematically several problems related to the Aerospace Engineering. To do so it is necessary to be familiar with the n-dimensional Euclidean space, making a special emphasis in dimensions 2 and 3, visualizing the more important subsets. He/she must be able to manage (scalar and vector) functions of several variables, as well as their continuity, differentiability, and integrability properties. The student must solve optimization problems with and without restrictions and will apply the main theorems of integration of scalar and vector functions to compute, in particular, lengths, areas and volumes, and moments of continuum distributions.

DESCRIPTION OF CONTENTS: PROGRAMME

1. The Euclidean space Rn and its sets.
2. Scalar and vector functions of n real variables.
3. Limits, continuity and differentiability.
4. Higher order derivatives and local behavior of functions.
5. Differential operators and geometric properties.
6. Optimization with and without constraints.
7. Multiple integration. Techniques and changes of variables.
8. Line and surface integrals.
9. Integral theorems of vector calculus in R2 and R3.

LEARNING ACTIVITIES AND METHODOLOGY

The learning methodology will include:
- Attendance to master classes, in which core knowledge will be presented that the students must acquire. The recommended bibliography will facilitate the students' work.
- Resolution of exercises by the student that will serve as a self-evaluation method and to acquire the necessary skills.
- Exercise classes, in which problems proposed to the students are discussed.
- Partial exams.
- Final Exam.
- Tutorial sessions.
- The instructors may propose additional homework and activities.

ASSESSMENT SYSTEM

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

- Two partial evaluation controls.
- Final examination.

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

Aditionally, the instructors may propose additional homeworks and activities to be evaluated.

BASIC BIBLIOGRAPHY

- E. Marsden, A. J. Tromba Vector Calculus, W. H. Freeman, 2012

- James Stewart Multivariable calculus (8th ed.)., Cengage Learning., 2016

- M. D. Weir, J. Hass, G. B. Thomas. Thomas' Calculus, Multivariable., Addison-Wesley, 2010

ADDITIONAL BIBLIOGRAPHY

- M. J. Strauss, G. L. Bradley, K. J. Smith. Multivariable Calculus, Prentice Hall, 2002

- R. Larson, B. H. Edwards Calculus II, Cengage, 2009

- S. Salas, E. Hille, G. Etgen Calculus. One and several variables, Wiley, 2007

- T. M. Apostol Calculus, Wiley, 1975