Calculus II

Academic Year: (2020 / 2021) **Review date: 03-02-2021**

Department assigned to the subject: Mathematics Department

Coordinating teacher: MARTINEZ RATON, YURI

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

OBJECTIVES

The student will be able to formulate, solve and understand mathematically the problems arising in engineering. To do so it is necessary, in this second course of Calculus, to be familiar with the n-dimensional euclidean space, in particular in dimension 3, and with its more usual subsets. He/she must be able to manage (scalar and vectorial) several variables functions and its continuity, differentiability and integrability properties. The student must solve optimization problems with and without restrictions and will apply the main integration theorems to compute areas and volumes, inertial moments and heat flow.
(PO: a)

DESCRIPTION OF CONTENTS: PROGRAMME

1- Differential calculus in several variables
  a Functions of several variables. Limits and continuity
  b Derivatives. Differentiability
  c Differential operators
  d Chain rule. Directional derivatives
2- Local study of functiopns of several variables
  a Higher order derivatives
  b Extrema
  c Conditional optimization
3- Integration of functions of several variables
  a Iterated integration
  b Change of variables in the integral
  c Aplications
4- Trajectory integrals. Surface integrals.
  a Integrals along curves. Conservative vector fields
  b Integrales on surfaces
  c Computation of areas and volumes
  d Vectorial integral Theorems: Green, Stokes and Gauss

(PO: a)

LEARNING ACTIVITIES AND METHODOLOGY

The docent methodology will include:
- Master classes, where the knowledge that the students must acquire will be presented. To make easier the development of the class, the students will have written notes and also will have the basic texts of reference that will facilitate their subsequent work.
- Resolution of exercises by the student that will serve as self-evaluation and to acquire the necessary skills.
- Problem classes, in which problems proposed to the students are discussed and developed.
- Partial controls.
- Final control.
- Tutorials.

(PO: a)

ASSESSMENT SYSTEM

The evaluation will be based in the following criteria:
- Three or four partial evaluation controls (60%=30%+30%).
- Final examination (40%).

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

BASIC BIBLIOGRAPHY

- MARSDEN, Jerrold E. y TROMBA, Anthony CALCULO VECTORIAL 6ª Edición, Pearson Universidad, 2018
- SALAS, HILLE, ETGEN CALCULUS, VOLUMEN II, REVERTE.
- SPIEGEL MATEMATICAS AVANZADAS PARA INGENIERIA Y CIENCIAS, MC GRAW HILL (SERIE SCHAUM).
- UÑA, SAN MARTIN, TOMEO PROBLEMAS RESUELTOS DE CALCULO EN VARIAS VARIABLES, THOMSON.

ADDITIONAL BIBLIOGRAPHY

- APOSTOL CALCULUS, REVERTE.
- BRADLEY, SMITH CALCULO DE VARIAS VARIABLES (VOLUMEN 2), PRENTICE HALL.
- BURGOS CALCULO INFINITESIMAL DE VARIAS VARIABLES, MC GRAW HILL.
- LARSON, HOSTETLER, HEYD CALCULO II, PIRAMIDE.
- LIASHKO, BOIARCHUK, GAI, GOLOVACH ANTI-DEMIDOVICH (VOLUMENES 3 Y 4), URSS.
- STEWART, CALCULO: CONCEPTOS Y CONTEXTOS, THOMSON.
- WREDE, SPIEGEL CALCULO AVANZADO, MC GRAW HILL (SEIRE SCHAUM).