Calculus II

Academic Year: (2019 / 2020) **Review date: 08-05-2020**

Department assigned to the subject: Mathematics Department

Coordinating teacher: MOLINA MEYER, MARCELA

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 aim of this course is to provide students the basic tools of differential and integral calculus of several variables. To achieve this goal students must acquire a range of expertise and capabilities.
SPECIFIC LEARNING OBJECTIVES (PO a):
- To understand the n-dimensional Euclidean space and in more depth n = 2 and 3.
- To know the properties of scalar and vector functions of several variables.
- To understand the concepts of continuity, differentiability and integrability.
- To be able to handle optimization problems using optimization techniques.
- To understand how to calculate double, triple, line and surface integrals.
- To know and apply the main theorems of vector calculus: Green, Gauss, Stokes.
- To understand how to apply the integral to calculate surface areas, volumes and solve some basic problems of Mathematical-Physics.

SPECIFIC ABILITIES (PO a):
- To be able to work with functions of several variables given in terms of a graphical, numerical or analytical description.
- To understand the concept of differentiable function and ability to solve problems involving the concept.
- To understand the concept of multiple integral, line and surface integral and its practical applications.

GENERAL ABILITIES (PO a):
- To understand the necessity of abstract thinking and formal mathematical proofs.
- To acquire communicative skills in mathematics.
- To acquire the ability to model real-world situations mathematically, with the aim of solving practical problems.
- To improve problem-solving skills.

DESCRIPTION OF CONTENTS: PROGRAMME

1 .- The n-dimensional Euclidean space. Cartesian, polar, cylindrical and spherical coordinates.
2 .- Scalar and vector functions of several variables. Limits, continuity and differentiability.
3 .- Taylor's theorem. Optimization problems with and without constraints.
4 .- Double, triple, line and surface integral.
5 .- Theorems of Green, Gauss, Stokes and its applications .

LEARNING ACTIVITIES AND METHODOLOGY

Lecture sessions: 3 ECTS credits (PO: a).
Problem sessions: 3 ECTS credits (PO: a).

ASSESSMENT SYSTEM

We will follow a continuous-assessment system(40%) plus a final exam (60%):

- The continuous-assessment part consists in two written examinations contributing with weight 40% to the final mark. The mid-term examinations will include approximately at two thirds of the semester.

- The final exam, contributing with weight 60% to the final mark, will be held at the end of the semester. (PO: a.)

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

BASIC BIBLIOGRAPHY

- Howard Anton, Irl C. Bivens, Stephen Davis, Calculus Multivariable, 9th ed.,, Wiley. & Sons., 2009
- Jarrold E. Marsden, Anthony Tromba. Vector Calculus, 6th ed., W. H. Freeman., 2013
- Lasrson, R., Edwards, B Calculus, 10th International ed., Brooks Cole, Cengage Learning, 2014
- P. J. Hernando Clases de Cálculo II para Ingeniería, Revisión 2.5, 2018
- Salas, S., Hille, E., Etgen, G. Calculus: one and several variables, 10th ed., Wiley, 2007
- Stewart, James Calculus, 6th ed., Thomson Brooks/Cole, 2009
- Weir, Maurice D., Hass, Joel, Thomas, George B . Jr. Multivariable Thomas'calculus, Pearson Addison Wesley, 2014

ADDITIONAL BIBLIOGRAPHY

- James Stewart Multivariable Calculus: Concepts and Contexts, Cengage Learning, 2009
- James Stewart Multivariable Calculus: Concepts and Contexts, 4 ed., Brooks/Cole, Cengage Learning, 2010
- Juan de Burgos Cálculo infinitésimal de varias variables, 2 ed., Mc Graw-Hill Interamericana, 2008
- Paul Charles Matthews Vector Calculus, Springer, 1998
- Ron Larson, Bruce H. Edwards, Robert P. Hostetler. Multivariable Calculus, Cengage Learning, 2006