

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

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.
- To know what are linear ordinary differential equations and learn techniques for solving equations of first and second order.

SPECIFIC ABILITIES (PO a, k):

- 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.
- To understand what is an ordinary differential equation and know how to apply techniques of solving differential equations in different contexts.

GENERAL ABILITIES (PO a, g, k):

- 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.
- To be able to use mathematical software in specific situations.

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

Theory (3.0 credits. PO a).

Problem sessions working individually and in groups (3.0 credits. PO a).

ASSESSMENT SYSTEM

We follow a continuous-assessment system plus a final exam:

- The continuous-assessment part consists in a written examination contributing with weight 40% to the final mark. The mid-term examination will take place, approximately, at two thirds of the semester and it will be held in regular class hours, according to the current regulations.
- 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 (assignments, laboratory, practicals...):	40