Calculus II

Academic Year: (2020 / 2021) **Review date: 23-07-2020**

Department assigned to the subject: Mathematics Department

Coordinating teacher: MUÑOZ GARCIA, JAVIER MANUEL

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

Evaluation system, 60% continuous evaluation and 40% final exam.
The continuous evaluation will consist of some of the following methods: written controls, online questionnaires, submissions, video elaboration, in these videos the students will solve exercises or present group or individual work. Interactive tools such as Kahoot!, Wooclap, Breakoutromos and Jamboard, among others, could be used.

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

BASIC BIBLIOGRAPHY

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