Calculus II

Academic Year: (2019 / 2020)	**Review date: 02-05-2020**

Department assigned to the subject: Mathematics Department

Coordinating teacher: ARVESU CARBALLO, JORGE

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
By the end of this content area, students will be able to have:
1.- Knowledge and understanding of the mathematical principles of calculus of several variables underlying industrial technologies engineering.
2.- The ability to apply their knowledge and understanding to identify, formulate and solve mathematical problems of calculus of several using established methods.
3.- The ability to choose and apply relevant analytical and modelling methods in calculus of several variables.
4.- The ability to select and use appropriate tools and methods to solve mathematical problems in terms of calculus of several variables.
5.- The ability to combine theory and practice to solve mathematical problems of calculus of several variables.
6.- Understanding of the applicable methods and techniques applicable to calculus of several variables and their limitations.

DESCRIPTION OF CONTENTS: PROGRAMME
Chapter 1. n-dimensional Euclidean Space. Topologic structure. Functions of several variables.
        Limits and continuity. Partial derivatives and differentiability. Gradient vector. Jacobian matrix. Chain rule and directional derivatives. Differential operators.

Chapter 2. Hessian matrix. Local extrema. Extremum problems with constraints.
        Lagrange multipliers.

Chapter 3. Integration in R^n. Iterated integrals. Fubini's Theorem.
        Change of variables. Applications.

Chapter 4. Line integrals. Conservative fields. Surface integrals.
        Green, Stokes and Gauss' Theorems.

LEARNING ACTIVITIES AND METHODOLOGY
The learning activities will include:

1.- Master sessions.
2.- Problems sessions.
3.- Partial tests.
4.- Final exam.
5.- Tutorial activities.

ASSESSMENT SYSTEM

The evaluation will be based in the following criteria:
- Two partial evaluation controls (40%).
- Final examination (60%).

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals…):   40

BASIC BIBLIOGRAPHY

- DEMIDOVICH, B.P. Problemas de Análisis Matemático,, Editorial Paraninfo, 1991

- SALAS, S. L. ; HILLE, E. ; ETGEN, G. Calculus: one and several variables, Wiley, 2007

- MARSDEN, J.E. ; TROMBA, A.J. Vector Calculus, Freemann, 2012

ADDITIONAL BIBLIOGRAPHY

- BURGOS, R. Cálculo infinitesimal de una y varias variables, Mc-Graw Hill, 1995

- APOSTOL, T. Calculus, Vol. 2, John Wiley & Sons, 1969

- BARTLE, R. G. The Elements of Real Analysis,, John Wiley & Sons, 1976

- WREDE, R. C. ; SPIEGEL, M. R. Schaum's Outline of Advanced Calculus, McGraw Hill, 2002