

## CALCULUS

<b>Degree:</b>	<b>Technical Engineer in Surveying (bachelor)</b>
<b>Credits (ECTS):</b>	<b>4.8</b>
<b>Year:</b>	<b>1st</b>
<b>Type:</b>	<b>Core</b>
<b>Semester:</b>	<b>A</b>

### 1) OBJECTIVES:

The main aim of this subject is that the alumni acquire the knowledge use the basic mathematical tools on integral and derivative calculus, in order to develop properly knowledge in following subjects as Cartography, Topographic, Physics Foundations and Topographic Methods.

### 2) THEORY LESSONS:

#### BLOCK 0. INTRODUCTION: DIFFERENTIAL CALCULUS OF A VARIABLE

- 0.1 Derivative and Differential of a function.
  - Derivative of a function at a given point. Geometric interpretation.
  - Lateral Derivatives.
  - Derivative calculus revision.
  - Differential of a function. Approximation of a derivable function by its differential.
- 0.2 Local study of derivable derivative functions
  - Increase and decrease. Maxima and minima.
  - Concavity, convexity and inflection points.
- 0.3 Taylor's theorem and some of its applications.

#### BLOCK I: DIFFERENTIAL CALCULUS FOR FUNCTIONS OF VARIOUS VARIABLES.

- 1.1. - Introduction to differential calculus for functions of various variables.
- 1.2. - Vectorial function of a real variable and its relation to the case of a real function of a real variable.
- 1.3. - Real function of a vectorial variable. General view.
- 1.4. - Real function of a vectorial variable. Partial derivatives.
- 1.5. - Geometric interpretation of partial derivatives for a double variable function.
- 1.6. - Differential of a real function of various real variables, application to approximate calculations. Vectorial function of a vectorial variable, general concept.
- 1.7.- Maxima and Minima Study. Conditioned ends.

## BLOCK II: INTEGRATION OF VARIOUS VARIABLES FUNCTIONS

2.0. - Preliminaries: Indefinite Integration for real functions of real variables. Definite integration and some of its applications.

2.1. - Introduction: rectangle partition.

2.2. - Double integration and one-dimensional iterated integration, its geometric interpretation.

2.3. - Triple Integration, its geometric interpretation.

2.4. - Variable change on double or triple integral: polar, spherical and cylindrical coordinates.

2.5.-Some applications for double and triple integration.

### 3) BIBLIOGRAPHY:

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