

Course unit title: MATHEMATICS

Course unit code: 1-1-03

Type of course unit: compulsory

Level of course unit: first cycle

Year of study: 1st

Semester: 1st

Number of ECTS credits allocated: 6 ECTS

Name of lecturer: Luisa Oliveira

Objectives

According to present technological development, the application area of mathematical basis is indispensable for the good performance of the Marketing activity.

The Mathematics discipline (comprised in the Scientific Area of Quantitative Methods) in the Marketing Management course, is intended to make students aware of the importance of mathematical aspects, in the framework and conditioning of the company's operation. In this discipline, an approach is made to the matrix calculus, differential calculus in \mathbb{R}^n , primitive and integral, considering the importance of the concepts and techniques in this area for subsequent course disciplines. The intention is also to change the capacities of students in organizing and relating new concepts.

Learning outcomes of the course unit

- Matrix representation of a linear application;
- Identify basic changes and operate with the matrixes, relating them;
- Analyze and identify the characteristic of a matrix;
- Identify and calculate invertible matrixes;
- Resolve, discuss and relate linear equation systems;
- Identify and relate properties of the determinants;
- Calculate determinants applying the Sarrus rule and the Laplace Equation;
- Resolve linear equation systems applying Cramer's rule;
- Interpret domains and codomains;
- Calculate function limits of more than one variable;
- Analyze continuity of functions and identify properties of continuous functions;
- Calculate 1st, 2nd, 3rd and n order partial derivatives;
- Calculate differentials of two and n independent variables;
- Identify homogenous functions;
- Calculate directed derivatives;
- Understand the notion of primitive;
- Calculate primitives of rational functions;
- Give examples of functions the primitivation of which can be reduced to that of rational functions;
- Define integral and geometrically interpret its concept;
- Identify and relate properties of integrals;
- Calculate integrals applying the integration methods;
- Calculate parametric integrals;
- Calculate improper integrals and of infinite limit indentifying their nature;
- Apply integrals in the calculation of plane areas.

Mode of delivery: face-to-face

Prerequisites and co-requisites: none

Recommended optional programme components: none

Course contents

I – Matrixes

II – Determinants

III – Vectorial Spaces

IV – Numerical Series

I – Real variable functions. Generalities and examples; Revision of limits and its properties.

II – Differential calculation in \mathbb{R} . Lateral derivates. Relation between derivability and continuity. Differential concepts. Derivation roles: definitions and examples. Differential concepts. Derivation roles: Revision and examples; Extremes and functions.

III – Differential calculations in \mathbb{R}^n . Functions of various variables; Limits and continuity; Partial, directional and directed derivatives; differentiability and homogeneity functions; Derivatives and differentials of superior order; Free and conditioned extremes.

IV – Primitives. Primitive concept: First properties; Immediate primitives; integration methods: integration by decomposing; integration by parts; integration by substitution.

V – Integrals. Integral definition: Geometrical interpretation; Riemann's integral; Integrals properties; Defined integral; The Barrow formula; Integration methods; Improper integrals; Application of Area calculi.

Recommended Reading:

- Ferreira, M. A. e Amaral, I., Matemática – Álgebra Linear – Volume 1 (Matrizes e Determinantes, Lisboa, Edições Sílabo, Lda., 6ª Edição, 1999)
- Ferreira, M. A. e Amaral, I., Matemática – Álgebra Linear – Exercícios Vol. 1, Lisboa, Edições Sílabo, Lda., 6ª Edição, 1999
- Ferreira, M. A. e Amaral, I., Matemática – Cálculo Diferencial em \mathbb{R}^n , Lisboa, Edições Sílabo, Lda., 4ª Edição, 1996
- Ferreira, M. A. e Amaral, I., Matemática – Cálculo Diferencial em \mathbb{R}^n - Exercícios, Lisboa, Edições Sílabo, Lda., 4ª Edição, 1996
- Ferreira, M. A. e Amaral, I., Matemática – Primitivas e Integrais, Lisboa, Edições Sílabo, Lda., 5ª Edição, 1996
- Ferreira, M. A. e Amaral, I., Matemática – Primitivas e Integrais - Exercícios, Lisboa, Edições Sílabo, Lda., 5ª Edição, 1996

Planned learning activities and teaching methods: Theoretical-practical lessons

Assessment methods and criteria

- There is no register for presences in classroom;
- Each discipline will have the following assessment:
 - 1 Test in the classroom (20% weighted)
 - 1 or more group or individual work (30% weighted)
 - Participation /attendance (**10%** weighted)
 - 1 Assessment at end of Semester to be fixed in Calendar (**40%** weighted)

Should the student have a grade inferior to 8 (7.5) in the Assessment, he will immediately be given an EXAM.

Language of instruction: portuguese