School of Technology and Management
Course Unit Syllabus

Level of qualification:
First cycle (EQF level 6) - Bachelor
Study cycle:
Business Management

Course Unit: **9152305;9994305 – Mathematics I**

Year 1 | **Semester 1** | **ISCED Code: 461** | **ECTS: 5**

Tipe of Course Unit: Compulsory **Delivery Mode:** Face-to-face **Language of Instruction:** Portuguese

COURSE COORDINATOR: Teresa Maria Monteiro

HOURS OF WORK

TOTAL HOURS	Contact Hours								Hours in autonomous work
	Theory	Theory and practice	Practical and laboratory work	Field work	Seminar	Internship	Tutorial guidance	Other	
125		60							65

Prerequisites (if applicable): Not applicable

LEARNING OUTCOMES (knowledge, skills and competence)

To master and apply the concepts and techniques studied in the domains of real-valued functions and of differential calculus (see syllabus); to acquire support tools for other curricular units; to develop exposition, argumentation and reasoning skills.

CONTENTS

Properties of real numbers: intervals, finite sets, open sets, closed sets and absolute value of a number. Notions of topology in R: distance/metric space, neighbourhood, limit points and the Bolzano-Weierstrass theorem. Notions of real-valued functions: general definitions, polynomial functions, exponential function, logarithmic function, trigonometric functions and inverse trigonometric functions. Limit, continuity, derivative and tangent line to the graph of the function at a point. Bolzano and Weierstrass theorems. Derivative rules. Rolle and Lagrange theorems. Indeterminate forms: the Cauchy and L´Hospital rules. Applications of differential calculus, namely to optimization problems. Real-valued functions of more than one real variable: definition, domain, geometric representation in the case of two variables and partial derivatives.

DEMONSTRATION OF THE CONTENTS COHERENCE WITH THE COURSE UNIT’S LEARNING OUTCOMES

Students are expected to master and apply the studied concepts and techniques in the domains of real-valued functions of real variables, as well as of differential calculus (see syllabus), not only in the context of this curricular unit but also of others, throughout their academic studies. They should also be able to express their ideas and thoughts clearly.

TEACHING METHODOLOGIES

Before each new topic is introduced, students are provided with a historical and topic overview, and objectives are set. Classes have a lecturing component and also a practical one, dedicated to exercise/problem solving where the degree of abstraction is directly related to the business management context. In addition to the course materials put together by the course teacher, students are encouraged to look for and use complementary materials (such as books, calculator and internet search), with the aim to develop the students’ independence and proactivity in the learning process.

DEMONSTRATION OF THE COHERENCE BETWEEN THE TEACHING METHODOLOGIES AND THE LEARNING OUTCOMES

Classes have a lecturing component and also a practical one, dedicated to exercise/problem solving, where the degree of abstraction is directly related to the business management context. Students are encouraged to apply the acquired knowledge in problem solving, to explain their reasoning and to take their colleagues’ arguments into consideration.

EVALUATION METHODS

Assessment is made up of several tasks carried out throughout the semester, but students can also choose to take a final exam.

MAIN BIBLIOGRAPHY

Apostol, T.. 1999. Cálculo, vol. I e II. Barcelona: Editora Reverté, S.A.

Azenha, A. e M. A. Jerónimo. 2000. Elementos de Cálculo Diferencial e Integral em IR e IRn. McGraw-Hill.

Campos Ferreira, J.. 2008. Introdução à Análise Matemática. Lisboa: Fundação Calouste Gulbenkian.

Knut Sydsæter, Peter J. Hammond. 2012. Essential Mathematics for Economic Analysis, Financial Times Press/ Prentice Hall.

Sarrico, C.. 2003. Análise Matemática – leituras e exercícios. Lisboa: Gradiva.

Swokowski, E.. 1995. Cálculo com Geometria Analítica, vols. I e II. São Paulo: Makron Books do Brasil Editora, Lda.

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