POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	**SUBJECT DESCRIPTION**	**MODELO** PED.013.03

Course	**Management**					
Subject	**Mathematics II**					
Academic year	2023-2024	*Curricular year*	1st	*Study period*	2nd semester	
Type of subject	Compulsory	*Student workload (H)*	Total: 168	Contact: 90	*ECTS*	6
Professor(s)	Graça Tomaz					
☒ *Area/Group Coordinator* ☐ *Head of Department*	Graça Tomaz					

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

To provide the student with knowledge of Differential Calculus, Integral Calculus, and basics of scalar functions becoming thus equipped with a conceptual theoretical framework and calculus skills needed to the understanding and development of mathematical applications within the scope of the course.

To stimulate the student's ability for generalization, abstraction, logical argumentation, and critical thinking.

2. PROGRAMME

1. Real-valued functions of a real variable

   Basic definitions, domains, and graphs. Exponential and logarithmic functions. Limits. Continuity. Continuous functions theorems.
2. Real differential calculus

   Derivative and geometric interpretation. Derivative rules. Chain rule. Higher-order derivatives. Theorems on differentiable functions (Rolle and Lagrange theorems, Cauchy rule). Concavity and convexity. Optimization. Curve sketching.

3. Real integral calculus

   Indefinite integral: Immediate indefinite integrals. Integration methods.

   Integration of rational functions.

   Riemann integral: Definition, examples, and properties. Fundamental theorem of the integral calculus. Integration by parts and substitution. Areas and other applications.

4. Scalar functions

   Definition, domains and graphs. Partial derivatives. Two variable optimization. Applications.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The programme is designed to provide the basic contentes in the area of Mathematical Analysis so that students have the essential tools to solve concrete problems.

4. MAIN BIBLIOGRAPHY

Compulsory

1. Azenha, A. & Jerónimo, M. A. (2000). Elementos de Cálculo Diferencial e Integral em R e R^n, McGraw Hill, Lisboa.

2. Herman, E. & Strang, G. (2016). Calculus, vol. 1, OpenStax. (Disponível online em: https://openstax.org/details/books/calculus-volume-1)

3. Stewart, J. (2017). Cálculo, Vol I, Tradução da 8ª edição norte-americana, Cengage Learning.

Recommended

1. Ferreira, J. C. (1995). Introdução à Análise Matemática, Fundação Calouste Gulbenkian, Lisboa.

2. Pires, G. E. (2014). Cálculo Diferencial e Integral em IR^n, 2ª edição, IST Press, Lisboa.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Methodology: The teaching methodologies include lectures and interactive classes: theoretical classes with the resolution and discussion of exercises and problems addressing the issues in a practical and objective way to engage students in their learning process. The Moodle platform is used, enhancing the completion of asynchronous activities.

Continuous Assessment: Two written tests (T1, T2) graded on a scale of 20 points. Every student whose average score across both tests is 10 points or higher will be considered approved, provided they have obtained a minimum score of 5 points in each test.

Exam (normal season): The students who were unsuccessful in continuous evaluation can take one test covering the entire syllabus. They are approved if the obtained grade is not less than 10 points out of 20.

Exam (recourse season): Every student duly enrolled in the course who has not been approved in previous seasons may, during the recourse season, take an exam covering all the content taught. They will be considered approved if they obtain a score equal to or greater than 10 points out of 20.

In any of the evaluation seasons, no student may receive a score higher than 16 points without taking an additional oral examination.

All tests/exams will be closed-book, with the use of calculators and mobile phones prohibited.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The expository method is used to present the theoretical concepts fundamental to the understanding of the syllabus. The interactive method is consistent with the objectives as the professor solves some exercises by asking students' participation and promoting the exchange of ideas among all students. Problem solving is also in line with the objectives of the curricular unit as it is the application of the theoretical contents to the practical problems that allow students to consolidate the subject matter that has been taught.

7. ATTENDANCE

Not applicable.

8. CONTACTS AND OFFICE HOURS

Professor and Area Coordinator: Graça Tomaz; gtomaz@ipg.pt ; Office 33

Office hours: Monday 16:30-18:30; Wednesday: 15:00-17:00

9. OTHERS

Not applicable.

DATE
29 February 2024

SIGNATURES

Professor and Area Coordinator

(signature)