

POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.013.03
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Course	Data Science and Artificial Intelligence					
Subject	Calculus					
Academic year	2023.24	Curricular year	1st	Study period	2nd semester	
Type of subject	Compulsory	Student workload (H)	Total: 168	Contact: 90	ECTS	6
Professor	Natália Rodrigues					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)	Graça Tomaz				

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

Provide students with basic knowledge of Differential Calculus and Integral Calculus 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. It is also intended that students develop their ability to generalize, abstraction, logical argumentation, and critical thinking.

2. PROGRAMME

1. Real-valued functions of a real variable. Function basics. Elementary functions: polynomial, rational, exponential, logarithmic, trigonometric and their inverses. Limits and continuity. Bolzano Theorem and Weierstrass Theorem.
2. Differential calculus. Derivative function. Geometric interpretation of the derivative. Derivative rules. Theorems about differentiable functions. Application of differential calculus.
3. Indefinite integral. Immediate indefinite integrals. Integration methods. Integration of rational functions.
4. Riemann integral. Definition and properties. Fundamental theorem of the integral calculus. Integration by parts and substitution. Application of the definite integrals – áreas in the plane.
5. Introduction to differential calculus of several variables. Scalar functions. Limits and continuity. Partial derivatives. Gradient. Partial derivatives of higher order. Local extrema.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

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

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4. MAIN BIBLIOGRAPHY

Compulsory

1. Apostol, T. M. (1985). Cálculo, Vol. I, Editora Reverte, Rio de Janeiro
2. Azenha, A. (2000). Elementos de Cálculo Diferencial em \mathbb{R} e \mathbb{R}^n , McGraw-Hill.

Recommended

1. Herman, E. & Strang, G. (2016). Calculus, vol. 1, OpenStax. (Disponível online em: <https://openstax.org/details/books/calculus-volume-1>)
2. Castro A.C.M.(2013). Viamonte A.J., Sousa A.V. Cálculo I - Conceitos, Exercícios e Aplicações, Publindústria.
3. Ferreira, J. C. (1995). Introdução à Análise Matemática, Fundação Calouste Gulbenkian, 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.

Continuous Assessment: Two written tests (P1, P2) during the semester. The students are approved whenever the average grade is not less than 10 points in 20.

Exam (normal season): The students unsuccessful in continuous evaluation can take one test about the syllabus. They are approved if the obtained grade is not less than 10 points in 20. If the students took tests P1 and P2 and were not approved by continuous assessment, but they have obtained a grade greater than or equal to 9.5 points in one of them, they can choose to take only the test in which they obtained the grade less than to 9.5 points to reach a CF of 10 points, at least.

Exam (recourse season): The students unsuccessful in continuous evaluation and normal season can take one test about the syllabus. They are approved if the obtained grade is not less than 10 points in 20.

Compulsory oral exam for classifications higher than 16. All the written tests are closed-book tests, and the use of calculators or mobile phones is interdict.

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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: Natália Rodrigues; narod@ipg.pt; office 43

Office hours: Thursday, 15:00-17:00

Area coordinator: Graça Tomaz; gtomaz@ipg.pt; office 33.

9. OTHERS

Not applicable

DATE

19 de fevereiro de 2024

SIGNATURES

Assinatura na qualidade de (clicar)

(signature)

Assinatura na qualidade de (clicar)

(signature)