



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Mathematical Analysis

Academic Year 2024/2025

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Mathematical Analysis (L9006)

5. Scientific Area

6. Curricular Year

1st

7. Type of Curricular Unit / Semester

2nd Semester



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8. Class type and workload (work time)

Theoretical classes:

Practical classes:

Theoretical-Practical Classes 30,00

Tutorial Guidance: 20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutora MARIA ADELAIDE DUARTE CARREIRA LEITE VIDEIRA

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

The curricular unit, by promoting the learning of some structural concepts of Mathematical Analysis and by presenting some applications of these concepts, aims to provide students with the mathematical tools that are indispensable for the study of various disciplines in the field of Informatics, namely those involving quantitative aspects.

15. Specific Objectives

Familiarize students with the concept of integral for real functions of Riemann integral and some applications; Complement differential calculus in R_n ; Familiarize students with ordinary differential equations and some of their applications

16. Skills to be acquired

Students should be acquainted:

- Calculate integrals: simple, to know their fundamental properties and some of their applications.
- Solve the most frequent differential equations in applications

17. Teaching Methodology

The course is organised in theoretical/practical sessions (with presentation of main concepts and properties) supported by tutorial sessions where examples of application will be presented.



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18. Course Unit Program

- 1.1. Primitive concept and general properties
- 1.2. immediate primitives
- 1.3. Primitivation by parts
- 1.4. Primitivation of rational fractions
- 1.5. Primitivation by substitution

2. One-dimensional integral calculus
 - 2.1. The Riemann Integral
 - 2.2. integral properties
 - 2.3. Barrow's Theorem
 - 2.4. Calculation of limited flat areas
 - 2.5. indefinite integrals
 - 2.6. improper integrals

3. Ordinary differential equations
 - 3.1. Motivation: radioactivity decay.
 - 3.2. First order equations. Linear equations. Separable equations. Exact equations. Applications. Existence and unicity theorem.
 - 3.3. Second order linear equations. Existence and unicity theorem. General solution of the homogeneous equation with constant coefficients. Solution of the non-homogeneous equation. Applications

19. Assessment Methods

The continuous assessment component consists of two points written during the semester

20. Didactic Resources

Bibliographic indications and a theoretical-practical workbook available on Moodle.

21. Sustainability Objectives

The knowledge acquired in the course is essential for the various aspects of computer engineering

22. Keywords

Antiderivatives
Riemann Integral
Areas in the plane
Ordinary Differential Equations



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23. Main Bibliography

Author(s): R. Larson, R. P. Hostetler, B. H. Edwards
Title: Cálculo
Edition: 1^a Year: 2006
Local: São Paulo
Publisher: McGraw-Hill

Author(s): A. Monteiro, I. Matos
Title: Primitivas-Cadernos de Matemática
Edition: 1^a Year: 2014
Local: Amadora
Publisher: Orion

Author(s): B.Louro; Ana Sá
Title: Cálculo Diferencial e Integral em R
Edition: 1^a Year: 2015
Local: Lisboa
Publisher: MatCubo-Bertrand

24. Complementary Bibliography

Author(s): Salas,Hille
Title: Calculus
Edition: 10^a Year: 2018
Local: New Jersey
Publisher: John Wiley and Sons

Author(s): Miguel Ramos
Title: Curso elementar de equações diferenciais
Edition: 1^a Year: 2000
Local: Lisboa
Publisher: Textos de Matemática da FCUL- Departamento de Matemática da FCUL



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