UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Mathematical Analysis

Academic Year 2025/2026

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

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

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

Dr. JOSÉ MANUEL SILVA GUERREIRO LOUÇÃO DE MATOS

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 Economy, namely those involving quantitative aspects.

15. Specific Objectives

To familiarize students with the basic concepts of integral calculus for real-valued functions with one real variable and differential calculus for real-valued functions with several real variables.

16. Skills to be acquired

Identify fundamental properties of integrals and select appropriate antiderivative techniques
Calculate definite and improper integrals, applying Barrow's Theorem and solving plane-area problems
Apply partial derivatives, calculate gradients, and use the chain rule for functions of several variables
Formulate and solve free and conditional optimization problems using the Lagrange multiplier method
Interpret analytical results in geometric terms

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

17. Teaching Methodology

The material will be explained in theoretical and practical classes, with presentations of the topics accompanied by illustrative examples and problem-solving exercises. Student work will be supported by tutorial sessions.

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. Real functions of several real variables

3.1. Generalities. Domains and graphical representation. contour lines
3.2. Brief indications on limits and continuity
3.3. Partial derivatives. Derivation of Composite Functions
3.4. Implicitly defined functions
3.5. Optimization
3.5.1. free extremes
3.5.2. Extremes in limited and closed domains
3.5.3. conditioned extremes

19. Assessment Methods

The continuous assessment component consists of two written tests, carried out individually during the semester. Each test will cover the topics taught up to the corresponding date and will have equal weight in the final continuous assessment grade.

20. Didactic Resources

Students are provided with recommended bibliographic references and a theoretical-practical booklet, which includes examples and exercises, available on the Moodle platform. These materials complement the lectures and support independent study.

21. Sustainability Objectives

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

SDG 4 - Quality Education - Promote skills in logic, calculus and mathematical modelling.
SDG 8 - Decent Work and Economic Growth - Enhance employability through solid mathematical training and critical spirit.
SDG 9 - Industry, Innovation and Infrastructure - Apply mathematics to solve technical and scientific problems.

22. Keywords

Antiderivatives
Riemann Integral
Functions of several variables
Optimisation

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

23. Main Bibliography

Author(s):	R. Larson, R. P. Hostetler, B. H. Edwards		
Title:	Cálculo		
Edition:	8ª	Year:	2006
Local:	São Paulo		
Publisher:	McGraw Hill		
ISBN Code:	9788586804564		

Author(s):	A. Monteiro, I. Matos		
Title:	Primitivas - Cadernos de Matemática		
Edition:	1ª	Year:	2014
Local:	Amadora		
Publisher:	Orion		
ISBN Code:	9789728620257		

Author(s):	B. Louro; Sá; Alves, Ana		
Title:	Cálculo Diferencial e Integral em R		
Edition:	1ª	Year:	2022
Local:	Lisboa		
Publisher:	Escolar Editora		
ISBN Code:	9789725925973		

24. Complementary Bibliography

Author(s):	Marsden, J.; Weinstein, A.		
Title:	Calculus I, II, III		
Edition:	1ª	Year:	1985
Local:	New York		
Publisher:	Springer-Verlag		
ISBN Code:	0387909745		

Author(s):	James Stewart, Daniel Clegg, Saleem Watson Cengage		
Title:	Cálculo		
Edition:	9ª	Year:	2022
Local:	Boston		
Publisher:	Cengage Learning		
ISBN Code:	978-0-357-11351-6		

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

UNIVERSIDADE LUSÍADA
LISBOA

Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'ANÁLISE MATEMÁTICA': Academic Year 2025/2026
Autor / Author	Prof. Doutora MARIA ADELAIDE DUARTE CARREIRA LEITE VIDEIRA
Classificação / Classification	-
Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
Data Hora / Date Time	
Formato de dados / Data Format	Texto / Text, PDF
Estatuto de utilização / Usage	Acesso público / Public Access
Relação / Relation	Version 1,0

(c) Universidade Lusíada, 2025

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt