



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Operational Research

Academic Year 2026/2027

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Business Management

3. Cycle

1st

4. Course Unit

Operational Research (24118)

5. Scientific Area

6. Curricular Year

2nd

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 SÍLVIA ALEXANDRA CARRAPATO CHÁ

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

The main objective of this Curricular Unit is to provide students with skills to solve optimisation problems and predict future behaviour in the field of Management.

15. Specific Objectives

Formulate and solve problems, using Linear Programming techniques; analyse and optimise costs in order to manage resources; extract information from Forecasting Models.

16. Skills to be acquired

Students should be able to: formulate and solve Linear Programming models using graphical and Simplex methods; interpret the solutions of primal and dual problems and perform sensitivity analyses; solve transportation and assignment problems; plan projects with CPM/PERT, identify the critical path and relate duration to costs; select forecasting models and assess errors; use Excel and Solver to support management decision making.

17. Teaching Methodology

The Curricular Unit is structured into theoretical/practical sessions, together with tutorial sessions.

In theoretical/practical sessions, there will be an exposition of the subject, included in the Curricular Unit's program, with emphasis on examples.

In tutorial sessions, exercises provided to students will be solved, within the scope of the topics taught in theoretical/practical sessions with supervision from the teacher.



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18. Course Unit Program

1.Linear Programming

The Linear Programming Model.

Linear Programming Applications.

Problem formulation.

Graphical method for solving Linear Programming problems.

Primal Simplex Algorithm.

Duality.

Dual Simplex Algorithm.

Post-optimization.

Economic interpretation of Primal and Dual solutions.

Sensitivity analysis.

Particular cases of Linear Programming: Transportation and Assignment Problems and resolution algorithms.

2.Project Management: CPM/PERT

Fundamental concepts. CPM (Critical Path Method). PERT (Project Evaluation and Review Technique).

Estimation of activity durations.

Critical path determination.

Cost analysis.

Optimal project duration.

3.Forecasting Models

Forecasting model choice.

Qualitative and quantitative forecasting methods.

Analysis and Classical Decomposition of Time Series.

Forecasting with Smoothing Models.

Forecasting with Regression Models.

Forecast error measures.

Prediction intervals.

19. Assessment Methods

The Regulations for the Assessment of Knowledge and Skills currently in force will apply. Continuous assessment must include oral contributions distributed throughout the teaching period and a final written test.

20. Didactic Resources

Bibliography indicated. Theoretical/practical sessions notes. Software Excel.

21. Sustainability Objectives



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SDG 9: Industry, Innovation and Infrastructure. Linear Programming allows you to optimize industrial processes, promoting innovation and efficiency.

SDG 12: Responsible Consumption and Production. Linear Programming helps to minimize waste and manage resources.

SDG 8: Decent Work and Economic Growth. CPM/PERT Project Management improves project execution, increasing productivity.

22. Keywords

Model

Formulation

Linear Programming

Project Management

Forecasting Models



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23. Main Bibliography

Author(s): F. S. Hillier & G. J. Lieberman
Title: Introduction to Operations Research
Edition: 9th ed. Year: 2010
Local: New York
Publisher: McGraw-Hill
ISBN Code: 978-0-07-337629-5

Author(s): M. C. Mourão, M. V. Pato, L. S. Pinto, O. A. Simões & J. Valente
Title: Investigação Operacional - Exercícios e Aplicações
Edition: 2ª Ed. Year: 2019
Local: Lisboa
Publisher: Escolar Editora
ISBN Code: 978-972-592-556-0

Author(s): J. Caiado
Title: Métodos de Previsão em Gestão - com aplicações em Excel
Edition: 3rd ed. Year: 2022
Local: Lisboa
Publisher: Edições Sílabo
ISBN Code: 978-989-561-219-2

24. Complementary Bibliography

Author(s): M. M. Hill & M. M. Santos
Title: Investigação Operacional - Programação Linear, Vol.1
Edition: 4ª Ed. Year: 2022
Local: Lisboa
Publisher: Edições Sílabo
ISBN Code: 978-989-561-245-1

Author(s): M. S. Bazaraa, J. J. Jarvis & H. D. Sherali
Title: Linear Programming and Network Flows
Edition: 4th ed. Year: 2010
Local: Hoboken, New Jersey
Publisher: John Wiley & Sons, Inc.
ISBN Code: 978-0-470-46272-0



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Ficha técnica MIP / MIP Datasheet	
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Autor / Author	Prof. Doutora SÍLVIA ALEXANDRA CARRAPATO CHÁ
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