	SUBJECT DESCRIPTION	MODELO PED.013.02
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<i>Course</i>	Mechanics and Industrial Computing			<i>Academic year</i>	2021/2022		
<i>Subject</i>	Applied Mathematics II			ECTS	6,5		
<i>Type of course</i>	Compulsory						
<i>Year</i>	1st	<i>Semester</i>	2nd	<i>Student Workload:</i>			
<i>Professor(s)</i>	Maria Manuela André Alves Simões and Fernando Pires Valente			<i>Total</i>	175,5	<i>Contact</i>	90
<i>Area Coordinator</i>	Fernando Pires Valente and José Miguel Rodrigues Salgado						

Planned SD

1. LEARNING OBJECTIVES

Objectives:

Acquire knowledge and skills in statistics and numerical analysis, that enable them to understanding matters of other subjects of the course and the application of that knowledge in professional life.

Skills to be acquired by students:

- 1 - Ability to calculate probabilities.
- 2 - Ability to work with various probability distributions.
- 3 - Ability to undertake a study of sampling and statistical inference.
- 4 - Ability to solve nonlinear equations.
- 5 - Ability to approximate functions with different methods
- 6 - Ability to solve linear and nonlinear systems
- 7 - Ability to compute integrals with numerical methods
- 8 - Ability to solve ordinary differential equations

2. PROGRAMME

Numerical Analysis Module:

Theory of errors
 Nonlinear equations
 Polynomial interpolation
 Systems of linear and nonlinear equations
 Approximation
 Numerical integration
 Ordinary Differential equations

Statistics Module:

Basic probability theory.
 Random variables and distributions.
 Special distributions.
 Sampling theory.
 Interval estimation.
 Hypothesis testing.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

It is intended that students acquire skills that allow them to perform the statistical treatment of data, the program includes UC syllabus for examination and treatment of various types of data. Regarding the numerical analysis module course the syllabus UC are the classic content of any discipline of Numerical Analysis or Numerical Methods in science and engineering courses of higher education in Portugal or in any developed country and allows to achieve the goals set out in point 1.


4. MAIN BIBLIOGRAPHY

Fundamental

- 1 Fonseca, Jaime (2001) "Estatística Matemática" vol 1 e vol 2 Ed. Sílabo.
- 2 Murteira, J. F. Bento (1990) "Probabilidades e Estatística", McGraw-Hill.
- 3 Valente, F. P., **Análise Numérica**, Edição do IPG, 2015.
- 4 Valente, F. P., **Análise Numérica**, Tópicos e Problemas, Edição do IPG, 2018.
- 5 Valente, F. P., **Métodos Numéricos**, Coletânea de problemas de Métodos Numéricos resolvidos para a UC, 2020.
- 6 Simões, M., Caderno de Exercícios, material didático elaborado para a UC de Métodos Estatísticos, ESTG/IPG, 2020.
- 7 Simões, M., Slides para as aulas, ESTG/IPG, 2020.
- 8 Pina, H.L.G. (2010), "Métodos Numéricos", Escolar Editora.

General

- 1 Fonseca, Jaime e Torres, Daniel (2011) "Exercícios de Estatística-vol 1 e 2", 2ª edição, Ed. Sílabo.
- 2 Murteira, B.; Ribeiro, C.S.; Silva, J.A. e Pimenta, C. (2007) "Introdução à Estatística", 2ª edição, McGraw-Hill.
- 3 Reis, E.; Melo, P.; Andrade, R. e Calapez, T. (2007) "Estatística Aplicada" vol.1, 5ª edição, Ed. Sílabo.
- 4 Reis, E.; Melo, P.; Andrade, R. e Calapez, T. (2001) "Estatística Aplicada" vol.2, 4ª edição, Ed. Sílabo.
- 5 Asaithambi, N.S. (1995) "Numerical Analysis, Saunders College Publishing.
- 6 Atkinson, K.E. (1989), "An Introduction to Numerical Analysis, John Wiley & Sons
- 7 Ralston, A. e Rabinowitz, P. (1978), "First Course in Numerical Analysis", McGraw-Hill.

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5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching methodology:

The teaching methodology was predominantly practical and theoretical synchronous distance lectures with practical examples and application. Blackboard e-learning platform.

Evaluation:

Ongoing assessment – some practical evaluation works (20%) throughout the semester, Final frequency (80%). The final classification is the average of the grades of the two modules provided there is the requirement of a minimum score of 5 points in each module. Students will be approved if the final classification is greater than or equal to 9.5; or Assessment by final exam (100%).

In each case, students with a final score greater than or equal to 16/20 will sit for an oral exam or accept the final score of 16.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Because students should acquire competence to carry out statistical data treatment, these topics are included in the syllabus for analysis and treatment of diverse types of data.

Teaching methodology is mainly theoretical and practical with the theoretical exposure short of essential concepts of subjects taught, followed by the resolution of practical problems where possible linked to a science course, using scientific calculator. It is intended so that the knowledge gained to consolidate so they turn to professional life.

7. ATTENDANCE

N.A. (Although, it is recommended that students attend all lessons).

8. CONTACTS AND OFFICE HOURS

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Coordenador da área disciplinar: Fernando Pires Valente (Ph.D); fvalente@ipg.pt; office n.º 46

Data: 30/6/2021