EUROPEAN UNIVERSITY

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EUROPEAN UNIVERSITY FOR CUSTOMISED EDUCATION

STUDY GUIDE

STATISTICS & DATA MINING

Organised by

Universidad de Cantabria (UC)

Brandenburg University of Technology Cottbus - Senftenberg · Universidad de Cantabria · Università di Catania · Université Polytechnique Hauts-de-France · UMONS University of Mons · University of the Peloponnese · Vaasan yliopisto University of Vaasa · Politécnico de Viseu

1. IDENTIFYING DATA.	
· Course Name.	Statistics & Data Mining (1537)
· Coordinating University.	Universidad de Cantabria
· Partner Universities Involved.	University Polytechnic Hauts-De-France
· Course Field(s).	Statistics and Computer Science
· Related Study Programme.	EUNICE Joint Master Degree: Information Technology for Smart and Sustainable Mobility
· ISCED Code.	054
· SDG.	9, 11
· Study Level.	M
· EUNICE Key Competencies	Problem solving: Green - strongly Teamworking: NOT AT ALL Communication: Red - partially Self-management: Red - partially Cognitive flexibility: Red - partially Digital competence: Green - strongly Technical competence: Green - strongly Global intercultural competence: NOT AT ALL

· Number of ECTS credits allocated.	4
· Mode of Delivery.	Online live/Online self-study
· Language of Instruction.	English
· Course Dates.	05.09.2025 – 21.11.2025 September 5th – November 21st
· Precise Schedule of the Lectures.	24 hours of asynchronous sessions, 12 hours of synchronous sessions on Friday mornings
· Key Words.	Statistics, data mining
· Catchy Phrase.	Understand, choose and apply statistics and data mining smart solutions for resilient sustainable mobility

· Prerequisites and co-requisites.	- Having completed the Eunice Machine Learning course - The study levels this course is available for: M

	- English level: B2
· Number of EUNICE students that can attend the Course.	Maximum number of EUNICE students that can attend the course: 20
· Course inscription procedure(s).	Application through the Eunice website

2. CONTACT DETAILS.	
· Department.	Departamento de Matemáticas, Estadística y Computación
· Name of Lecturer.	Alicia Nieto Reyes
· E-mail.	alicia.nieto@unican.es
· Other Lecturers.	Emmanuelle Grislin-Le Strugeon (INSA HdF-UPHF)

3. COURSE CONTENT.

The students will learn how to analyze mobility data in order to create and produce smart solutions for resilient sustainable mobility. The goal is for the students to understand and be able to use basic ideas of statistical inference and data mining in a variety of settings.

4. LEARNING OUTCOMES.

Understanding and being able to choose and apply data mining and machine learning techniques, being able to distinguish between supervised and unsupervised learning, descriptive and predictive models, and understanding the most used algorithms in data analysis

5. OBJECTIVES.

- Understanding the concepts and terminology of data mining techniques.
- Recognizing the benefits of a systematic use of knowledge extraction techniques for obtaining predictive or descriptive models and patterns.
- Knowing different machine learning and statistical techniques used in data mining, their potential, their computational cost and their limitations.
- Being able to choose, for a particular problem, which data mining techniques are more appropriate.
- Evaluate the quality of a model using simple evaluation techniques
- Implement specific data mining algorithms

6. COURSE ORGANISATION.

UNITS

1.	Descriptive statistics
2.	Foundations of statistical Inference (univariate and multivariate analysis)
3.	Dimensionality reduction (PCA)
4.	Parametric and non-parametric tests
5.	Resampling techniques (bootstrap)
6.	Big principles of supervised / unsupervised methods
7.	Main types of predictive techniques (regression and classification)
8.	Main types of descriptive techniques (clustering, association rule learning)

LEARNING RESOURCES AND TOOLS.

Virtual course, materials provided by the professor.

PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.

Lectures and seminars.

7. ASSESSMENT METHODS, CRITERIA AND PERIOD.

Students will pass several questionnaires related to the course lessons and a final written exam.

OBSERVATIONS.

8. BIBLIOGRAPHY AND TEACHING MATERIALS.

Specific lectures, videos, and tools are provided by the professor.