1. BASIC INFORMATION

Course	Research
Degree program	Masters Degree in Big Data Analytics
School	Escuela de Arquitectura, Ingeniería y Diseño
Year	1
ECTS	6
Credit type	Optional
Language(s)	English
Delivery mode	Face-to-face / Online
Semester	2
Academic year	2025-2026
Coordinating professor	Javier Perez Piñeiro

2. PRESENTATION

This course aims to prepare students to undertake the tasks involved in the process of developing scientific work, providing them with tools to approach research activities in a structured manner. The goal is for students to gain a comprehensive understanding of the scientific research process. In this regard, the course seeks to equip students with methodological skills that enable them to identify and organize the stages of research in an orderly way, so that the research process is perceived as an integrated entity in which the different phases complement each other.

Additionally, this course aims to prepare students to conceptually address activities related to the dissemination of research results in general, and the development of the doctoral thesis in particular.

Therefore, in this subject, students will explore the methodological issues that arise during the research process and that may be of particular interest to those preparing for a future doctoral dissertation. The course dynamics include both theoretical deepening of methodological aspects and the use of specific case studies that serve as examples of different scientific approaches.

3. LEARNING OUTCOMES

Knowledge

CON-OPT-01. To understand bibliographic and computational resources, as well as the methodological and structural approaches of a research project in Big Data.

Skills

HAB03. Evaluate supervised and unsupervised machine learning models for problem-solving.

HAB08. Critically and meticulously evaluate the results obtained through the use of big data analysis techniques.

HAB-OPT-01. Critically evaluate existing literature, formulate relevant research questions, and develop strong hypotheses to generate new ideas in the field of big data analysis.

Competences

CP08. Research technical trends in technologies and processes for information discovery and knowledge generation from data.

CP10. Prepare, present, and defend a professional or research project in the field of big data analysis, individually and publicly, before an academic panel, as a synthesis of the competencies acquired throughout the program.

CP-OPT-01. Effectively prepare and present research findings to academic and professional audiences, including the preparation of articles for scientific publication.

The specific competencies acquired in this course are:

Knowledge of the methods used in research and their application in innovation processes for internal or departmental improvement, or in the creation of new products based on the generation of added value from data.

Understanding of the aspects that link professional practice to common needs in economics, regulation and standards, R&D&I policies, and the drafting of technical reports.

4. CONTENT

The course is organized into learning units, which are further divided into topics:

Methodology and Research Design

- **Unit 1:** Scientific Research Process
- **Unit 2:** Research Phases: Quantitative and Qualitative
- **Unit 3:** Dissemination of Results
- **Unit 4:** Doctoral Thesis

Resources Associated with Research Activity

- **Block 1:** Research Projects
    - Structure of a Research Project
    - National and International Project Calls
    - Research Project Funding
- **Block 2:** Bibliographic Resources
    - Information Search
    - Information Management

Practicum

Unit 1

- Topic 1: Practicum Orientation
- Topic 2: Context of Higher Education in Spain
- Topic 3: Doctoral Program in Control Engineering and Intelligent Systems for Health and the Environment
- Topic 4: Doctoral Program in Industrial Instrumentation Engineering Applied to Intelligent Transport and Sustainable Energy

Unit 2

- Topic 1: Research at Universidad Europea
- Topic 2: Research Groups and Lines in Engineering
- Topic 3: ABACUS and Scientific Portal

Unit 3

- Topic 1: Research and State of the Art
- Topic 2: Scientific Conferences
- Topic 3: Scientific Journals and Impact
- Topic 4: Writing the Research Report

5. TEACHING-LEARNING METHODOLOGIES

The following types of teaching-learning methodologies will be applied:

- MD1: Face-to-face lecture or, if applicable, through the virtual campus
- MD2: Cooperative learning
- MD3: Problem-Based Learning (PBL)
- MD4: Group research (a) and/or (b) group problem-solving
- MD6: Simulation environments and field experiences

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Clases magistrales	30
Actividades individuales	52
Actividades aplicativas de carácter integrador	23
Actividades en laboratorio	15
Trabajo autónomo	102
Pruebas de conocimiento	3
TOTAL	**225**

Virtual mode:

Learning activity	Number of hours
Clases magistrales	30
Actividades individuales	52
Actividades aplicativas de carácter integrador	23

Actividades en laboratorio	15
Trabajo autónomo	102
Pruebas de conocimiento	3
2TOTAL	**225**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
SE4-Learning folder (Portfolio)	100%

Virtual mode:

Assessment system	Weight
SE4-Learning folder (Portfolio)	100%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of 4.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 4.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Budget preparation	Week 3
Bibliographic search	Week 4
Project Goals	Week 7
Project methodology	Week 8
Delivery of research work	Week 12

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any changes as and when appropriate.

9. BIBLIOGRAPHY

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10. EDUCATIONAL GUIDANCE, DIVERSITY AND INCLUSION UNIT

From the Educational Guidance, Diversity and Inclusion Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students' inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by mean of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunity for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:

orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section on virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.