1. OVERVIEW

Subject area	Computer Science Project I
Degree	Bachelor's Degree in Computer Engineering
School/Faculty	Architecture, Engineering and Design
Year	3
ECTS	6
Type	Compulsory
Language(s)	Spanish
Delivery mode	On campus
Semester	5 (semester 1 of the 3rd year)
Year	2022–2023
Coordinating professor	Borja Monsalve Piqueras
Teachers	Borja Monsalve Piqueras Isabel Sutil Martín

2. INTRODUCTION

Within the project-based learning method, this syllabus includes different subjects oriented to the student's experiential learning through carrying out engineering projects. The subject's approach is as follows:

- An Engineering Project subject area is incorporated in the first year, which aims to put into practice the skills acquired in the core subject areas.
- In the second year, there are two project-based subject areas, which make up the computer science project subject. The intended learning outcomes after carrying out this project are related to the development of an engineering project, using novel techniques, methods, elements and domains.
- The subject areas that make up the computer science project subject are in the third year of the degree. They cover more specialised content such as data mining and text mining tools on Open Data, application of intelligent system techniques, and at the most advanced level, web development, mobile applications and advanced use of databases.
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3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

CB5: Students have developed the learning skills necessary to undertake further study in a much more independent manner.

Transversal skills (CT, by the acronym in Spanish):

CT1: Independent Learning: Ability to choose the most effective strategies, tools and opportunities for independent learning and implementation of what has been learnt.

CT5: Ability to put knowledge into practice, using the skills acquired through the study of mock situations based faithfully on real life issues in the relevant profession.

CT6: Oral or written communication: Ability to communicate and gather information, ideas, opinions and viewpoints to understand and be able to act, spoken through words or gestures or written through words and/or graphic elements.

CT7: Awareness of ethical values: Ability to think and act in line with universal principles based on the individual's value, contributing to his/her full development and involving commitment to certain social values.

CT11: Planning and time management: Ability to set objectives and choose the right means to fulfil them through efficient use of time and resources.

CT14: Innovation/Creativity: Ability to propose and invent new, original solutions that contribute towards improving problem situations, including ideas from other contexts.

CT15: Responsibility: Ability to fulfil commitments to themselves and others when undertaking a task and try to meet a range of objectives within the learning process. Ability to face and accept the consequences of actions taken freely.

CT17: Teamwork: Ability to integrate and collaborate actively with other people, departments and/or organisations in order to reach common goals.

Skills of the profession:

CG1: Ability to conceive, draft, organise, plan, develop and sign projects in the field of computer engineering, with the objective of conceiving, developing and making use of the systems, services and computer applications.

Specific skills (CE, by the acronym in Spanish):

CE25: Ability to possess a thorough understanding of the fundamental principles and computational models and know how to apply them to interpret, select, evaluate, model, and create new concepts, theories, uses and technological developments related to computer science.

CE28: Ability to learn about the fundamentals, paradigms and techniques of intelligent systems and to analyse, design and build systems, services and computer applications that use these techniques in any field of application.

CE29: Ability to acquire, obtain, formalise and represent human knowledge in a computable form to solve problems through a computer system in any field of application, particularly those related to aspects of computing, perception and performance in intelligent environments.

CE31: Ability to understand and develop computational learning techniques and design and implement applications and systems that use them, including those dedicated to automatic information extraction and knowledge from large volumes of data.

Learning outcomes (RA, by the acronym in Spanish):

RA1. Create one or several data collections from open data sources (Open Data).

RA2. Carry out a transformation and cleaning process of heterogeneous data collections.
RA3. Build a data mining system with the support of specific tools.
RA4. Implement a data mining system using a high-level programming language.
RA5. Apply intelligent system techniques.
RA6. Defend the procedures followed and the results obtained orally and/or in writing.
RA7. Work in groups and independently to carry out medium-sized projects.
RA8. Responsibly carry out individual tasks in the group work.
RA9. Self-assess the results obtained and the performance provided, taking into account one's abilities and demonstrating self-confidence.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CT5, CE31.	**RA1**. Create one or several data collections from open data sources (Open Data).
CT5, CE29.	**RA2**. Carry out a transformation and cleaning process of heterogeneous data collections.
CB5, CT5, CT11, CT14, CT15, CT17, CE25.	**RA3**. Build a data mining system with the support of specific tools. **RA4**. Implement a data mining system using a high-level programming language.
CB5, CT5, CE28.	**RA5**. Apply intelligent system techniques
CT6, CT7.	**RA6**. Defend the procedures followed and the results obtained orally and/or in writing.
CB5, CT7, CT11, CT14, CT15, CT17.	**RA7**. Work in groups and independently to carry out medium-sized projects. **RA8**. Responsibly carry out individual tasks in the group work.
CB5, CT7, CT1.	**RA9**. Self-assess the results obtained and the performance provided, taking into account one's abilities and demonstrating self-confidence.

4. CONTENTS

Use of data mining and text mining tools on Open Data. Application of intelligent system techniques to the project.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

1. Survey on aims and interests.

This survey is used to establish the aims of the subject and gather the student's interests on the subject. We will then make reference to it throughout the year for the students to evaluate the achievement of the aims and interests. In the online delivery mode, an initial questionnaire will be

carried out with the same objective. Throughout the year, reference will be made to this survey, and a final reflective questionnaire will be carried out for the students to check their learning progress of the subject.

2. Lectures, subjects of study and seminars

The "lectures" taught in the on-campus delivery mode are called subjects of study and seminars in the online delivery mode, and are conducted through readings on the topic, technical notes and webinars (which are recorded for students to access). In addition, students will be given a motivating introduction to each subject area, with multimedia presentations looking at specific topics of the subject, finally followed by forums.

4. a) Group investigation (jigsaw) and/or b) group problem-solving.

This learning method will be used for the development of both declarative and procedural knowledge. In method type a), a different topic will be assigned to each group to be investigated. Later, new groups will be formed with students who have all studied a different topic, and these new groups will be proposed comprehension and problem-solving activities. In method type b), a series of short questions and problems will be proposed to be solved in groups.

To develop these methods, students have different synchronous and asynchronous tools at their disposal in the online delivery mode, such as forums and group work chats which are only accessible to members of the group, as well as web conferences.

7. Practical case studies.

These will be used for the development of conditional knowledge. In the online delivery mode, case studies will be used to develop the practical contents of the subject through forums and seminars. This method is also applicable in the classroom for the on-campus modality.

8. Fieldwork, conferences, visits to companies and institutions.

These will be used for the development of conditional knowledge. In the on-campus delivery mode, all learning methods may be used, while only conferences can be used in the online delivery mode, as they will be available for remote access in real time (via streaming technologies) or recorded and broadcast afterwards.

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity (AF, by the acronym in Spanish)	Number of hours
Lectures	25 h
Group work	50 h
Independent working	50 h
Tutorials, academic monitoring and assessment	25 h
TOTAL	**150h**

Online:

Learning activity (AF, by the acronym in Spanish)	Number of hours
Independent working	50 h
Group work	25 h
Independent reading of topics and discussion	50 h
Tutorials, academic monitoring and assessment	25 h
TOTAL	**150h**

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Type	Assessment system	Weighting (min-max) %
1	Knowledge tests (oral / written)	0-20
2	Development of articles, reports or design briefs.	20-40
3	Alternative assessment methods with mind maps, diaries, debates, portfolios, peer assessment, etc.	0-15
4	Fieldwork, conferences, visits to companies and institutions, etc.	0-10
6	Skills	15
14	Group presentation of the projects carried out	20-40

Online:

Type	Assessment system	Weighting (min-max) %
8	Knowledge tests (oral / written)	60
9	Development of articles, reports or design briefs.	10-20
10	Alternative assessment methods with mind maps, diaries,	0-5

	debates, portfolios, peer assessment, etc.	
11	Fieldwork, conferences, visits to companies and institutions, etc.	0-5
12	Skills	5-10
14	Group presentation of the projects carried out	10-20

On the Campus Virtual, when you open the subject area, you will find specific weighting, details of the assessable tasks, as well as the deadlines and assessment procedures for each task.

7.1. Ordinary exam period

To pass the subject area in the ordinary exam period, you will need a final grade of at least 5 out of 10. In addition, you must achieve a “pass” grade (usually 5 out of 10, and 6 out of 10 in the checkpoints or oral/written tests associated with the submissions) in each of the type 1, 2, 3 and 14 activities (8, 9, 10 and 14 in the online delivery mode).

You must have at least 70% class attendance to pass the subject area.

If any of the above points are not met, the maximum grade in the ordinary exam period after applying the percentages will be 4 out of 10.

7.2. Extraordinary exam period (resits)

To pass the subject area in the extraordinary exam period, you will need a weighted average of at least 5 out of 10 in the final grade.
The failed and unsubmitted type 1, 2, 3 and 14 activities (8, 9, 10 and 14 in the online delivery mode) must be repeated, and a ”pass” grade must be achieved in each of them (normally 5 out of 10, and 6 out of 10 in the checkpoints and oral/written tests associated with the submissions). For that purpose, alternative activities to those proposed in the ordinary exam period, or the corrections to errors in those activities, will be put forward.
If any of the above points are not met, the maximum grade in the extraordinary exam period after applying the percentages will be 4 out of 10.

8. TIMELINE

The timeline with submission dates for the assessable tasks in this subject area will be indicated in this section:

Assessable tasks	Date
Activity 1. Project proposal	Week 2

Activity 2. ETL and dataset creation. *CheckPoint*. Individual, on-campus knowledge test on the activity.	Week 8
Activity 3. Modelling practice and assessment of machine learning algorithms using specific applications (RapidMiner). *CheckPoint*. Individual, on-campus knowledge test on the activity.	Week 11
Activity 4. Implementation of a program using a high-level language.	Week 18
Activity 5. Final documents of the application.	Week 19
Activity 6. Public presentation	Week 19
Activity 7. Application demo	Week 20

The timeline may be subject to change for logistical reasons related to the activities. Students will be informed of any changes in due time and course.

9. BIBLIOGRAPHY

The recommended bibliography is indicated below:

10. DIVERSITY AWARENESS UNIT

Students with special educational needs:

To ensure equal opportunities, curricular adaptations or adjustments for students with special educational needs will be outlined by the Diversity Awareness Unit (UAD, Spanish acronym).
As an essential requirement, students with special educational needs must obtain a report about the curricular adaptations/adjustments from the Diversity Awareness Unit by contacting unidad.diversidad@universidadeuropea.es at the beginning of each semester.

11. STUDENT SATISFACTION SURVEYS

Your opinion matters!
Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degrees and the learning process.

These surveys will be available in the survey area of your campus virtual or by email.

Your opinion is essential to improve the quality of the degree.
Many thanks for taking part.