1. OVERVIEW

Subject area	Computer Engineering Project II
Degree	Bachelor's Degree in Computer Engineering
School/Faculty	School of Architecture, Engineering and Design
Year	Second
ECTS	6
Type	Compulsory
Language(s)	Spanish
Delivery mode	On campus
Semester	Semester 2
Year	2022/2023
Coordinating professor	Jorge García González

2. INTRODUCTION

In the Computer Engineering Project, a single project will be carried out reflecting the profession of a computer engineer and it will cover the two semester subject areas, Computer Engineering Project I and II. It will be designed by a coordinating professor of the subject with help from specialist professors of related subject areas, with the aim that the students put into practice the knowledge of the rest of the subject areas in the syllabus taught in the same year and in previous years. It will have a common basic framework established by the content of the subject areas established in this subject, however, additional content may be included if it is required by the specific project.

The final assessment of the project will require the submission of a report, describing in detail the work carried out and, where appropriate, the prototype developed. Likewise, a public oral defence of the project in front of, at least, the subject coordinator will be required. Professors of related subject areas and, where appropriate, the representative of the supporting external company or organisation may also be present.

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.

General Skills (CG, by the acronym in Spanish):
- 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.
- CG2. Ability to manage project activities in the field of computer science.

- CG3. Ability to design, develop, assess and ensure the accessibility, ergonomics, usability and security of systems, services and computer applications, as well as the information they manage.
- CG4. Ability to define, assess and select hardware and software platforms for the development and implementation of systems, services and computer applications.
- CG10. Knowledge to carry out measurements, calculations, valuations, appraisals, experts' reports, studies, reports, task planning and other similar computer-related work.
- CG11. Ability to analyse and assess the social and environmental impact of technical solutions, understanding the ethical and professional responsibility of the role of a Technical Engineer in Computer Science.

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.
- CT4: Ability to analyse and synthesise: be able to break down complex problems into manageable blocks; evaluate other options and perspectives to find the ideal solution. Synthesising to reduce the complexity and better understand the situation and/or solve problems.
- 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.

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

- CE8 Ability to plan, conceive, use and manage computer projects, services and systems in all areas, leading their implementation and continuous improvement and assessing their economic and social impact.
- CE13 Knowledge, design and efficient use of the most appropriate data types and structures to solve a problem.
- CE14 Ability to analyse, design, construct and maintain robust, secure and efficient applications, choosing the most appropriate paradigm and programming languages.
- CE19 Knowledge and application of the tools necessary for storing, processing and accessing information systems, including web-based systems.
- CE22 Knowledge and application of software engineering principles, methods and life cycles.
- CE23 Ability to design and assess personal computer interfaces that guarantee the accessibility and usability of systems, services and computer applications.

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

- RA1: Create a database: design, creation of tables, and supply.
- RA2: Design data structures and algorithms according to efficiency criteria.
- RA3: Implement an application that includes distributed programming.
- RA4: Defend the procedures followed and the results obtained orally and/or in writing.
- RA5: Work in groups and independently to carry out medium-sized projects.
- RA6: Responsibly carry out individual tasks in the group work.
- RA7: Self-evaluate the results obtained and the performance provided, taking into account one's own abilities, demonstrating self-confidence. The table below shows how the skills developed in the subject area match up with the intended learning objectives:

Skills	Learning outcomes
CB5, CT1, CT5, CT17, CE14, CE19	RA1: Create a database: design, creation of tables, and supply.
CE5, CT1, CE22, CT5, CE13	RA2: Design data structures and algorithms according to efficiency criteria.
CT1, CT5, CT14, CE8, CE22, CE23	RA3: Implement an application that includes distributed programming.
CT6, CT4	RA4: Defend the procedures followed and the results obtained orally and/or in writing.
CT11, CT17	RA5: Work in groups and independently to carry out medium-sized projects.
CT11, CT15	RA6: Responsibly carry out individual tasks in the group work.
CT4, CT7	RA7: Self-assess the results obtained and the performance provided, taking into account one's abilities and demonstrating self-confidence.

4. CONTENT

Unit 1. Introduction to the Subject Area

- Contextualisation.
- Objectives.
- Rules and regulations.
- Forming work groups.

The aim of this unit is to make a general presentation on the subject area and introduce the content which will be developed, explaining the project-based learning methods.

Unit 2. Databases
- Entity-relationship diagrams Relational tables.
- SQLite
- Modification of the System developed in the S1 to work on databases.

Unit 3. Microcontrollers and acquisition of signals using sensors
- Arduino microcontrollers and its different hardware variants available on the market.
- Sensors for the acquisition of signals.
- Connection of sensors, use of libraries and programming of the acquisition system, and connection and sending of the remote database.

The aim of this unit is to show the content related to the tools that the student will use for the acquisition of signals and their storage in the system.

In addition, students will be shown the tools that they will use for communication between the microcontroller and the desktop system that manages the database.

Unit 4. Final project integration and assessment
• Project report.
• Project Video.
• Final project presentation.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Surveys on aims and interests.
- Lectures, subjects of study and seminars.
- Group research and/or problem-solving.
- Practical case studies.
- Fieldwork and conferences.

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	**150 h**

Online:

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

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

On campus:

Assessment system	Weighting
Exams and tests	20%

Drawing up reports	25%
Skills assessment - Peer assessment	15%
Seminars	5%
Group presentation of the projects carried out in public	20%
Exercises, problems, case studies, designs, simulations and research	15%

Online:

Assessment system	Weighting
Exams and tests	60%
Drawing up reports	20%
Exercises, problems, case studies, designs, simulations and research	10%
Group presentation of the projects carried out in public	10%

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

7.1. Ordinary exam period

To be able to pass the subject area in the ordinary exam period, you must have at least 70% attendance in the on-campus delivery mode at the time of submission.
To pass the subject area in the ordinary exam period, you will need a final grade of at least 5.0 out of 10.0 (weighted average) for the subject area.
In any case, you must achieve a grade of at least 5.0 in the average of the knowledge activities and in the final submission of the system, so they can be averaged with the rest of the activities.

7.2. Extraordinary exam period (resits)

All submissions in the extraordinary exam period will be carried out individually, and will be subject to an anti-plagiarism assessment.

To pass the subject area in the extraordinary exam period, you will need a final grade of at least 5.0 out of 10.0 (weighted average) for the subject area.
In any case, you must achieve a grade of at least 5.0 in the average of the knowledge activities and in the final submission of the system, so they can be averaged with the rest of the activities.

Activities that were failed or not submitted, and that were compulsory to pass in the ordinary exam period, must be submitted after receiving the relevant corrections from the lecturer.

8. TIMELINE

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

On campus:

Assessable tasks	Date
Project draft (2.5%)	Week 3
Knowledge test (10% + 10%)	Weeks 6–7

	Weeks 13–14
Database - ERD Design (2.5%)	Weeks 7–8
Submission of code (5% + 5%)	Weeks 8–9
	Weeks 14–15
Progress reports (10%)	Weeks 9–10
	Weeks 15–16
Final report (10%)	Weeks 17–18
Public presentation (20%)	Weeks 17–18
PBS video (5%)	Weeks 17–18
Skills peer assessment (15%)	Start/End
Attendance to seminars and visits (5%)	Review planning in the Campus Virtual

Assessable tasks	Date
Initial project report (5%)	Week 3
Requirements analysis (2.5%)	Weeks 4–5
Database - ERD Design (2.5%)	Weeks 7–8
Code delivery (2.5%)	Weeks 14–16
Progress reports - Database development (5%)	Weeks 9–10
Final report (10%)	Weeks 17–18
Public presentation (10%)	Weeks 17–18
PBS video (2.5%)	Weeks 17–18
Knowledge Test (60%)	Exam week - end of semester

The timelines may be subject to change for logistical reasons related to the activities. Students will be informed of any changes in due time and course. The complete and detailed timeline will be published on the Campus Virtual.

9. BIBLIOGRAPHY

The Campus Virtual will provide detailed references and material for the subject area, but some of the sourced used are:

https://learn.sparkfun.com/tutorials/ad8232-heart-rate-monitor-hookup-guide
https://www.youtube.com/watch?v=s2Z_f9WU_j4
https://www.w3schools.com/sql/default.asp

Introducción al aprendizaje activo como base del PBL
https://www.youtube.com/watch?v=y7k6Ha65Ejc.
- SQLite:https://www.sqlite.org/index.html
- DB Browser for SQLite: https://sqlitebrowser.org
- WIFI Modulo ESP8266. Conectarse y enviar datos por Internet:
  https://www.youtube.com/watch?v=7gXcTBHLCRc

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.