

1. OVERVIEW

Subject area	Object-Orientated Programming
Degree	Bachelor's Degree in Computer Engineering
School/Faculty	Architecture, Engineering and Design
Year	First
ECTS	6 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery mode	On campus / Online
Semester	Second semester
Year	2022/2023
Coordinating professor	Pedro J. Lara
Teacher	

2. INTRODUCTION

This subject area belongs to Computer Science module, formed by the following subject areas:

- Fundamentals of Computer Science
- Fundamentals of Programming
- Object-Oriented Programming

2. SKILLS AND LEARNING OUTCOMES

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

- CB1: Students have demonstrated knowledge and understanding of a study area originating from general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB2: Students can apply their knowledge to their work or vocation in a professional manner and possess the skills which are usually evident through the forming and defending of opinions and resolving problems within their study area.

- CB3: Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.
- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
- 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):

- CT2: Self-confidence: Ability to evaluate one's own results, performance and skills with the self-determination necessary to complete tasks and meet any objectives.
- 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.
- CT8: Information management: Ability to seek, choose, analyse and integrate information from diverse sources.
- CT9: Interpersonal relationship skills: Ability to maintain positive relationships with other people through assertive verbal and non-verbal communication. This means being able to express or communicate what you want, think or feel without discomforting, offending or harming the feelings of other people.
- CT10: Initiative and entrepreneurial spirit: Ability to undertake difficult or risky actions with resolve. Ability to anticipate problems, propose improvements and persevere to ensure they are implemented. Willingness to take on and carry out tasks.
- CT11: Planning and time management: Ability to set objectives and choose the right means to fulfil them through efficient use of time and resources.
- CT12: Critical thinking: Ability to analyse an idea, occurrence or situation from different perspectives and adopt a personal viewpoint based on scientific rigour and objective reasoning, rather than intuition.
- 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.
- CT16: Decision-making: Ability to choose between different options or methods to effectively solve varied situations or problems.
- 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):

- CE5: Knowledge of the structure, organisation, operation and interconnection of computer systems, the fundamentals of their programming, and how they are used to solve engineering problems.
- CE13: Knowledge, design and efficient use of the most appropriate data types and structures for problem-solving.

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

- RA1: Manage the control of programs through modules.
- RA2: Apply the basic concepts of software engineering to practically solve medium-sized projects.
- RA3: Use basic concepts linked to the object-oriented paradigm: class design, inheritance, dependencies, associations, multiplicity, access modifiers, overloading, abstract classes, polymorphism and interfaces.
- RA4: Understand what a software design pattern is and apply some as examples.
- RA5: Correctly use tools and modelling languages.
- RA6: Implement programs in an object-oriented programming language.

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

Skills	Learning outcomes
CE5	RA1, RA2, RA3, RA4, RA5, RA6
CE13	RA3, RA4, RA5, RA6

4. CONTENTS

The contents of the subject area are as follows:

- Implementation of classes. Attributes, constructors, methods. Inheritance. Collections.
- Advanced class design. Method overloading and rewriting. Abstract classes. Polymorphism. Interfaces.
- Quality assurance and design patterns.
- Graphic interfaces

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- **MD1. 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.

- **MD2. 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).
- **MD3. Laboratory work:** while the laboratories described in section 7 will mainly be used for the on-campus delivery mode, the online delivery mode will use the virtual desktop infrastructure, with the different methods and use cases explained in detail in section 7.
- **MD4. a) Group investigation 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 questions and short problem activities will be proposed to be solved in groups.
- **MD5. Designs,** understood as practical proposals for solving specific problems (unlike the study of practical cases, it is not a question of delving deeper into the analysis and the real problems. Instead, it is based on this knowledge, and the aim is to provide new solutions in accordance with engineering standards). These learning methods will be used for the development of procedural knowledge.
They will be used in all delivery modes and help to develop creative potential and technical skills in the field of engineering.
- **MD8. Fieldwork, conferences, visits to companies and institutions.**
These will be used for the development of conditional knowledge. In the on campus delivery mode, all these learning methods may be used, while in the online delivery mode, only conferences can be carried out, 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
AF1: On-campus/online lectures, reading topics and complementary materials, implementation of activities carried out independently and collectively.	50 h
AF2: Work carried out in the classroom independently and in groups Case studies, problem solving, project development. simulation	25 h
AF3: Independent working	50 h
AF4: Tutorials, academic monitoring and assessment	25 h
TOTAL	150h

Online:

Learning activity (AF, by the acronym in Spanish)	Number of hours
AF3: Independent working	25 h
AF6: Independent reading on complementary topics and materials and implementation of activities carried out independently. Subsequently, asynchronous group discussion on the Campus Virtual forum, and online seminars with the synchronous e-learning tools on the Campus Virtual.	50 h
AF7: Work carried out on the Campus Virtual independently and in groups. Case studies, problem solving, project development, simulation	50 h
AF8: Tutorials, academic monitoring and assessment through the Campus Virtual.	25 h
TOTAL	150

7. ASSESSMENT

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

On campus:

Assessment system	Weightin
SE1: Objective tests: in-class assessable tasks carried out individually.	30
AS2, AS3, AS6: Various classroom activities that can be delivered individually and/or in groups.	30
AS2, AS3, AS6: Various tasks carried out outside the classroom: work, exercises, practice and mini-projects	30
AS2, AS3, AS4, AS6: Skill-based aspects of participation in tasks carried out inside and outside of the classroom.	10

Online:

Assessment system	Weightin
SE8: Objective tests: in-class assessable tasks carried out individually.	60
AS9, AS10, AS14: Various classroom activities that can be delivered individually and/or in groups.	20
AS9, AS10, AS14: Various tasks carried out outside the classroom: work, exercises, practice and mini-projects	15
AS9, AS10, AS11, AS14: Skill-based aspects of participation in tasks carried out inside and outside of the classroom.	5

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

In order to pass the subject area in the ordinary exam period, you must:

- Achieve a grade of at least 5 in the assessable activities 1 and 3
- Achieve a grade of at least 5 in the average of all the assessable activities.
- 50% attendance

The grade in the ordinary exam period will appear as NP (No grade reported) if the student fails to submit any assessable task which counts towards the weighted average.

7.2. Extraordinary exam period (resits)

In order to pass the subject area in the extraordinary exam period, you must achieve a grade of at least 5 in the assessable activities 1 and 3, and achieve a grade of at least 5 in the average of the rest of the assessable activities to submit.

Assessable activities not passed in the ordinary exam period, or those not submitted, must be submitted after receiving the relevant corrections and feedback from the lecturer.

The grade in the extraordinary exam period will appear as NP (No grade reported) if the student fails to submit any assessable task which counts towards the weighted average.

8. TIMELINE

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

Assessable tasks	Date
Activities UA1 (individual and group)	Weeks 1–3
Activities UA2 (individual and group)	Weeks 4–6
Activities UA3 (individual and group)	Weeks 7–9
Knowledge Test (individual)	Week 10
Activities UA4 (individual and group)	Weeks 11–13
Activities UA5 (individual and group)	Weeks 14–17
Overall Knowledge Test	Week 18

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:

- Documentación oficial de Java: <https://docs.oracle.com/javase/>
- "Piensa en Java". Eckel, Bruce. Pearson Prentice Hall. Ed. 2008
- WikiBooks: Object Oriented Programming.
https://en.wikibooks.org/wiki/Object_Oriented_Programming
- "El lenguaje unificado de modelado" / Grady Booch, James Rumbaugh, Ivar Jacobson; traducción José Sáez Martínez ; supervisión de la traducción y revisión técnica Jesús J. García Molina. Disponible en Colección General (Campus Villaviciosa) (QA76.64 .B66818 2004)
- "UML y patrones : introducción al análisis y diseño orientado a objetos y al proceso unificado" / Craig Larman ; traducción, Begoña Moros Valle ; supervisión de la traducción y revisión técnica, Jesús García Molina. Disponible en Colección General (Campus Villaviciosa) (QA76.64.L37318 2008)

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.