Universidad Europea

1. OVERVIEW

Subject Area	Physical Interaction Workshop
Degree	Bachelor's Degree in Design
School/Faculty	Faculty of Architecture, Engineering and Design
Year	Third-party
ECTS	6 ECTS
Type	Compulsory
Language(s)	Spanish/English
Delivery Mode	On campus
Semester	Second semester
Academic Year	2024/2025
Coordinating professor	

2. INTRODUCTION

This subject deals with designing interaction systems with a physical interface. Students learn how to create prototypes with sensors, electronics, programming and audiovisual and mechanical actuators. Using the Arduino platform, this workshop proposes the development of interactive projects in interior space, the design of interactive objects and the interaction with communication systems. It will also present an introduction to ubiquitous computing, home automation and the internet of things.

Over the course of the subject, we will focus on the importance of learning and the use of programming with code as a tool for designing interaction, as well as its creation within a conceptual framework and a creative strategy.

3. SKILLS AND LEARNING OUTCOMES

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

- 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.
- 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, as per the Spanish acronym):

- CT1: Independent Learning: the ability to choose the most effective strategies, tools and opportunities for independent learning and implementation of what they have learnt.

- CT11: Planning and time management: ability to set objectives and choose the right means to fulfil them through efficient use of time and resources.
- CT13: Problem solving: ability to resolve an unclear or complex issue or situation which has no established solution and requires skill to reach a conclusion.
- CT14: Innovation/Creativity: ability to propose and invent new and original solutions broadening the scope and bringing different aspects to the original problem.
- CT 17: Teamwork: ability to integrate and collaborate actively with other people, areas and/or organisations to reach common goals.

Specific skills (CE, as per the Spanish acronym):

- CE5. Ability to apply knowledge of physics, dimensioning, numerical calculus, analytical geometry and basic algebra in design projects.
- CE6. Ability to understand the range of applications for the processes of symbolism, semiotics, practical functions, use and ergonomics in design.
- CE11. Ability to apply the technology and tools of graphic design, product and interiors in the different design creation and production phases.
- CE14. Ability to create and develop design projects in digital environments including multimedia and websites.

Learning outcomes (RA, as per the Spanish acronym):

- RA8: Understand the concepts of physical interaction design applied to a spatial design project. Understand home automation and the use of programming with code as a tool for an automated spatial design project.
- RA12: Develop advanced projects in the project-based learning area with groups of students from different disciplines and in collaboration with students off architecture and engineering courses.

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

Skills	Learning outcomes
CB2, CB4, CB5, CT1, CT11, CT13, CT14, CT17, CE5, CE6, CE11, CE14	• RA8: Understand the concepts of physical interaction design applied to a spatial design project. Understand home automation and the use of programming with code as a tool for an automated spatial design project. • RA12: Develop advanced projects in the project-based learning area with groups of students from different disciplines and in collaboration with students off architecture and engineering courses.

4. CONTENTS

The subject matter is divided into five units:

- **UA0**. Introduction to physical computing. Electronic devices and circuit bending.
- **UA1**. Arduino programming. Basic and variable circuits and functions. Digital and analogue inputs. Cycles and sequences. Logic programming.
- **B2.** Sensors and actuators. Servomotors, buzzers, ultrasounds, piezoelectrics, displays and capacitive sensors.

- **UA3**. Serial connection. Introduction to Processing. Interaction between Arduino and Processing.
- **B4.** From the prototype to the physical interaction project.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:
- Lecture.
- Collaborative learning.
- Project-based learning (PBS)
- Learning based on workshop teaching

6. LEARNING ACTIVITIES

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

On-campus:

Learning activity	Number of hours
Attendance and participation in activities	6.25h (on-site)
Directed learning, practical exercises and problem-solving	25h (20% on-site)
Project presentation	12.5h (on-site)
Integrated group project	12.5h (40% on-site)
Research work and projects	62.5h (40% on-site)
Self-study	12.5h (off-site)
Tutorials, academic follow-up and assessment	18.75h (on-site)
TOTAL	150 h

7. ASSESSMENT

The assessment methods, plus their weighting in the final grade for the course, are as follows:

On-campus:

Assessment method	Weight
Projects	100%

On the Virtual Campus, when you open the course, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

7.1. Ordinary examination period

To pass the course in the ordinary examination period you must obtain a grade of 5.0 or more out of 10.0 in the final grade (weighted average) for the subject.

7.2. Extraordinary examination period

To pass the course in the extraordinary examination period you must obtain a grade of 5.0 or more out of 10.0 in the final grade (weighted average) for the subject.

Activities not passed in the ordinary examination period, or those not delivered, must now be delivered after having received the relevant corrections to them by the lecturer.

8. SCHEDULE

The schedule with delivery dates of assessable activities in the course is indicated in this section:

Assessable activities	Date
Activity 1	Week 3
Activity 2	Week 4
Activity 3	Week 5
Project 4	Week 7
Project 1	Week 8
Activity 5	Week 9
Activity 6	Week 11
Project 2	Week 12

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

9. BIBLIOGRAPHY

The recommended bibliography is indicated below:

● Culkin, J. y Hagan E. (2017) Learn Electronics with Arduino: An Illustrated Beginner's Guide to Physical Computing, Make.
● O'Sullivan D. y Igoe T. (2004) Physical Computing, Course Technology PTR.
● Shiffman, D. (2008) Learning Processing: A Beginner's Guide to Programming Images, Animation, and Interaction, Morgan Kaufmann.

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

The Educational Guidance and Diversity Unit offers support throughout your time at university to help you with your academic achievement. One of the main pillars of our educational policy is the inclusion of

students with special educational needs, universal accessibility to the different university campuses and equal opportunities.

This unit offers students:

1. Support and monitoring through personalised counselling and programmes for students who need to improve their academic performance.
2. Promotion of diversity, with curricular changes possible in terms of methodology or assessment for those students with special educational needs in order to provide equal opportunities for all our students.
3. We also offer students a range of educational extracurricular resources for developing a variety of skills to enhance their personal and professional development.
4. Career guidance by offering tools and advice to students with doubts regarding their professional careers or those who believe they have chosen the wrong line of study.

Students who need educational support can contact us at:
orientacioneducativa@universidadeuropea.es

11. SATISFACTION SURVEYS

Your opinion matters!

Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degree courses and the learning process.

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

Your opinion is essential to improve the quality of the course.

Many thanks for taking part.