Course guide
804475 - EIM - Electronics and Multisensory Interaction

Last modified: 15/07/2024

Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.

Degree: BACHELOR'S DEGREE IN DIGITAL DESIGN AND MULTIMEDIA TECHNOLOGIES (Syllabus 2023). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: Molins Pitarch, Carla

Others:

TEACHING METHODOLOGY

There are two types of classes that we call Theory and Practice.
Theory refers to reference contents, main glossary, history of the field, state of the art, resources, books, concepts, authors, etc.
Practice refers to everything related to application and development using electronic materials, sensors, and software. This includes assessable classroom practices.
There are sessions where the two types of classes occur simultaneously.
Participation is essential, as the aim is to develop the ability to communicate ideas collaboratively.

LEARNING OBJECTIVES OF THE SUBJECT

Knowledge
Recognise basic concepts related to electronics and microcontrollers and identify their potential application in the development of multimedia installations and products.
Identify the importance and design of multisensory feedback (visual, auditory, haptic) in multimedia applications.

Skills
Edit, transform and encode digital sound and image files using programming languages and authoring software.

This practical-oriented course includes theoretical capsules to help students understand the fundamentals of electronics and sensorial interaction. We will address various case studies and materialize project proposals by designing circuits, understanding signals, and specifying electronic components and complex sensors to create projects that provide users with interactive experiences.

The work will be based on the Arduino ecosystem, using different types of inputs and outputs to develop interactive experiences.

The course will be organized into 2 main blocks:

Initial Block (Fundamentals of Physical Computing): We will learn the basics of electronics and physical computing in this block. We will become familiar with different tools and the physical principles of electronic components, always from a practical perspective. The initial block will conclude with a small evaluative project that achieves the learning objectives of the fundamentals.

Exploration Block (Advanced Sensorial Interactivity): The second block will introduce more advanced concepts in terms of sensorial interactivity. This block will also present conceptual challenges that will be worked on weekly until identifying a concept/technique to explore in greater depth for the final group project, which will serve as the evaluative final project.

Throughout both blocks, there will be conceptual explanations, programming and electronic circuit development sessions, and supervised practices during class hours, which should be complemented with self-directed learning.

Throughout the course, there will be a weekly 20-minute session where students, in small groups, will present a topic/reference author.

STUDY LOAD

Type	Hours	Percentage
Guided activities	12,0	8.00
Self study	90,0	60.00
Hours medium group	18,0	12.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

PART A: Fundamentals

Description:
In this first part of the course, we will combine a weekly theme with learning introductory programming with Arduino.

Description: Each week, we will work on a thematic block with a practical component supported by theoretical content.

Full-or-part-time: 75h
Practical classes: 25h
Self study : 50h

PART B: Exploration

Description:
The second part will focus on exploring different techniques and tools that will allow us to investigate various approaches within multisensory interaction. We will incorporate other tools into our Arduino systems such as Processing, OpenCV, and various libraries that will expand our interactive environments.

Full-or-part-time: 75h
Practical classes: 35h
Self study : 40h

GRADING SYSTEM

- Lab deliverables*- 25%
- Mid-term project – 15%
- Mid-term exam 15%
- Group case study – 5%
- Final Project: project and presentation– 20%
- Final project: Individual Report- 10%
- Participation and attitude - 10%

*Lab deliverables can be handed in a week later with a maximum grade of 6.

Irregular actions that may lead to a significant variation in the grade of one or more students constitute a fraudulent performance of an evaluation act. This action will lead to a descriptive grade of fail and a numerical grade of 0 for the ordinary global assessment of the subject, without the right to re-evaluation.
If the teachers have evidence of the use of AI tools that are not permitted in the assessment tests, they may summon the students involved to an oral test or a meeting to verify the authorship.

EXAMINATION RULES.

Uncompleted or failed assignments can be resubmitted at the end of the semester. Assignments submitted during these periods will be evaluated on a scale of 6 points instead of 10.

Why only a 6? Well, for two reasons.

Because the course is progressive and in crescendo (continuous assessment). What you learn on the first day, you'll use until the end. If you submit assignments on time, you assimilate the content and enjoy the next content and project more.

Because the first submission in week 3 will be challenging. However, towards the end of the semester, you could do it with your eyes closed. It doesn't have the same merit and value to do it when it's due as when we already have it mastered.

SUMMARY: Submit everything as and when it should be done, pass, and enjoy the course more. If you miss submitting any assignment, RESUBMIT IT! ;)

BIBLIOGRAPHY

Basic:
- John Maeda. Creative Code. 2004.
- John Maeda. Design by numbers . Cambridge: MIT press, 2001.
- Reas, Casey. Form+Code in Design, Art, and Architecture (Design Briefs. Princeton Architectural Press, nd.
- Shiffman, Daniel. The nature of code. 2012-2024.
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- Reas, Casey, and Ben Fry. . Processing: A Programming Handbook for Visual Designers and Artists.. Cambridge: MIT Press, 2007.
- Levin, Golan, Brain, Tega. Code as creative medium : a handbook for computational art and design [on line]. Cambridge: The MIT Press, 2021Available on: https://discovery.upc.edu/discovery/fulldisplay?docid=alma991001812459706711&context=L&vid=34CSUC_UPC:VU1&lang=ca&search_scope=MyInst_and_CI&adaptor=Local%20Search%20Engine&tab=Everything&query=any,co.

RESOURCES

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