UAB
Universitat Autònoma de Barcelona

Challenge-based Innovation

Code: 106943
ECTS Credits: 6

2024/2025

Degree	Type	Year
2503743 Management of Smart and Sustainable Cities	OB	2

Contact

Name: Fernando Luis Vilariño Freire
Email: fernandoluis.vilarino@uab.cat

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

No previous requirements.

Objectives and Contextualisation

1. Acquisition of the building blocks of challenge-based methodologies.
2. Identification of the fundamental tools to propose a solution to a challenge.
3. Complete definition of a specific challenge.

Learning Outcomes

1. CM22 (Competence) Work in multidisciplinary environments and with the participation of very diverse actors (technicians, managers, citizens, institutional agents, etc.).
2. KM29 (Knowledge) Describe the methodology to identify the social and economic challenges related to the management of cities.
3. SM27 (Skill) Develop citizen participation projects to propose urban management policies and measures.

Content

The contents are divided into 2 parts:

PART 1: Building blocks of challenge-based methodologies (2ECTS)
1. The Citizen-centric multi-stakeholder approach: quadruple-helix.
2. The foundations of Challenge based-learning.
3. Challenge-based research and innovation tools at UAB.
4. Evaluating, assessing and reporting the impact of actions on Challenges.
5. Sustainability and mid-long term approaches for impact.

PART 2: Challenge design (4 ECTS)
1. The UAB campus as a living lab for challenge resolution: A critical approach
2. Building blocks of Citizen Science. Citizen-centric knowledge generation
3. Introduction to LaTeX for scientific reporting. Version 1.0 of the report
4. Identifying the maturity of a solution. Case study: AI for challenge resolution.
5. Preparation of the presentation for the Challenge-solving project: Elavator pitch, structure and media.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
HANDS-ON PROJECT DEVELOPMENT	24	0.96	CM22, SM27
LECTURES WITH THE THEORETICAL FOUNDATIONS	26	1.04	KM29
Type: Autonomous			
GROUP PROJECT DEVELOPMENT	30	1.2	CM22, KM29
INDIVIDUAL STUDY	36	1.44	KM29, SM27
PROJECT DEVELOPMENT IN FIELD	26	1.04	CM22, SM27

The course is based on a practical implementation aimed at solving challenges.

The sessions will be structured around 2 different parts: 1) Building blocks of challenge-based methodologies (2ECTS), and 2) Challenge design (4 ECTS). For each topic, students will be provided with the fundamental theoretical concepts, which will be applied in the context of challenge-based innovation approaches.

The citizen-centric approach will be a recurrent pivotal point in the discourse of the subject: The Citizen as member of the Community and as an actor for challenge-solving. Renowned experts will provide open discussions during class hours with the aim of generating a modern and real-world critical vision.

Students will participate actively through field trips, in real open urban environments. The Campus of the UAB will be the living lab of reference to address challenges, which will be connected to the similar challenges appearing in different cities. Students will participate in all parts of the challenge definition life-cycle, and will have assigned specific roles, so that their teaching experience will be implemented in a living lab model approach.

From these actions, students will engage in groups in a process to generate a deliverable for one specific challenge definition, interacting with stakeholders under the supervision of the teaching staff. An evaluation of the challenge definition provided will be carried out based on contents and impact of the project, in such a way that students must demonstrate their ability to manage the process and point out potential measures of its socio-economic and transformation impact.

This methodological vision allows working cooperatively in complex or uncertain environments and with limited resources, in a multidisciplinary context, assuming and respecting the role of the different members of the team.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
DOCUMENT OF THE CHALLENGE DEFINITION	70%	4	0.16	CM22, SM27
PRESENTATION OF THE CHALLENGE IDENTIFICATION	30%	4	0.16	CM22, KM29

Each part of the subject will be associated with a deliverable with a relative weight on the final grade.

Deliverables:

1. D1: PRESENTATION OF THE CHALLENGE IDENTIFICATION (30%)
2. D2: CHALLENGE DEFINITION DOCUMENT (70%)

Final grade = Grade_D1*0.3 + Grade_D2*0.7

To pass the subject the student must have a 5 in all two deliverables. Conversely, the student should resubmit the work in a new delivery.

Bibliography

[1] Bilkis, M., Moyà Kohler, J. & Vilariño, F. (2024). "Challenge-device-synthesis: A multi-disciplinary approach for the development of social innovation competences for students of artificial Intelligence". In proceeding of Edulearn 2024. Palma (SPain)

[2] ECIU. (2021). "ECIU Challenges". Retrieved from: https://challenges.eciu.org

[3] Knapp, J. et at. (2016) "Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days". Simon& Schuster; 1 edition.

[4] Imanbayeva, A. (2021). "Challenge-based learning ECIU. Teamcher toolkit."

[5] Universidad de Monterrey. (2015). "Challenge based learning". EduTrends.

[6] van Urk, F., Vilariño, F. et al. (2023). "Challenge-based research for a stronger and more sustainable Europe. How Challenge-Based Research enhances the impact-driven approach of Europe and European universities". ECIU University.

Software

LaTeX - A document preparation system. https://www.latex-project.org

Language list

Name	Group	Language	Semester	Turn

(PLAB) Practical laboratories	1	Catalan	second semester	afternoon
(PLAB) Practical laboratories	2	Catalan	second semester	afternoon
(PLAB) Practical laboratories	3	Catalan	second semester	afternoon
(TE) Theory	1	Catalan	second semester	afternoon