Course guide
205079 - 205079 - Agile Methodologies and Processes for Innovative Solutions

Last modified: 11/04/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).
MASTER'S DEGREE IN RESEARCH IN MECHANICAL ENGINEERING (Syllabus 2021). (Optional subject).
MASTER'S DEGREE IN MECHANICAL ENGINEERING RESEARCH (Syllabus 2024). (Optional subject).
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2025). (Optional subject).

Academic year: 2025 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Marcel Macarulla Martí

Others: Jordina Arcal Cunillera
Marc Nicolau Martínez

TEACHING METHODOLOGY

The class combines the following teaching methodologies:
- In-class lectures: In these lectures the teacher will introduce the students to the basic concepts, methodologies, techniques & processes. These lectures will be highly engaging to motivate students to share related experiences & relevant examples

- Radical collaboration sessions: In these sessions the teacher will introduce the students to several team ideation techniques to provide the students with the creative confidence and tools to improve their collaboration skills and creativity.

- Team activities & homework: This course is based in learning by doing techniques, so students will unlock their creative potential & spur new ways of thinking through weekly activities that culminate in a motivating & fun challenge.

LEARNING OBJECTIVES OF THE SUBJECT

In this course students will learn new cutting edge techniques to manage teams, projects and processes to deliver faster robust solutions to the market, boosting competitiveness & innovation based on Agile methodologies. By the use of User Centered Design students will practice how to guide teams into the unknown through the process of experimentation. They will get familiar with tools to help them understand user needs, generate innovative solutions, learn faster & reduce the risks of launching new ideas through Minimum Viable Products (MVPs). These solutions will be designed and developed for 3D printing production, solving a real challenge proposed by an innovative company.

STUDY LOAD

Type	Hours	Percentage
Hours small group	10,5	14.00
Self study	48,0	64.00
Hours large group	16,5	22.00

Total learning time: 75 h

CONTENTS

Module 1: Introduction to Agile Management

Description:
In this module agile management process and tools will be exposed. In addition, it will be presented a set of team collaboration tools that can be used to work with agile methodologies.

Full-or-part-time: 11h
Theory classes: 4h
Self study : 7h

Module 2: Introduction to User Centered Design, a process for creative problem solving

Description:
In this module it will be explained what is User centered Design and it will be justified the importance of this discipline. The User centered Design process and tools will be presented focusing on:
- Phases and outcomes (innovation and impact)
- Research techniques to understand people and identify user needs
- Empathy and interpreting reality (the environment, pain points & shortcuts)
-Workflow, personas and their needs
- Mapping user needs
- Looking for patterns (Insights/opportunities)
- Communicating research

Full-or-part-time: 11h
Theory classes: 4h
Self study : 7h

Module 3: Introduction to 3D printing design

Description:
In this module students will learn the 3D printing best practices for final part production. This knowledge will be delivered by HP's engineers.

Full-or-part-time: 14h
Theory classes: 5h
Self study : 9h

Module 4: Deep dive into Agile Management and User Centered Design

Description:
In this module students will deep dive into Agile Management and User Centered Design using a case study. Students will develop in groups a product following the principals of Agile Management and User Centered Design. Finally the product will be produced using HP's 3D printing technology (Multi Jet Fusion)

Full-or-part-time: 28h
Theory classes: 10h
Self study : 18h

Module 5: Value proposition and lean canvas

Description:
In this module students will learn how to assess the value of a new product and how to apply the lean canvas method. This module also will go in depth in how to analyze the costs of a product produced using the 3D printing technology. Students will apply the explained concepts in order to analyze the viability & feasibility of the created product during the course.

Full-or-part-time: 11h
Theory classes: 4h
Self study : 7h

GRADING SYSTEM

The final mark depends on two metrics, homework and continuous evaluation (50%) and the final presentation (50%).

BIBLIOGRAPHY

Basic:
- Kelley, David; Kelley, Tom. Creative confidence: unleashing the creative potential within us all. London: William Collins, 2013. ISBN 9780008139384.
- Knapp, J.; Zeratsky, J.; Kowitz, B. Sprint: how to solve big problems and test new ideas in just five days. London: Bantam Press, 2016. ISBN 9780593076118.
- Fitzpatrick, Rob. The MOM test: how to talk customers and learn if your business is a good idea when everyone is lyint to you. Leipzig: Founder Centric, 2014. ISBN 9781492180746.
- Osterwalder, Alex [et al.]. Value proposition design: how to create products and services customers want: get started with--: bad value proposition design: a guide to burning cash, communicating poorly, and spending your short life building stuff nobody wants. Hoboken: John Wiley & Sons, 2014. ISBN 9781118968055.
- IDEO. The field guide to human-centered design: design kit. San Francisco: IDEO, 2015. ISBN 9780991406319.
- Jongerius, Pieter. Get Agile: Scrum for UX, design and development. Amsterdam: BIS Publishers, 2012. ISBN 9789063693022.

Complementary:
- Ries, Eric. The lean startup: how today's entrepreneurs use continuous innovation to create radically successful businesses [on line]. New York: Crown Business, 2011 [Consultation: 23/04/2025]. Available on: https://research-ebsco-com.recursos.biblioteca.upc.edu/plink/b5a19109-b87a-3314-b122-ec181e103b05. ISBN 9780307887917.
- Kolko, Jon. Exposing the magic of design: a practitioner's guide to the methods and theory of synthesis. Oxford: Oxford University Press, 2011. ISBN 9780190276218.
- Portigal, Steve. Interviewing users: how to uncover compelling insights. Brooklyn, NY: Rosenfeld Media, 2013. ISBN 9781933820118.
- Maeda, John. The laws of simplicity: design, technology, business, life. Cambridge (Mass.): MIT Press, 2006. ISBN 9780262134729.
- Gothelf, Jeff. Lean vs. agile vs. design thinking: what you really need to know to build high-performing digital product teams. Unites states: Sense & respond press, 2017. ISBN 9780999476918.