Course guide
295107 - 295II015 - Technological Innovation

Last modified: 04/06/2026

Unit in charge: Barcelona East School of Engineering
Teaching unit: 732 - OE - Department of Management.

Degree: MASTER'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2019). (Compulsory subject).
MASTER'S DEGREE IN INTERDISCIPLINARY AND INNOVATIVE ENGINEERING (Syllabus 2019). (Compulsory subject).
ERASMUS MUNDUS MASTER IN SUSTAINABLE SYSTEMS ENGINEERING (EMSSE) (Syllabus 2024). (Optional subject).
MASTER'S DEGREE IN MECHANICAL TECHNOLOGIES (Syllabus 2024). (Optional subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: JORGE OLIVELLA NADAL

Others: Primer quadrimestre:
JORGE OLIVELLA NADAL - Grup: T11, Grup: T12
JORDI VILA CASTAÑER - Grup: T11, Grup: T12

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMUEQ-09. Manage Research, Development and Technological Innovation, taking into account the transfer of technology and property and patent rights
CEMUEII-05. Apply predictive analytics to identify risks and opportunities for innovation in different areas of the company, planning and managing a project to create a new technological product and its business model.
CEMUEQ-10. To adapt to the structural changes of society motivated by factors or phenomena of an economic, energetic or natural character and to contribute with technological solutions with a high commitment of sustainability
CEMUEII-07. Identify and evaluate internal and external technologies, both consolidated and emerging, and propose management actions in accordance with the company's strategy. Plan and manage RDI projects and recognize the procedures to obtain public-private financing for the mentioned projects.

Generical:
CGMUEQ-04. To carry out the appropriate research, undertake the design and manage the development of engineering solutions, in new or little known environments, relating creativity, originality, innovation and technology transfer
CGMUEQ-09. Communicate and discuss proposals and conclusions in multilingual, specialized and non-specialized forums, in a clear and unambiguous way
CGMUEQ-10. Adapt to changes, being able to apply new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit
CGMUEII-03. Analyze the economic, social and environmental impact of technical solutions to base strategic decisions on criteria of objectivity, transparency and professional ethics.
CGMUEII-04. Transfer technological solutions in the form of products, services, processes or facilities in an efficient and sustainable manner, with an attitude of leadership and entrepreneurial spirit.

Transversal:
01 EIN. ENTREPRENEURSHIP AND INNOVATION: Knowing about and understanding how businesses are run and the sciences that govern their activity. Having the ability to understand labor laws and how planning, industrial and marketing strategies, quality and profits relate to each other.
02 SCS. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.

LEARNING RESULTS

Knowledges:
K.05. Identify emerging technologies, both in the mechanical domain and in the field of new information and communication technologies, that can be applied to mechanical engineering projects.

Skills:
S.04. Incorporate sustainability and energy efficiency criteria into the design, planning, execution and operation phases of engineering projects.
S.05. Critically examine the results of the analysis of a process or product, taking into account the limitations of the techniques used.
S03. Develop the ability to contribute to innovation in new or existing institutions and business organisations by participating in creative projects, and apply competencies and knowledge related to entrepreneurship, organisation and technology-based business development.
S04. Understand advanced digital technologies so that they can be applied critically in diverse contexts such as data analysis, multiscale modelling, technoeconomic analysis and environmental systems analysis.
S02. Educate well-trained and enthusiastic professionals with broad multidisciplinary knowledge of tools and technologies for sustainable systems engineering. Training takes place in an international and multicultural environment to stimulate global collaboration in addressing complex challenges in a wide range of application fields, such as logistics, transport, advanced production systems, energy systems management and health improvement.

Competences:
C.01. Recognise the complexity of the economic and social phenomena typical of a welfare society in order to relate welfare to globalisation and sustainability, and use techniques, technology and principles of economics and sustainability in a balanced and compatible way.
C.04. Ensure, within the limits of one’s professional competence, compliance with ethical standards, professional guidelines and current legislation regarding fundamental rights, taking into account the goal of reducing inequalities, the gender perspective, and the principles of accessibility, inclusion and non-discrimination in the design of technical solutions and in the management of projects and teams.
C01. Identify the complexity of economic and social phenomena in the welfare society to relate well-being to globalisation and sustainability and use technique, technology, economics and sustainability in a balanced and compatible manner.
C04. Ensure compliance with ethical standards, professional guidelines and current legislation in professional practice in the field of respect for fundamental rights, and consider the reduction of inequality, the gender perspective and the principles of accessibility, inclusion and non-discrimination in the design of technical solutions and in project and team management.
C02. Work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY

The teaching of the course is based on different methodologies (Master classes, seminars, workshops, projects) prioritizing active learning and "learning by doing" through exercises and team projects.

LEARNING OBJECTIVES OF THE SUBJECT

This course aims to provide students with an experience-based introduction into the technology-based innovation. A real life simulation of the process that innovators go through when considering a technological business opportunity witll be performed. To do so, the different steps of the innovation process will be considered. In particular, the phases consdered will be: (1) analysis of a technology opportunity, (2) definition of a proposal, and (3) presentation of a proposal.

At the end of the course, the student will be able to use the tools analysis of analysis that are used in the innovation world to assess a technological business opportunity and to present the results appropriately.

STUDY LOAD

Type	Hours	Percentage
Self study	96,0	64.00
Hours large group	40,5	27.00
Hours small group	13,5	9.00

Total learning time: 150 h

CONTENTS

Analysis of a technological opportunity

Description:
Obtaining of information
Level of development
Comparison of alternatives
Technology forecasting

Full-or-part-time: 37h 30m
Theory classes: 13h 30m
Self study : 24h

Innovation tools

Description:
Value Chain/Industry Structure
Customer Experience (CX)
Business Model Innovation
Finantial Appraisal

Full-or-part-time: 37h 30m
Theory classes: 13h 30m
Self study : 24h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

Coursework from Block 1: 30%
Mid-term project document and presentation: 20%
Coursework from Block 2: 30%
End-of-course project document and presentation: 20%
There is no resit/retake for this subject.

BIBLIOGRAPHY

Basic:
- Lannon, John M. Technical communication [on line]. 14th ed. Boston: Pearson Education Limited, [2016] [Consultation: 14/09/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5186037. ISBN 9781292154305.
- Osterwalder, Alexander; Pigneur, Yves; Clark, Tim. Business model generation : a handbook for visionaries, game changers, and challengers [on line]. Hoboken, New Jersey: John Wiley & Sons, cop. 2010 [Consultation: 14/09/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=581476. ISBN 9780470876411.
- Trott, Paul. Innovation management and new product development. Sixth Edition. Harlow: Pearson, [2017]. ISBN 9781292133423.
- Olivella Nadal, Jordi. Technology evaluation for entrepreneurs [on line]. Copenhagen: Bookboon.com, 2018 [Consultation: 14/09/2022]. Available on: https://yourknow.com/uploads/books/technology-evaluation-for-entrepreneurs.pdf. ISBN 9788740323603.
- Bombardó, C.; Aguilar, M. ; Barahona, C. Technical writing : a guide for effective communication [on line]. Barcelona: Edicions UPC, 2007 [Consultation: 08/02/2018]. Available on: http://hdl.handle.net/2099.3/36667. ISBN 9788483019276.