Course Unit	Thesis/FinalProject/Internship			Field of study	Chemical Engineering								
Master in	Chemical Engineering			School	School of Technology and Management								
Academic Year	2023/2024	Year of study	2	Level	2-2	ECTS credits	42.0						
Type	Annual	Semester	-	Code	6362-756-2001-00-23								
Workload (hours)	1 134	Contact hours	T -	TP 50	PL -	TC -	S 10	E -	OT 30	O -			

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): Simão Pedro de Almeida Pinho

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Demonstrate the acquisition of knowledge on research methodologies
2. Identify and interpret the importance of innovation on the engineering and entrepreneurship activities. Know mechanisms to create technological based enterprises and to protect intellectual property
3. Acquire knowledge on chemical engineering emerging issues, through assistance of seminars
4. Demonstrate the acquisition of knowledge on product engineering. Identify and analyse the steps involved in the development of new products
5. Prepare a state-of-the-art of a given R&D subject or chemical engineering professional application
6. Perform a scientific research/project work/professional internship, with publication of the obtained results through the elaboration of a master thesis/project report/internship report

Prerequisites

Before the course unit the learner is expected to be able to:
Demonstrate strong knowledge on the main chemical engineering phenomena and processes

Course contents

Research methodologies and project preparation. Creation of technological based enterprises. Seminars/Workshops. Research thesis/project/internship.

Course contents (extended version)

1. Research Methodologies and Project Preparation (7 ECTS)
   - processes, methodologies and practices associated to scientific research in engineering
   - project preparation on the subject proposed to the scientific research/project/internship
2. Creation of Technological Based Enterprises (2 ECTS)
   - identification of opportunities of technological innovation and corresponding market valorisation
   - technological commercialisation sequence
   - intellectual property protection and identification of funding resources for new businesses
3. Seminars/Workshops (3 ECTS)
   - assistance of seminars given by professors from DTQB and by external personalities
   - steps involved in the development of new products
   - process engineering versus product engineering
   - commodities versus specialties
   - case studies
4. Scientific research/project/internship (30 ECTS)
   - development of a scientific research/project/professional internship with the publication of results

Recommended reading

1. Richard C. Dorf; Thomas H. Byers, Technology Ventures: From Idea to Enterprise, McGraw Hill, 2004.
2. Jack M. Kaplan, Anthony C. Warren, Patterns of Entrepreneurship, John Wiley & Sons, 2nd edition, 2006.
3. Jeffry A. Timmons; Stephen Spinelli, New Venture Creation: Entrepreneurship for the 21st Century, 6ª Ed. , McGraw Hill-Irwin, 2004.
4. David Probert et al. , Technology Roadmapping, Research Technology Management, 46, 2; pg. 27-59 (2003).
5. E. L. Cussler and G. D. Moggridge, Chemical Product Design, Cambridge University Press.

Teaching and learning methods

Contact hours: 10 hours of theoretical-practical classes on research methodologies, 60 h of supervising on project preparation and development of the scientific research/project/internship, 20 h of theoretical-practical classes on innovation, 30 h on seminars. The non contact period (1000 h) corresponds to the time needed for the student to work on the scientific research/project/internship.

Assessment methods

- Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)
  - Development Topics - 12% (Research, innovation, seminar /workshops methodologies: modules and evaluation)
  - Presentations - 17% (State of the art or project evaluation)
  - Projects - 71% (Final discussion and evaluation of the Dissertation / Project / Professional Internship)

Language of instruction

English

Electronic validation

Simão Pedro de Almeida Pinho	Hélder Teixeira Gomes	José Carlos Rufino Amaro
01-03-2024	13-03-2024	16-03-2024