COURSE DATA

DATA SUBJECT

Code: 46553
Name: Comprehensive management of quality, safety and innovation I
Cycle: Master's Degree
ECTS Credits: 4
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2261 - Master's Degree in Chemical Engineering	Escola Tècnica Superior d'Enginyeria	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2261 - Master's Degree in Chemical Engineering	Comprehensive management of quality, safety and innovation	COMPULSORY

COORDINATION

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SUMMARY

4,0 ECTS compulsory subject in the first semester of the Master in Chemical Engineering, which is taught in Spanish. This course is part of the whole area of integral Management of the quality, of the security and of the innovation (7,0 ECTS), that finds in the management and production optimization and sustainability module. It consists of 2 distinct thematic blocks in which the course is structured: Quality management, industrial safety and occupational risk prevention and management innovation.

The course contents are summarized as: quality, environment, PRL, quality management: business management standard scopes. Implementation and management system audits. Preparation of technical reports and scientific papers. Project management of technological innovation. Impact and feasibility of projects of technological innovation Sources of information and funding R + D + I. Strategy for protection and exploitation of R + D + I.

LEARNING OUTCOMES (RD 1393/2007): To gain knowledge about quality management. To know and know how to apply quality management tools and methodologies. To know the functioning of standarized management systems. To understand the operation of the standardized quality management systems. To

learn the basic principles of audits as a management tool. To know the organisms and institutions related to industrial safety, prevention of occupational risks, quality and R-D-i. To be able to integrate or analyse innovation concepts and procedures in R.D+i into a project. To be able to communicate scientific aspects-technological mediating inform briefs or arguments at skilled forums. To acquire basic kens of culture of innovation and entrepreneurship. Understanding and applying the keys to the definition of the impact and management of technological innovation project. To know the various forms and sources of funding for R. D.i, the institutional strategic guidelines, the requirements and the associated documentation To know the various forms and sources of funding for R + D + i. To acquire basic knowledge about the protection and exploitation of intellectual property, scientific and technological dissemination and transfer of technology

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Some prior basic knowledge is recommended on the principles of quality.

COMPETENCES / LEARNING OUTCOMES

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Adapt to changes and be able to apply new and advanced technologies and other relevant developments with initiative and entrepreneurship.

Adapt to structural changes in society caused by economic, energy or natural factors or phenomena in order to solve resulting problems and provide technological solutions with a high commitment to sustainability.

Be able to access information tools in different areas of knowledge and use them properly.

Be able to analyse and synthesise for the continued progress of products, processes, systems and services while applying criteria of safety, affordability, quality and environmental management.

Be able to assess the need to complete their technical, scientific, language, computer, literary, ethical, social and human education, and to organise their own learning with a high degree of autonomy.

Be able to defend criteria with rigor and arguments and to present them properly and accurately.

Be able to take responsibility for their own professional development and specialisation in one or more fields of study.

Communicate and discuss proposals and conclusions in specialised and non-specialised multilingual forums, in a clear and unambiguous manner.

Conduct proper research, undertake the design and lead the development of engineering solutions in new or unfamiliar environments by linking creativity, originality, innovation and technology transfer.

Have skills for independent learning in order to maintain and enhance the specific competences of chemical engineering which enable continuous professional development.

Integrate knowledge and handle the complexity of formulating judgments and decisions, based on incomplete or limited information, which take account of the social and ethical responsibilities of professional practice.

Lead and define multidisciplinary teams which can make technical changes and address managerial needs in both national and international contexts.

Lead and manage, both technically and economically, projects, facilities, plants, companies and technological centres in the field of chemical engineering and related industrial sectors.

Lead and manage the organisation of work and human resources by applying criteria of industrial safety, quality management, risk prevention, sustainability and environmental management.

Manage and perform verification and control of facilities, processes and products, as well as certifications, audits, inspections, tests and reports.

Manage research, development and technological innovation taking into account the transfer of technology and the property and patent rights.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

DESCRIPTION OF CONTENTS

1. Quality management

1. Basic principles of quality, quality management and management systems.
2. Introduction to management systems: ISO 9001 and 14001 standards. HLS structure. Benefits of management systems. Continuous improvement and by process management. Implantation and Certification. Documented information.
3. ISO9001- ISO 14001 management systems: Requirements. Elements. Standard analysis.
4. Management tools and methodologies.

2. Innovation management at chemical engineering

1. Innovation in chemical engineering. Tools of an innovation project. Technological surveillance cycle.
2. Research, development and innovation programs (R+D+I). Regional, national and international public financing programs. Public procurement of innovation.
3. Design of R+D+i projects, feasibility, sustainability and impact.
4. Management of the protection and exploitation of R+D+I results.
5. Tools for the communication of R+D+I results.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	22,00
Seminar	1,50
Classroom practices	16,50
Total hours	**40,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	32,00
Independent study and work	16,00
Preparation of lessons	6,00
Preparation for assessment activities	6,00
Resolution of case studies	0,00
Total hours	**60,00**

TEACHING METHODOLOGY

The course will be developed through lectures and practical classes.

Classroom sessions: through participatory lectures, the main concepts will be developed to provide a comprehensive and integrated vision, analysing in detail the key and most complex aspects, promoting, at all times, student participation. Adequate resources for further preparation of the subject in depth by the student will be also recommended.

Practical activities: The practical sessions will complement the theoretical activities in order to apply the basics, and expand the knowledge and experience that the students acquired during the fulfilment of the proposed work. This will be done in the classroom or in small groups. The following types of classroom activities are included:

- Classes of exercises and questions in the classroom. The teacher will explain a number of standard exercises, which allow students to acquire the necessary skills to analyse, formulate and solve the problems of each subject. Some problems will be solved in practical sessions in small groups.
- Sessions for discussion and resolution of exercises. In these sessions the students will analyse and discuss a series of exercises or work previously posed by the teacher. These sessions will be conducted in small groups.
- Innovation project developed for students.

For the development of all these activities, both students and the teacher will use the "Aula Virtual" platform. An schedule will be proposed for the student works.

EVALUATION

The assessment of student learning will be carried out by

50% of the mark corresponds to the evaluation of the works. The remaining 50% will correspond to tests score. It will be a minimum requirement to pass the subject further from 4.5 in the exams.

The works of the innovation section will not be recoverable.

REFERENCES

Basic

Dirección estratégica de la innovación tecnológica Schilling, Melissa A | Madrid etc. : McGraw-Hill/Interamericana de España, cop. 2008. | [2ª ed.]

Ayudas a la I+D+i del Gobierno Español . URL: http://www.idi.mineco.gob.es/portal/site/MICINN

Ayudas a la I+D+i de la Comision Europea. URL: http://www.eshorizonte2020.es/ Normat iva Of icina Española de Patentes y Marcas. URL: http://www.oepm. es/es/propiedad_industrial/Normativa/normas_sobre_proteccion_de_invenciones/

Pastor Fernández, Andrés. Sistemas integrados de gestión. Cádiz: Universidad de Cádiz, 2013. Print. - González Gaya, Cristina, and Carlos Manzanares Canizares. Sistemas de gestión de la calidad ISO 9001: guía de aplicación. Madrid: Universidad Nacional de Educación a Distancia, 2020.

Bovea Edo, María Dolores, Francisco J Colomer Mendoza, and Valeria Ibáñez Forés. Gestión ambiental en la empresa. Castelló de la Plana: Universitat Jaume I. Servei de Comunicació i Publicacions, 2013. Print.

Additional

Jussi Moisio, Kari Tuominen - Deploying the integrated management system : quality, environment, and health and safety [ISO 9001, ISO 14001, OHSAS 18001] : self-assessment work book : 59 probing questions and contrasting pairs of examples : what separates the successful from the average?

Germán Burriel LLuna. Sistemas de gestión de riesgos laborales e industriales. Fundación MAPFRE.

Adam, Patricia A. Agile in ISO 9001: How to Integrate Agile Processes into Your Quality Management System. Cham: Springer International Publishing AG, 2023. Web.

Field, Alan. ISO 50001: A Strategic Guide to Establishing an Energy Management System. IT Governance Publishing, 2019. Web.

Naeem Sadiq, Asif Hayat Khan. ISO 14001 Step by Step - A Practical Guide: Second Edition. 2nd ed. Ely: IT Governance Publishing, 2019. Print.