

Master in Chemical Engineering



Places available (2021/22): **25***
Official Code: **9461**
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*For students not currently attending MIEQ

GENERAL OBJECTIVES DEFINED FOR THE STUDY CYCLE

Prepare students for a professional career in practical or research activities in Chemical Engineering or related areas. Emphasizing a practical engineering culture simultaneously with the design activity, the syllabus offers students the possibility to acquire specific skills in one of the following specialisation:

- i.** Processes and Product;
- ii.** Energy;
- iii.** Biotechnology;
- iv.** Environment.

LEARNING GOALS

From the training perspective, the Master in Chemical Engineering promotes the development or acquisition of the following skills:

- i.** Analyze and solve, in a scientific and systematic way, fundamental and complex problems in Chemical Engineering and related areas, using innovative methods;
- ii.** Be aware and apply the available methods for the conception, design, implementation and operation of systems in industrial and social contexts, as well as in the development of new products, processes and methodologies;
- iii.** Independently plan and execute research activities, either theoretical or experimental;
- iv.** Be able to work and communicate in multidisciplinary teams, in a national or international context.

TEACHING AND LEARNING METHODOLOGIES

Chemical Engineering is the transversal training base in the programme, with the possibility of specialization in one of four domains, along with training in the areas of management, safety, quality and soft skills. The practice of engineering is emphasized through a pedagogical perspective in constant renewal, combined with a learning scheme focused in the engineering design extended to areas related to Chemical Engineering.

In addition to a set of transversal course units, the student's path includes specific contents according to the chosen specialization, as well as optional course units, related or not with that same specialization. The teaching methods favor a more applied and practical training, with the students having a greater autonomy, and with predominance of continuous / distributed assessment practices.

STUDY PLAN



SPECIALISATION: PROCESSES AND PRODUCT

1st YEAR

1 st SEMESTER	Credits
. Chemical Engineering and Sustainability	6
. Chemical Engineering Laboratories I	6
. Elements of Industrial Management	6
. Product Engineering	6
. Reaction Engineering III	6

2 nd SEMESTER	Credits
. Transferable Skills	1.5
. Quality and Safety	4.5
. Chemical Engineering Laboratories II	6
. Numerical Simulation Applied to Chemical Engineering	6
. Process Dynamics and Control	6

Optional Course Units (6 Credits)

. Environmental Technology	6
. Industrial Chemistry for the Chemical Engineering	6
. Industrial Facilities and Construction	6
. Polymeric Materials in Industry	6

2nd YEAR

1 st SEMESTER	Credits
. Decision and Optimization Methods in Chemical Processes	6
. Industrial Automation and Multivariate Data Processing	6
. Engineering Project	12

Optional Course Units (6 Credits)

. Introduction to Nanotechnology	6
. Petroleum Engineering and Refining and Petrochemical Processes	6
. Any curricular unit of U.Porto	6

2 nd SEMESTER	Credits
. Dissertation	30



SPECIALISATION: ENERGY

1st YEAR

1 st SEMESTER	Credits
. Chemical Engineering and Sustainability	6
. Chemical Engineering Laboratories I	6
. Elements of Industrial Management	6
. Renewable Energies I	6
. Thermal Energy and Energetic Efficiency	6

2 nd SEMESTER	Credits
. Transferable Skills	1.5
. Quality and Safety	4.5
. Chemical Engineering Laboratories II	6
. Process Dynamics and Control	6
. Renewable Energies II	6

Optional Course Units (6 Credits)

. Environmental Technology	6
. Industrial Chemistry for the Chemical Engineering	6
. Industrial Facilities and Construction	6
. Polymeric Materials in Industry	6

2nd YEAR

1 st SEMESTER	Credits
. Decision and Optimization Methods in Chemical Processes	6
. Renewable Energies III	6
. Engineering Project	12

Optional Course Units (6 Credits)

. Introduction to Nanotechnology	6
. Petroleum Engineering and Refining and Petrochemical Processes	6
. Any curricular unit of U.Porto	6

2 nd SEMESTER	Credits
. Dissertation	30



**SPECIALISATION:
BIOTECHNOLOGY**

1st YEAR

1 st SEMESTER	Credits
. Bioresources Engineering	6
. Chemical Engineering and Sustainability	6
. Elements of Industrial Management	6
. Protein Engineering	6
. Separation Processes in Biotechnology	6

2 nd SEMESTER	Credits
. Transferable Skills	1.5
. Quality and Safety	4.5
. Enzyme Engineering	6
. Fermentation Engineering	6
. Process Dynamics and Control	6

Optional Course Units (6 Credits)

. Environmental Technology	6
. Industrial Chemistry for the Chemical Engineering	6
. Industrial Facilities and Construction	6
. Polymeric Materials in Industry	6

2nd YEAR

1 st SEMESTER	Credits
. Biomolecular and Metabolic Engineering	6
. Decision and Optimization Methods in Chemical Processes	6
. Engineering Project	12

Optional Course Units (6 Credits)

. Introduction to Nanotechnology	6
. Petroleum Engineering and Refining and Petrochemical Processes	6
. Any curricular unit of U.Porto	6

2 nd SEMESTER	Credits
. Dissertation	30



**SPECIALISATION:
ENVIRONMENT**

1st YEAR

1 st SEMESTER	Credits
. Chemical Engineering and Sustainability	6
. Chemical Engineering Laboratories I	6
. Elements of Industrial Management	6
. Gaseous Emissions Control and Management	6
. Solid Waste Treatment Technologies and Systems I	6

2 nd SEMESTER	Credits
. Transferable Skills	1.5
. Quality and Safety	4.5
. Chemical Engineering Laboratories II	6
. Environmental Quantitative Risk Analysis	6
. Process Dynamics and Control	6

Optional Course Units (6 Credits)

. Environmental Technology	6
. Industrial Chemistry for the Chemical Engineering	6
. Industrial Facilities and Constructions	6
. Polymeric Materials in Industry	6

2nd YEAR

1 st SEMESTER	Credits
. Decision and Optimization Methods in Chemical Processes	6
. Water Treatment Technologies and Systems I	6
. Engineering Project	12

Optional Course Units (6 Credits)

. Introduction to Nanotechnology	6
. Petroleum Engineering and Refining and Petrochemical Processes	6
. Any curricular unit of U.Porto	6

2 nd SEMESTER	Credits
. Dissertation	30

A3ES

Agência de Avaliação e Acreditação do Ensino Superior

Credits in ECTS (European Credit Transfer System)