



UNIVERSIDAD
COMPLUTENSE
MADRID



Bachelor's Degree
Engineering

Chemical
Engineering Degree

Syllabus

| Course Type | ECTS |
|---------------------------------|------------|
| Compulsory Core Courses | 60 |
| Compulsory Courses | 141 |
| Elective Courses | 24* |
| Bachelor's Degree Final Project | 15 |
| Total | 240 |

* It includes 6 ECTS for External Internships.

| First Year | ECTS |
|-----------------------------------|------|
| Materials Science | 6 |
| Applied Statistics | 6 |
| Physics | 9 |
| Chemical Engineering Fundamentals | 9 |
| Applied Computer Sciences | 6 |
| Mathematics I | 9 |
| Industrial Organization | 6 |
| Basic Chemistry | 9 |

| Second Year | ECTS |
|--------------------------------------|------|
| Applied Graphic Expression | 6 |
| Introduction to Biochemistry | 3 |
| Mathematics II | 9 |
| Fluid Mechanics | 9 |
| Analytical Chemistry | 9 |
| Organic Chemistry | 9 |
| Applied Thermodynamics | 6 |
| Thermodynamics and Chemical Kinetics | 9 |

| Third Year | ECTS |
|----------------------------------|------|
| Process Engineering | 12 |
| Chemical Reaction Engineering | 12 |
| Thermal Engineering | 9 |
| Separation Processes | 12 |
| Processes Simulation and Control | 9 |
| Environmental Technology | 6 |

| Fourth Year | ECTS |
|--------------------------------------|------|
| Electrical and Automatic Engineering | 6 |
| Mechanical Engineering | 6 |
| Projects in Chemical Engineering | 9 |
| Four Elective Courses | 24 |
| Bachelor's Degree Final Project | 15 |

| Elective Courses | ECTS |
|--|------|
| Advanced Separation Processes | 6 |
| Industrial Chemical Analysis | 6 |
| Industrial Biochemistry | 6 |
| Climate Change | 6 |
| Production Management | 6 |
| Quality, Environmental and Safety Management | 6 |
| Environmental Engineering | 6 |
| Bioprocess Engineering | 6 |
| Particle Technology | 6 |
| Consumer Chemicals | 6 |
| Industrial Organic Chemistry | 6 |
| External Internship | 6 |

| Participation Credits | ECTS |
|-----------------------|------|
| Any course | 6 |



Knowledge acquired

- Mathematical problems in engineering: linear algebra, geometry, differential geometry, differential and integral calculus, ordinary and partial differential equations, numerical methods, numerical algorithms, statistics and optimisation.
- Fundamentals of the general laws of mechanics, thermodynamics, electromagnetic fields and waves.
- Computer programmes, operating systems, databases and computer applications.
- Application of basic concepts of chemistry to engineering.
- Graphical techniques, spatial conception, standardization, computer-assisted design and fundamentals of industrial design.
- Company concept. Institutional and legal framework of the company. Business organization and management. Marketing.
- Applied thermodynamics and heat transfer.
- Basic principles in fluid mechanics.
- Fundamentals of materials science.
- Principles of circuit theory and electrical machines.
- Fundamentals of electronics.
- Fundamentals of automatism and control methods.
- Fundamentals of machines and mechanisms.
- Fundamentals of materials resistance.
- Industrial production systems.
- Environmental technologies and sustainability.
- Project planning and management.
- Solving materia and energy balances.
- Biotechnology concepts, mass transfer, separation processes and chemical reaction engineering. Reactor designing. Transformation of raw materials and energy resources.
- Analysis, design, simulation and optimisation of processes and products.
- Applied experimental procedures.
- Instrumentation of chemical processes.
- Practical applications of chemical and biochemical analysis and synthesis in Chemical Engineering.
- Data analysis from laboratory observations and measurements. Their significance and the theories behind their interpretation.

Professional opportunities

- Chemical industry.
- Pharmaceutical sector.
- Industrial Biotechnology sector.
- Environmental sector.
- University teaching.
- Scientific research.





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Grados UCM



Faculty of Chemical Sciences

Campus de Moncloa
quimicas.ucm.es

For further information: www.ucm.es/estudios/grado-ingenieriaquimica

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