



UNIVERSIDAD  
COMPLUTENSE  
MADRID



Bachelor's Degree  
Engineering

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Chemical  
Engineering

# Syllabus

COURSE TYPE	ECTS
Compulsory Core Courses	60
Compulsory Courses	141
Elective Courses	24 *
Bachelor's Degree Final Project	15
<b>Total</b>	<b>240</b>

\* 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 matter 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.
- Industrial Security. Analysis and evaluation of risks.

- Economic analysis of chemical processes.
- Knowledge of the basic aspects and methodology, organization, and management of Chemical Engineering projects.
- Write, plan, execute and direct industrial projects in the field of Chemical Engineering.

## 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](http://quimicas.ucm.es)

For further information: [www.ucm.es/estudios/grado-ingenieriaquimica](http://www.ucm.es/estudios/grado-ingenieriaquimica)

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