UNIVERSIDAD COMPLUTENSE MADRID

Double Bachelor's Degree

Faculty of Chemical Sciences

Chemistry / Biochemistry

Syllabus

COURSE TYPE	ECTS
Compulsory Core Courses	78
Compulsory Courses	174
Elective Courses	66*
Bachelor's Degree Final Project	36
Total	**354**

* They correspond to 66 ECTS in a closed elective offer.

FIRST YEAR	ECTS
Biology	12
General Biochemistry	6
Applied Statistics and Numerical Methods	6
General Physics	9
General Biology Laboratory	6
General Chemistry Laboratory	6
Mathematics	9
General Chemistry	12
Techniques of Biochemical Analysis I	6

SECOND YEAR	ECTS
Biosynthesis of Macromolecules *	6
Materials Science	6
Enzymology	6
Structure of Biological Membranes	6
Protein and Nucleic Acid Structure *	9
Applied Computer Chemistry	6
Laboratory of Biochemistry and Molecular Biology I	9
Laboratory of Biochemistry and Molecular Biology II	6
Regulation of Metabolism	6
Cell Signalling	6
Techniques of Biochemical Analysis II *	6

* They correspond to a closed elective offer.

THIRD YEAR	ECTS
Clinical Biochemistry	6
Genetic Engineering	6
Integrated Laboratory of Biomedical Applications	6
Clinical Microbiology, Parasitology and Virology	6
Molecular Pathology	6
Analytical Chemistry I *	9
Physical Chemistry I	12
Inorganic Chemistry I	12
Organic Chemistry I *	12

* They correspond to a closed elective offer.

FOURTH YEAR	ECTS
Fundamentals of Bioreactors Design	6
Fundamentals of Biochemical Engineering	6
Immunology	6
Integrated Laboratory of Biotechnology	6
Biotechnological Processes *	6
Analytical Chemistry II *	9
Physical Chemistry II	12
Inorganic Chemistry II	12
Organic Chemistry II *	12

* They correspond to a closed elective offer.

FIFTH YEAR	ECTS
Biophysics and Bioinformatics *	6
Integrated Laboratory of Biophysics and Bioinformatics *	6
Analytical Chemistry III *	6
Design and Implementation of a Project in Chemistry	6
Bachelor's Degree Final Project (Chemistry)	18
Bachelor's Degree Final Project (Biochemistry)	18

* They correspond to a closed elective offer.

Knowledge acquired

- Designation and formulation of chemical compounds.
- Techniques of analysis and separation. Analytical chemistry as a metrological science.
- Bond, structure, properties, obtaining methods and chemical reactions.
- Fundamental aspects of inorganic chemistry. Experimental methods of synthesis and characterization of inorganic compounds.
- Principles of chemical and statistical thermodynamics.
- Quantum mechanics and its application to spectroscopy and the determination of the properties of atoms, molecules and solids.
- Structural bases of organic compounds and their physical, spectroscopic and chemical properties. Protocols for synthesis, isolation, and purification of organic compounds.
- Principles of mechanics and relationships with the movement of a particle and systems of particles and fluids.
- Mathematical foundations: variables and functions. Differential equations. Applied Statistics.
- Chemical Industry Processes.
- Biochemical concepts and principles.
- Physical principles involved in a biological process.
- Molecular mechanisms of metabolism.
- Transmission of genetic information at the molecular and cellular level.
- Molecular basis of pathological conditions.
- Recognition of tissues, cells, and subcellular organelles.
- Levels of structural organization of the proteins.
- Enzyme kinetics and enzyme regulation mechanisms
- Nucleic acids and genome organization.
- Isolation and quantification of biological macromolecules.
- Molecular mechanisms involved in physiological processes.
- Biotechnological applications.

Professional opportunities

This Joint (dual) Degree is designed to train professionals with a deep knowledge of the chemical basis of biological processes. Therefore, graduates will acquire a very appropriate and attractive educational background in many of the most advanced areas of research and industrial sectors (pharmaceutical, biotechnological, etc.) within the economy of developed countries.

- University teaching.
- Secondary school teaching.
- Scientific research.
- Chemists and biochemists in any institution of government agency, or in monopolies and state-owned companies (even indirectly), where this specific function is required.
- Chemists and biochemists for private firms (RTD, quality control, management, production, etc.).
- Chemical, pharmaceutical, food and biotechnology industries. Energy sector.
- Chemists for hygiene institutes.
- Customs chemists.
- QIR (Clinical Analysis, Clinical Biochemistry).
- Microbiology and parasitology.
- Immunology.
- Radiopharmacy.
- Specialist in Hospital radiophysics.

UNIVERSIDAD
COMPLUTENSE
MADRID

una europa

una-europa.eu

Grados UCM

Double Bachelor's Degree in Chemistry - Biochemistry

Fields of Study: Chemistry - Biochemistry and Biotechnology

Faculty of Chemical Sciences

Campus de Moncloa

quimicas.ucm.es

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

January 2026. The content of this brochure is subject to possible modifications

www.ucm.es