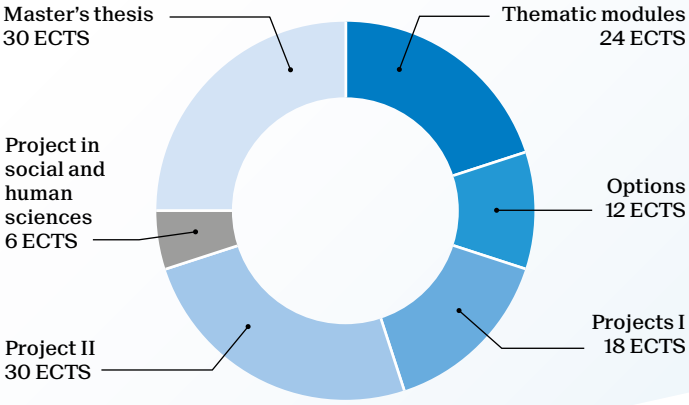
Master of Science in

MOLECULAR AND BIOLOGICAL CHEMISTRY

2-year program - 120 ECTS



Thematic modules and catalysis/ sustainability specialization

Students must choose 3 thematic modules. They may opt for a 30 ECTS catalysis/sustainability specialization. In this case, the sustainability module is mandatory and 16 ECTS of specialization labeled courses must be taken on top of the project in molecular sciences Ia.

	Spec.	Credits
Options		
Catalysis		
Advanced nuclear magnetic resonance	●	3
Bioprocesses and downstream processing	●	4
Biotechnology lab (for CGC)	●	4
Catalysis for emission control and energy processes	●	3
Electrochemical engineering	●	3
Heterogeneous reaction engineering	●	4
Sustainability		
Environmental Economics	●	4
Environmental system analysis and assessment	●	5
Fate and behaviour of environmental contaminants	●	4
Introduction to ethics and critical thinking	●	3
Legal aspect of sustainabilty & digitalization	●	5
Process intensification and green chemistry	●	3
Safety of chemical processes	●	2
Science of climate change	●	4
Sustainability and materials	●	3

Students may also opt for a 30 ECTS minor instead of the project in molecular sciences II.

Recommended minors:

- Materials science and engineering
- Physics

	Spec.	Credits
Thematic modules		**24**
Analytical and bioanalytical chemistry		8
Methods in drug development		3
Physical and chemical analyses of materials	●	3
Protein mass spectrometry and proteomics		2
Biological chemistry and biophysics		8
Cellular signaling		2
Frontiers in chemical biology		3
Nanobiotechnology and biophysics		3
Computational chemistry		8
Computational methods in molecular quantum mechanics		4
Understanding advanced molecular simulation		4
Inorganic chemistry		8
Catalysis for energy storage	●	3
Catalyst design for synthesis	●	2
Solid state chemistry and energy applications		3
Organic chemistry		8
Physical and computational organic chemistry		2
Structure and reactivity		3
Total synthesis of natural products		3
Physical chemistry		8
Molecular quantum dynamics		3
Optical methods in chemistry	●	3
Photochemistry I		2
Sustainability		8
Automated and data-driven laboratories	●	2
Sustainable chemicals manufacture: concepts/tools	●	4
Sustainable chemistry and engineering in industry	●	2
Options		**12**
Molecular and supramolecular science		
Artificial photosynthesis		2
Asymmetric catalysis for fine chemicals synthesis	●	3
Chemistry of f elements		2
Supramolecular chemistry		2
Physical and analytical chemistry		
AI for chemistry	●	2
Fundamentals of biosensors and electronic biochips		3
Machine learning for physicists	●	4
Molecular spectroscopy in chemistry		2
Photomedicine		2
Material science		
Nanomaterials		3
Organic electronic materials		4
Physical chemistry of polymeric materials		3
Polymer chemistry and macromolecular engineering		3
Food science		
Chemistry of food processes		2
Chimie des denrées alimentaires		2
Risk management	●	2
Projects I		**18**
Project in molecular sciences Ia	●	6
Project in molecular sciences Ib		12

School of Basic Sciences
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