



Study Plan

School: School of Sciences and Technology
Degree: Master
Course: Environmental Chemical Analysis (cód. 172)

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
QUI07866M	Sampling and Processing of Environmental Samples	Chemistry	6	Semester	156
MAT07867	Experimental Planning and Design	Mathematics	4	Semester	104
QUI07868	Atmospheric Pollution and Gas Emissions	Physics and Chemistry	4	Semester	104
QUI07869	Chemistry of Soil and Sediments	Chemistry	5	Semester	130
QUI07870M	Chemistry of Aquatic Systems	Chemistry	6	Semester	156
QUI07871	Toxicology of most Relevant Pollutants	Biochemistry	4	Semester	104

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
QUI07872M	Analysis, Treatment and Valuation of Liquid Waste	Chemistry	6	Semester	156
QUI07873	Analysis, Treatment and Valuation of Solid Waste	Chemistry	4	Semester	104
QUI07874	Planning, Management and Organisation of Analysis Laboratories	Chemistry	6	Semester	156
QUI07875	Quality, Standards and Certification of Laboratories	Chemistry	4	Semester	104
QUI07876M	Advanced Analytical Techniques I	Chemistry	6	Semester	156
QUI07877	Advanced Analytical Techniques II	Chemistry	5	Semester	130

2nd Year - 3rd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
QUI07878	Research Methodologies	Chemistry	2	Semester	52

Mandatory alternatives

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
	Dissertation				
	Internship				

2nd Year - *** TRANSLATE ME:4^o semestre ***

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
QUI08171M	Seminars	Chemistry	3	Year	24

Mandatory alternatives

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
	Dissertation				
	Internship				



Conditions for obtaining the Degree:

*** TRANSLATE ME: Para aprovação na componente curricular deste Mestrado, é necessário a aprovação (através de avaliação ou creditação), das seguintes unidades curriculares: { \ } newline

1.º Semestre { \ } newline

- 6 UC Obrigatórias num total de 29 ECTS { \ } newline

2.º Semestre { \ } newline

- 6 UC Obrigatórias num total de 31 ECTS { \ } newline

3.º Semestre { \ } newline

- 1 UC Obrigatória num total de 2 ECTS { \ } newline

4.º Semestre { \ } newline

- 1 UC Obrigatória num total de 3 ECTS { \ } newline

{ \ } newline

Para obtenção do grau, é necessário também a aprovação na Dissertação ou Relatório de Estágio, com um total de 55ECTS, no 3.º e 4.º Semestre. ***

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Sampling and Processing of Environmental Samples (QUI07866M)

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Chemistry of Soil and Sediments (QUI07869)



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Chemistry of Aquatic Systems (QUI07870M)

- 01 Introduction: objectives and scope of the curricular unit; water as source; preservation and propagation of life historical and socio-economic perspectives, the hydrological cycle, the human water cycle the concept of sustainable development.
- 02 Chemical and physical properties of water: ecological implications.
- 03 Thermodynamics of ionic hydration: kinetic control of hydrolysis reactions.
- 04 Chemical equilibriums in natural waters: acid-base equilibrium (hydration effects; polyphosphates in water; the carbon dioxide/carbonate system); solubility equilibriums (precipitation and dissolution, complexation and chelates chemical speciation); redox equilibriums (dissolved oxygen, diagrams pE pH).
- 05 Natural cycle and regulation of trace metals in aquatic environments: Global cycling of metals; solid water interface; complexation by humic substances; hydrophobic systems; regulation of heavy metals in rivers, lakes and oceans.
- 06 Introduction to aquatic microbial biochemistry: microbial transformations.
- 07 Photochemical processes in natural waters.
- 08 Regulation of the chemical composition of natural waters: biogeochemical cycles of carbon, nitrogen and sulfur; Interdependence of biogeochemical cycles.
- 09 Nature and types of aquatic pollutants: Eutrophication.
- 10 Treatment and disinfection of different water matrices: Origins and uses of water; legal and institutional framework in the water industry, drinking water production; qualitative and quantitative characterization of water quality indicators; recycling and reuse.
- 11 Modelling applied to environmental systems: A historical perspective (the main systems and problems modeled, classification of models, the modelling process); models of BOD/COD; stratification models; models of eutrophication; structural dynamic models; new modelling techniques.

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Toxicology of most Relevant Pollutants (QUI07871)

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Analysis, Treatment and Valuation of Liquid Waste (QUI07872M)

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Analysis, Treatment and Valuation of Solid Waste (QUI07873)

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Planning, Management and Organisation of Analysis Laboratories (QUI07874)

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Quality, Standards and Certification of Laboratories (QUI07875)

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Advanced Analytical Techniques I (QUI07876M)



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Advanced Analytical Techniques II (QUI07877)

Atomic Absorption and Emission

New techniques based on the use of electrothermal atomizers, hydride generator and plasma

Electrochemical methods

Square wave voltammetry and differential pulse

Advantages and disadvantages of implementing the new methods.

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Research Methodologies (QUI07878)

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Seminars (QUI08171M)