

PhD in Environmental Engineering

Curriculum · 6 semesters · 120 ECTS credits · 3000 academic hours

120 ECTS Credits	6 Semesters	24 Courses	3000 Academic Hours
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■ Required
 ■ Research
 ■ Elective
 ■ Thesis

Semester 1 — Foundations and Methodology 20 ECTS

CODE	COURSE NAME	DESCRIPTION	ECTS	HOURS	TYPE
ENV-ENG-101	Ecosystems and Environmental Services	Structure and functioning of ecosystems; valuation of environmental services and biodiversity.	5	125h	Required
ENV-ENG-102	Advanced Environmental Chemistry	Geochemical reactions, biogeochemical cycles, speciation of contaminants in environmental matrices.	5	125h	Required
ENV-ENG-103	Scientific Research Methodology	Experimental design, hypothesis formulation, literature review, data management and scientific writing.	5	125h	Research
ENV-ENG-104	Environmental Statistics and Geostatistics	Multivariate analysis, regression models, kriging and spatial analysis applied to environmental problems.	5	125h	Required

Semester 2 — Pollution and Treatment 20 ECTS

CODE	COURSE NAME	DESCRIPTION	ECTS	HOURS	TYPE
ENV-ENG-201	Advanced Wastewater Treatment	Advanced physico-chemical and biological processes: MBR, UASB, advanced oxidation and micropollutant removal.	5	125h	Required
ENV-ENG-202	Air Pollution and Control	Pollutant dispersion, air quality modeling, emission control technologies.	5	125h	Required
ENV-ENG-203	Solid and Hazardous Waste Management	Waste hierarchy, material and energy recovery, hazardous waste and WEEE treatment.	5	125h	Required
ENV-ENG-204	Soil and Groundwater Remediation	In situ and ex situ techniques; bioremediation, phytoremediation, multiphase extraction and reactive barriers.	5	125h	Required

Semester 3 — Climate Change and Assessment 20 ECTS

CODE	COURSE NAME	DESCRIPTION	ECTS	HOURS	TYPE
ENV-ENG-301	Climate Change and Climate Modeling	General circulation models, IPCC scenarios, vulnerability and adaptation to climate change.	5	125h	Required
ENV-ENG-302	Environmental Impact Assessment and SEA	EIA and strategic environmental assessment methodologies; risk analysis and public participation.	5	125h	Required
ENV-ENG-303	Hydrology and Watershed Management	Hydrological cycle, rainfall-runoff modeling, integrated water resource management and IWRM.	5	125h	Required
ENV-ENG-304	Elective I — Constructed Wetland Engineering	Design and operation of constructed wetlands for wastewater treatment and stormwater control.	5	125h	Elective

Semester 4 — Emerging Technologies and Thesis Proposal 20 ECTS

CODE	COURSE NAME	DESCRIPTION	ECTS	HOURS	TYPE
ENV-ENG-401	Environmental Biotechnology	Bioprocesses, bioreactors, applications of microorganisms in treatment and advanced bioremediation.	5	125h	Required
ENV-ENG-402	Environmental Economics and Ecological Valuation	Externalities, environmental policy instruments, contingent valuation and cost-benefit analysis.	5	125h	Required
ENV-ENG-403	Elective II — GIS and Environmental Remote Sensing	Geographic information systems, raster/vector analysis, satellite imagery and vegetation indices.	5	125h	Elective
ENV-ENG-404	Doctoral Thesis Proposal	Preparation, presentation and defense of the doctoral proposal before the academic committee.	5	125h	Thesis

Semester 5 — Research and Publication 20 ECTS

CODE	COURSE NAME	DESCRIPTION	ECTS	HOURS	TYPE
ENV-ENG-501	Advanced Research Seminar I	Progress presentations, peer review, methodological discussion and engagement with the scientific community.	5	125h	Research
ENV-ENG-502	Elective III — Environmental Nanotechnology	Nanomaterials for water treatment, nanoscale environmental sensors and ecotoxicity assessment.	5	125h	Elective
ENV-ENG-503	Research Internship or Exchange	Academic exchange at an external institution; minimum 4 weeks with technical report and external co-supervisor.	5	125h	Research
ENV-ENG-504	Scientific Writing and Publication	Strategies for writing ISI/Scopus articles, editorial process, peer review and research ethics.	5	125h	Research

Semester 6 — Doctoral Thesis and Defense 20 ECTS

CODE	COURSE NAME	DESCRIPTION	ECTS	HOURS	TYPE
ENV-ENG-601	Advanced Research Seminar II	Final presentation of results and validation with an external jury prior to the defense.	3	75h	Research
ENV-ENG-602	Research Ethics and Biosafety	Professional ethics, laboratory biosafety, data protection and intellectual property.	2	50h	Required
ENV-ENG-603	Doctoral Thesis — Development and Writing	Writing the final thesis document: introduction, methodology, results, discussion and conclusions.	10	250h	Thesis
ENV-ENG-604	Public Doctoral Thesis Defense	Presentation and defense before an external examining committee; evaluation of originality and scientific contribution.	5	125h	Thesis