AFU Education Group

Master's in Environmental Engineering

Study Plan · 4 semesters · 85 ECTS credits · 2 academic years

85	4	20	2,125
Total ECTS	Semesters	Courses	Academic Hours

Mandatory Research Elective Thesis

Semester 1 — Environmental Foundations — 22 ECTS

Course Name	Code	Description	ECTS	Hours	Type
Environmental Chemistry and Microbiology	MAM-101	Biogeochemical cycles, contaminant speciation, microbial communities and biotic processes in environmental systems.	5	125	Mandatory
Applied Hydraulics and Hydrology	MAM-102	Hydraulics fundamentals, rainfall-runoff hydrological modelling, flow analysis and watershed management.	5	125	Mandatory
Environmental Statistics and Modelling	MAM-103	Multivariate statistical analysis, regression models, experimental design and predictive modelling tools.	4	100	Mandatory
Environmental Law and Policy	MAM-104	National and international environmental regulatory framework, public policy instruments, licensing and legal compliance.	3	75	Mandatory
Research Methodology	MAM-105	Problem formulation, systematic literature review, methodological design and scientific writing.	5	125	Research

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Semester 2 — Treatment Processes and Technologies — 22 ECTS

Course Name	Code	Description	ECTS	Hours	Type
Wastewater Treatment	MAM-201	Physical-chemical and biological processes: activated sludge, biofilters, MBR, advanced oxidation and disinfection.	5	125	Mandatory
Integrated Waste Management	MAM-202	Waste hierarchy, reverse logistics, material and energy recovery, composting and hazardous waste treatment.	4	100	Mandatory
Air Quality and Emission Control	MAM-203	Criteria pollutants, dispersion modelling, control technologies (precipitators, bag filters, SCR) and regulations.	4	100	Mandatory
Environmental Impact Assessment	MAM-204	EIA methodologies, baseline studies, Leopold matrices, public participation, impact mitigation and management plans.	4	100	Mandatory
Elective I — Soil Remediation	MAM-205	In situ and ex situ remediation: bioremediation, phytoremediation, soil washing and permeable reactive barriers.	5	125	Elective

Semester 3 — Specialisation and Thesis Proposal — 21 ECTS

Course Name	Code	Description	ECTS	Hours	Type
Climate Change and Renewable Energy	MAM-301	IPCC scenarios, carbon footprint, carbon mechanisms, renewable energy integration and climate change adaptation.	4	100	Mandatory
GIS Applied to Environmental Engineering	MAM-302	Raster and vector spatial analysis, remote sensing, vegetation indices, risk mapping and geospatial decision-making.	4	100	Mandatory
Environmental Economics and Valuation	MAM-303	Ecosystem service valuation, environmental cost-benefit analysis, economic instruments and carbon markets.	3	75	Mandatory
Elective II — Environmental Biotechnology	MAM-304	Microorganism applications in bioremediation, biogas, bioleaching and biosensors for environmental monitoring.	4	100	Elective
Thesis Proposal	MAM-305	Problem definition, state-of-the-art review, objectives, methodology formulation and presentation to evaluation committee.	6	150	Thesis

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Semester 4 — Thesis and Professional Competencies					20 ECTS
Course Name	**Code**	**Description**	**ECTS**	**Hours**	**Type**
Advanced Research Seminar	MAM-401	Thesis progress presentations, critical peer review and engagement with national research networks.	3	75	Research
Corporate Environmental Management	MAM-402	ISO 14001 management systems, environmental audits, CSR, life cycle assessment (LCA) and sustainability reporting.	3	75	Mandatory
Elective III — Constructed Wetlands Engineering	MAM-403	Design of surface-flow and subsurface-flow constructed wetlands for wastewater treatment and stormwater control.	4	100	Elective
Master's Thesis — Development and Defence	MAM-404	Final thesis document writing, derived scientific article, public presentation and defence before external examining panel.	10	250	Thesis

Each ECTS credit corresponds to 25 hours of academic work (contact hours + independent study). Total workload: 2,125 hours over 4 semesters.