

Department of Environmental Engineering

Master of Engineering Program in Environmental Engineering (International Program)

M.Eng. (Environmental Engineering)

Plan A Option 1:

Total credits required: minimum 36 credits

(1) Major courses: minimum 3 credits (audit)

- Seminar: 2 credits

01210597 Seminar 1,1

- Major requirements: 1 credits

01210591 Research Methods in Environmental Engineering 1(0-3-2)

(2) Thesis: minimum 36 credits

01210599 Thesis 1-36

Plan A Option 2:

Total credits required: minimum 36 credits

(1) Major courses: minimum 24 credits

- Seminar: 2 credits

01210597 Seminar 1,1

- Major requirements: 16 credits

01210551 Chemistry in Environmental System 2(2-0-4)

01210552 Advanced Water Supply Engineering Process 2(2-0-4)

01210553 Advanced Wastewater Engineering Design 2(2-0-4)

01210561 Advanced Air Pollution Control 2(2-0-4)

01210562 Solid Waste Engineering and Management 2(2-0-4)

01210563 Hazardous Waste Management and Site Remediation 2(2-0-4)

01210571 Pollution Control Management 2(2-0-4)

01210572 Global Environmental Change and Management 1(1-0-2)

01210591 Research Methods in Environmental Engineering 1(0-3-2)

- Major electives: minimum 6 credits

01210554 Environmental Quality Assessment 2(1-3-4)

01210555 Membrane Technologies in Water and Wastewater Treatment 2(2-0-4)

01210556 Advanced Wastewater Treatment Technologies 2(2-0-4)

01210564 Emerging Pollutants in Environment 1(1-0-2)

01210565 Noise Pollution and Vibration Management 2(2-0-4)

01210566 Radioactive Waste Management 2(2-0-4)

01210573 Fate and Transport of Pollutants 2(2-0-4)

01210574 Mathematical Modeling Concept for Environmental Engineers 2(2-0-4)

01210575 Environmental and Health Risk Assessment 2(2-0-4)

01210576 Industrial Pollution and Management 2(2-0-4)

01210577 Water Quality Modeling 2(2-0-4)

01210596	Selected Topic in Environmental Engineering	1-3
01210598	Special Problems	1-3
(2) Thesis: minimum 12 credits		
01210599	Thesis	1-12

Plan B:

Total credits required: minimum 36 credits

(1) Major courses: minimum 30 credits

- **Seminar: 2 credits**

01210597	Seminar	1,1
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- **Major requirements: 16 credits**

01210551	Chemistry in Environmental System	2(2-0-4)
01210552	Advanced Water Supply Engineering Process	2(2-0-4)
01210553	Advanced Wastewater Engineering Design	2(2-0-4)
01210561	Advanced Air Pollution Control	2(2-0-4)
01210562	Solid Waste Engineering and Management	2(2-0-4)
01210563	Hazardous Waste Management and Site Remediation	2(2-0-4)
01210571	Pollution Control Management	2(2-0-4)
01210572	Global Environmental Change and Management	1(1-0-2)
01210591	Research Methods in Environmental Engineering	1(0-3-2)

- **Major electives: minimum 12 credits**

01210554	Environmental Quality Assessment	2(1-3-4)
01210555	Membrane Technologies in Water and Wastewater Treatment	2(2-0-4)
01210556	Advanced Wastewater Treatment Technologies	2(2-0-4)
01210564	Emerging Pollutants in Environment	1(1-0-2)
01210565	Noise Pollution and Vibration Management	2(2-0-4)
01210566	Radioactive Waste Management	2(2-0-4)
01210573	Fate and Transport of Pollutants	2(2-0-4)
01210574	Mathematical Modeling Concept for Environmental Engineers	2(2-0-4)
01210575	Environmental and Health Risk Assessment	2(2-0-4)
01210576	Industrial Pollution and Management	2(2-0-4)
01210577	Water Quality Modeling	2(2-0-4)
01210596	Selected Topic in Environmental Engineering	1-3
01210598	Special Problems	1-3

(2) Independent Study: 6 credits

01210595	Independent Study	3
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Course Description

01210551 Chemistry in Environmental System

2(2-0-4)

Chemical principles and theory involving in reactions in the environment, essential knowledge of organic chemistry and biochemical processes for environmental engineers, chemical reactions and processes of concern of aquatic, atmospheric and soil environments, types, changes and impact of major contaminants on the environment.

01210552	Advanced Water Supply Engineering Process Water quality standards for different purposes, analysis of coagulation and flocculation, sedimentation, filtration and disinfection processes, adsorption, ion exchange, desalination process.	2(2-0-4)
01210553	Advanced Wastewater Engineering Design Principle in selection of wastewater treatment processes, detailed design of activated sludge process and sludge treatment system.	2(2-0-4)
01210554	Environmental Quality Assessment Principles of qualitative and quantitative chemical analyses, analytical methods include conventional and instrumentation, laboratory practices on chemical analyses of major contaminants and environmental index parameters in accordance with APHA standard methods, analysis of laboratory results and interpretation in environmental engineering aspects.	2(1-3-4)
01210555	Membrane Technologies in Water and Wastewater Treatment Classification of membrane processes, theory of membrane filtration, membrane fouling, efficiencies of membrane processes, application of membrane process in water treatment, application of membrane process in water treatment and wastewater treatment, membrane bioreactor.	2(2-0-4)
01210556	Advanced Wastewater Treatment Technologies Physico-chemical treatment processes, electrochemical treatment process, adsorption, membrane process, ion exchange, advanced oxidation process, nutrient removal, water and wastewater reuse.	2(2-0-4)
01210561	Advanced Air Pollution Control Principles of air pollution control, particle, gas and vapour emission control technology, air pollution control system design, maintenance and potential evaluation of air pollution control system.	2(2-0-4)
01210562	Solid Waste Engineering and Management Current trend of solid waste management, solid waste minimization, solid waste management at sources, solid waste collection and transportation, solid waste transformation, final disposal of solid wastes, case studies.	2(2-0-4)
01210563	Hazardous Waste Management and Site Remediation Hazardous waste characteristics, source management, environmental regulations, waste treatment and disposal, contaminated site remediation systems.	2(2-0-4)
01210564	Emerging Pollutants in Environment Pollutant glossary, characterization and classification of environmental pollutants, occurrence of emerging pollutants, risks and hazardous effects of emerging pollutants, available technologies for treatment of emerging pollutants, environmental forensics for detection of emerging pollutants, case studies.	1(1-0-2)
01210565	Noise Pollution and Vibration Management Sources of noise pollution and vibration, sound wave behavior, instrument and guideline for noise measurement, impact of noise pollution and vibration on human health and environment, law and regulation for noise pollution control, noise pollution control, noise pollution control design, noise pollution problems in industry.	2(2-0-4)

01210566	Radioactive Waste Management Radioactivity and radiation, biological effects of ionizing radiation, radiation exposure, radiation protection, types of waste, management of high and low-level radioactive waste, long-term management and containment.	2(2-0-4)
01210571	Pollution Control Management Environmental problems, environmental audits, environmental life cycle concepts, environmental performance evaluation, environmental management system.	2(2-0-4)
01210572	Global Environmental Change and Management Study of global climate and environmental change, effects of biodiversity loss, natural resources and renewable energy management. Environmental management in national and international levels. Legal, economic and society tools for Environmental Management.	1(1-0-2)
01210573	Fate and Transport of Pollutants Environmental Chemistry, biogeochemical cycle, transport by advection and dispersion, chemical distribution among phases, mass balance in control volume.	2(2-0-4)
01210574	Mathematical Modeling Concept for Environmental Engineers Concepts for formulation and application of environmental models; matrices; finite difference method, finite element method; formulation of water quality models and hydrodynamic models, model calibration and verification, sensitivity analysis.	2(2-0-4)
01210575	Environmental and Health Risk Assessment Source and impact of wastes, toxic substances, infectious microorganisms on human health and environmental quality, regulation, international standard, toxicology, principle and methodologies of health and environmental risk assessment, hazard identification, exposure assessment, dose-response assessment, risk characterization, risk management, risk communication.	2(2-0-4)
01210576	Industrial Pollution and Management Sources of pollution in industry, laws and regulation involved in pollution control from industry, pollution evaluation and prevention in industry, environmental management control system design for industry.	2(2-0-4)
01210577	Water Quality Modeling Development of models for computation of pollutant dispersion in surface water and groundwater; biochemical oxygen demand and dissolved oxygen model for a stream, phytoplankton and nutrient interactions models, eutrophication model, water quality management model; application of a water quality, case studies.	2(2-0-4)
01210591	Research Methods in Environmental Engineering Principles and research methods in environmental engineering, problem analysis for research topic identification, data collection for research planning, identification of samples and techniques. Analysis, interpretation and discussion of research result; report writing for presentation and publication.	1(0-3-2)
01210595	Independent Study Independent study at the master's degree level in environmental engineering; compile and present the individual study report.	3
01210596	Selected Topic in Environmental Engineering Selected topics in environmental engineering at the master's degree level. Topics	1-3

are subjected to change each semester.

01210597	Seminar	1
	Presentation and discussion on current interesting topics in environmental engineering at the master's degree level.	
01309598	Special Problems	1-3
	Study and research in environmental engineering at the master's degree level and compile into a written report.	
01210599	Thesis	1-36
	Research at the master's degree level and compile into a thesis.	