Environmental Engineering

- **M.A.Sc. Environmental Engineering**
- **M.Eng. Environmental Engineering**
- **Ph.D. Environmental Engineering**

M.A.Sc. Environmental Engineering M.Eng. Environmental Engineering

About the Program

Established in 2000, the Institute combines the research strengths and resources of the Department of Civil and Environmental Engineering at Carleton University and the Department of Civil Engineering and the Department of Chemical Engineering at the University of Ottawa. Programs leading to M.Eng., M.A.Sc. and Ph.D. degrees in Environmental Engineering are available through the Institute. Registration will be at the university with which the student's supervisor is affiliated. Related fields of study and research in environmental engineering are also available through the Ottawa-Carleton Institute for Civil Engineering (which offers graduate degrees in Civil Engineering) and the Department of Chemical Engineering at the University of Ottawa (which offers graduate degrees in Chemical Engineering).

Admission Requirements

The requirement for admission to the master's program in Environmental Engineering is a four-year bachelor's degree in Environmental Engineering, other related engineering disciplines (Civil, Chemical, Mechanical, etc.), or Environmental Science disciplines.

All students entering the program are required to have courses in mathematics, probability and statistics equivalent to courses required in undergraduate engineering programs. Students admitted without full equivalency in these areas are expected to take appropriate undergraduate courses early in their studies. These courses will be additional to the normal degree requirements.

All students entering the program are also required to have taken undergraduate courses equivalent to the following:

Students registered at Carleton University	
MAAE 2300 [0.5]	Fluid Mechanics I
ENVE 3001 [0.5]	Water Treatment Principles and Design
ENVE 3002 [0.5]	Environmental Engineering Systems Modeling

Students registered at the University of Ottawa in Chemical Engineering:

CHG 3312 Fluid Flow
CHG 3111 Unit Operations
CHG 3127 Chemical Reactions in Engineering

Students registered at the University of Ottawa in Civil Engineering

CVG 2111 Introduction to Fluid Mechanics
CVG 2131 Introduction to Environmental Engineering
CVG 3132 Quality and Treatment of Water

These courses are considered to provide the minimum background in fluid mechanics, and in physical, chemical, and biochemical treatment principles, necessary to adequately follow environmental engineering courses at the graduate level. Depending on their background, students may have been exposed to these principles through a different combination of courses in their undergraduate curriculum. Students entering the program without an equivalent background in these topics are expected to take these courses early in their studies and they are considered additional to those normally required for the degree.

Program Requirements

Study at the master's level can be pursued through a thesis leading to a M.A.Sc., a project option leading to a M.Eng., or a coursework option leading to a M. Eng. The requirements for coursework are specified in terms of credits. At Carleton University, 1.0 credit typically comprises three hours of lectures or seminars a week for two terms, or the equivalent. At the University of Ottawa, 1.0 course credit is one hour of instruction per week for one term. Thus 1.0 credit in Carleton University notation is equivalent to 6 course credits in the University of Ottawa notation.The requirements are:

M.A.Sc. Environmental Engineering - Thesis option (6.0 credits)		
1. 3.0 credits in courses, with at least 0.5 credit from each of at least three of the areas of study listed below:		3.0
2. Participation in the graduate seminar series:		0.0
ENVE 5800 [0.0]	Master's Seminar (participation in the graduate seminar series)	
3. 3.0 credits in:		3.0
ENVE 5909 [3.0]	Master's Thesis (including successful oral defence)	
Total Credits		6.0

M.Eng. Environmental Engineering - Project option (5.0 credits)		
1. 4.0 credits in courses		4.0
2. 1.0 credit in:		1.0
ENVE 5900 [1.0]	Environmental Engineering Project	
3. Participation in the graduate student seminar series:		0.0
ENVE 5800 [0.0]	Master's Seminar	
Total Credits		5.0

M.Eng. Environmental Engineering - Coursework option (5.0 credits)	
1. Completion of a minimum of 5.0 credits by course	5.0
Total Credits	5.0

Breadth Requirement

In keeping with the objective of ensuring a breadth of knowledge for graduates of the program, students in the master's program are expected to take at least one

graduate level course from each of at least three of the following areas of study:

- Air Pollution
- Water Resources Management, Groundwater Management and Contaminant Transport
- Management of Solid, Hazardous, and Radioactive Waste, and Pollution Prevention
- Water and Wastewater Treatment
- Environmental Impact Assessment

This requirement serves the objectives of educating graduate professionals who are not only specialized in one area but who are sufficiently familiar with problems and different approaches in the other areas to enable them to interact readily at a \>technical level with colleagues working in those areas. In addition to the courses associated with the individual areas, students will be encouraged to select courses from fundamental areas such as chemistry, numerical modeling, and applied statistics.

Master's candidates transferring from another university must take at least half their courses at the Institute.

Ph.D. Environmental Engineering

About the Program

Established in 2000, the Institute combines the research strengths and resources of the Department of Civil and Environmental Engineering at Carleton University and the Department of Civil Engineering and the Department of Chemical Engineering at the University of Ottawa. Programs leading to M.Eng., M.A.Sc. and Ph.D. degrees in Environmental Engineering are available through the Institute. Registration will be at the university with which the student's supervisor is affiliated. Related fields of study and research in environmental engineering are also available through the Ottawa-Carleton Institute for Civil Engineering (which offers graduate degrees in Civil Engineering) and the Department of Chemical Engineering at the University of Ottawa (which offers graduate degrees in Chemical Engineering).

Admission Requirements

The normal requirement for admission into the Ph.D. Program in Environmental Engineering is completion of either:

- A Master's degree in Environmental Engineering, or a Master's degree in an engineering discipline with an environmental specialization.
- Students wishing to enter the program who do not have either of these backgrounds will be evaluated on a case-by-case basis. Additional course requirements may be specified in some cases.

Program Requirements

The requirements for the Ph.D. program (from a Master's degree) is the successful completion of 10.0 credits, of which 8.5 credits must be obtained from successful oral defence of a research thesis. The specific requirements are:

Ph.D. Environmental Engineering (10.0 credits)

1. 1.5 credits in courses		1.5
2. 0.0 credits in:		0.0
ENVE 7800 [0.5]	Ph.D. Seminar	
3. Successful completion of the comprehensive examination, which consists of a presentation of a Ph.D. research proposal followed by an oral examination to assess any academic deficiencies in the student's background related to the proposed research project and to assess the originality and feasibility of the proposed research project. The comprehensive examination should be completed within the first 16 months (or the equivalent of four full-time terms) of the student's program		
4. 8.5 credits in:		8.5
ENVE 6909 [8.5]	Ph.D. Thesis (Including successful oral defence)	
Total Credits		10.0

Master's students with outstanding performance in the master's courses may request transfer into the Ph.D. program without completing the master's degree. Students who are permitted to do so require a minimum of 4.5 credits by course for a Ph.D., including any credits transferred from the Master's degree program.

Ph.D. candidates transferring from another university must take at least half their courses at the Institute.

Graduate Courses

Course selection is subject to the approval of the adviser or the Advisory committee. Students may choose courses offered at either university from among those listed below.

The courses listed below are grouped by area of study. Master's students must complete at least one course in three of the five areas. The program's Associate Chair (graduate affairs), in consultation with the Institute's Director or Associate Director, will decide when a course offered outside the Institute, will decide when a course offered under a Special Topics or Directed Studies heading can be considered to meet the requirements of a given area. Course descriptions may be found in the departmental sections of the calendars concerned. Course codes in parentheses are for University of Ottawa (CHG and CVG), and those that begin with the prefix "ENVE" or "CIVE" are offered at Carleton. Only a selection of courses is given in a particular academic year.

Full course descriptions for courses offered at Carleton can be found in the relevant courses section of this calendar.

Air Pollution

ENVE 5101 (EVG 5101)	Air Pollution Control
ENVE 5102 (CVG 7161)	Traffic-Related Air Pollution
ENVE 5103 (CVG 7162)	Air Quality Modeling
ENVE 5104 (EVG 7104)	Indoor Environmental Quality
ENVE 5105 (EVG 7105)	Atmospheric Aerosols

ENVE 5106 (EVG 7106)	Atmospheric Chemical Transport Modelling
ENVJ 5101 (CHG 4301)	Air Pollution Control Process
ENVJ 5105	Adsorption Separation Process

Water Resources Management, Groundwater Management, and Contaminant Transport

ENVE 5301 (EVG 7301)	Contaminant Hydrogeology
ENVE 5302 (CVG 7163)	Case Studies in Hydrogeology
ENVE 5303 (EVG 7303)	Multiphase Flow in Soils
CIVJ 5605 (CVG 5124)	Coastal Engineering
CIVJ 5601 (CVG 5125)	Statistical Methods in Hydrology
CIVJ 5602 (CVG 5126)	Stochastic Hydrology
CIVJ 5606 (CVG 5131)	River Engineering
CIVJ 5503	Sediment Transport
CIVJ 5504 (CVG 5162)	River Hydraulics
ENVJ 5304 (CHG 8158)	Porous Media
ERTH 5403 (GEO 5143)	Environmental Isotopes and Groundwater Geochemistry
ERTH 5404 (GEO 5144)	Groundwater Resources
ERTH 5406 (GEO 5146)	Techniques of Groundwater Resources Evaluation
ERTH 5407 (GEO 5147)	Geochemistry of Natural Waters
ERTH 5408 (GEO 5148)	Theory of Flow and Contaminant Transport in Geological Materials

Management of Solid, Hazardous, and Radioactive Waste and Pollution Prevention

ENVE 5201 (EVG 7201)	Geo-Environmental Engineering
ENVE 5203 (EVG 7164)	Hazardous and Radioactive Wastes
ENVE 5204 (EVG 7134)	Resource Industry Waste Management
ENVE 5205 (EVG 7132)	Sludge Treatment and Disposal
ENVJ 5903 (CVG 5331)	Sludge Utilization and Disposal
ENVJ 5906 (CVG 5133)	Solid Waste Disposal
ENVJ 5908 (CVG 5179)	Anaerobic Digestion

Water and Wastewater Treatment

ENVE 5001 (CVG 7160)	Biofilm Processes
ENVE 5003 (EVG 7143)	Advanced Ultraviolet Processes
ENVE 5004 (EVG 7144)	Advanced Wastewater Treatment
ENVJ 5501 (CHG 8181)	Biochemical Engineering
ENVJ 5502 (CHG 8192)	Membrane Applications in Environmental Engineering
ENVJ 5503	Reverse Osmosis
ENVJ 5504	Membrane Separation Processes
ENVJ 5608 (CVG 5135)	Water Supply and Sanitation in Developing Countries
ENVJ 5900 (CVG 5130)	Wastewater Treatment Process Design
ENVJ 5901 (CVG 5132)	Unit Operations of Water Treatment
ENVJ 5905 (CVG 5137)	Water and Wastewater Treatment Process Analysis
ENVJ 5902	Advanced Water Treatment
ENVJ 5907 (CVG 5134)	Chemical Analysis for Environmental Engineering
ENVJ 5909 (CVG 5180)	Biological Nutrient Removal
ENVJ 5911 (CVG 5232)	Unit Operations of Water Treatment Lab
ENVJ 5912 (CVG 5238)	Advanced Water Treatment Processes Lab

Environmental Impact Assessment

ENVE 5401 (EVG 7401)	Environmental Impacts of Major Projects
ENVJ 5700 (CVG 5139)	Environmental Assessment of Civil Engineering Projects

To fulfill the requirements beyond the 1.5 credits of area courses, students may choose from the following:

Other Institute Courses

ENVE 5402 (EVG 7402)	Finite Elements in Field Problems
ENVJ 5500	Statistical Modeling and Control of Dynamic Processes
ENVJ 5505 (CHG 8195)	Advanced Numerical Methods in Transport Phenomena
ENVJ 5506	Modeling of Steady-State Processes
ENVJ 5507	Interfacial Phenomena in Engineering
ENVJ 5604	Water Resources Planning and Policy
CIVE 5601 (CVG 7140)	Engineering, Statistics, and Probabilities
CIVE 5304 (CVG 7150)	Intercity Transportation
CIVE 5305 (CVG 7151)	Traffic Engineering
CIVE 5307 (CVG 7153)	Urban Transportation
GEOG 5804	Geographic Information Systems

Seminars, Directed Studies and Special Topics

ENVE 5800 (EVG 7305)	Master's Seminar
ENVE 5906 (EVG 6108)	Directed Studies 1
ENVE 5907 (EVG 6109)	Directed Studies 2

ENVE 7800 (EVG 6109)	Ph.D. Seminar
ENVE 5701 (EVG 6301)	Topics in Environmental Engineering
ENVE 5702 (EVG 6302)	Topics in Environmental Engineering
ENVE 5704 (EVG 6304)	Topics in Environmental Engineering
ENVE 5703 (EVG 6303)	Topics in Environmental Engineering
ENVE 5705 (EVG 6305)	Topics in Environmental Engineering
ENVJ 8191	Selected Topics in Chemical Engineering
CIVJ 6000	Special Topics in Civil Engineering
CIVJ 6001	Special Topics in Civil Engineering
CIVJ 6002	Special Topics in Civil Engineering
CIVJ 6003	Special Topics in Civil Engineering
CIVJ 6004	Special Topics in Civil Engineering
CIVJ 6005	Special Topics in Civil Engineering
CIVJ 6006	Special Topics in Civil Engineering
CIVJ 6007	Special Topics in Civil Engineering
CIVJ 6008	Special Topics in Civil Engineering
CIVJ 6009	Special Topics in Civil Engineering
CIVJ 6010	Special Topics in Civil Engineering
CIVJ 6011	Special Topics in Civil Engineering
CIVJ 6012	Special Topics in Civil Engineering
CIVJ 6013	Special Topics in Civil Engineering
CIVJ 6014	Special Topics in Civil Engineering
CIVJ 6015	Special Topics in Civil Engineering
CIVJ 6016	Special Topics in Civil Engineering
CIVJ 6017	Special Topics in Civil Engineering
CIVJ 6018	Special Topics in Civil Engineering
CIVJ 6019	Special Topics in Civil Engineering
CIVJ 6020	Special Topics in Civil Engineering

Special Topics courses in Civil or Chemical Engineering will count as Institute courses only if approved by the program's Associate Chair (graduate affairs), in consultation with the Institute's Director or Associate Director.

Projects and Theses

ENVE 5900 (EVG 6001)	Environmental Engineering Project
ENVE 5909	Master's Thesis
ENVE 6909	Ph.D. Thesis

(EVG 9998) Comprehensive Examination

Non-Institute Courses

Students may also, subject to approval, select courses from the graduate programs in Civil, Chemical and Mechanical Engineering, as well as in Biology, Chemistry, Earth Sciences, Computer Sciences, Geography and Public Policy and Administration at both universities. Courses taken outside the Institute will not count towards the degree requirements unless approved by the adviser or the advisory committee and the program's Associate Chair (graduate affairs). In all programs, at least one half of the course work must be taken from the Institute.

Environmental Engineering - Joint (ENVJ) Courses

ENVJ 5101 [0.5 credit] (CHG 4301)
Air Pollution Control Process

ENVJ 5105 [0.5 credit]
Adsorption Separation Process

ENVJ 5304 [0.5 credit] (CHG 8158)
Porous Media

ENVJ 5500 [0.5 credit]
Statistical Modeling and Control of Dynamic Processes

ENVJ 5501 [0.5 credit] (CHG 8181)
Biochemical Engineering

ENVJ 5502 [0.5 credit]
Membrane Applications in Environmental Engineering

ENVJ 5503 [0.5 credit]
Reverse Osmosis

ENVJ 5504 [0.5 credit]
Membrane Separation Processes

ENVJ 5505 [0.5 credit]
Advanced Numerical Methods in Transport Phenomena

ENVJ 5506 [0.5 credit]
Modeling of Steady-State Processes

ENVJ 5507 [0.5 credit]
Interfacial Phenomena in Engineering

ENVJ 5604 [0.5 credit]
Water Resources Planning and Policy

ENVJ 5608 [0.5 credit]
Water Supply and Sanitation in Developing Countries

ENVJ 5700 [0.5 credit]
Environmental Assessment of Civil Engineering Projects

ENVJ 5701 [1.0 credit]
Special Topics Enviro Engin I

ENVJ 5702 [1.0 credit]
Special Topics Enviro Engin II

ENVJ 5703 [1.0 credit]
Special Topic Enviro Engin III

ENVJ 5900 [0.5 credit]
Wastewater Treatment Process Design

ENVJ 5901 [0.5 credit]
Unit Operations of Water Treatment

ENVJ 5902 [0.5 credit]
Advanced Water Treatment

ENVJ 5903 [0.5 credit] (CVG 5331)
Sludge Utilization and Disposal

ENVJ 5905 [0.5 credit]
Water and Wastewater Treatment Process Analysis

ENVJ 5906 [0.5 credit]
Solid Waste Disposal

ENVJ 5907 [0.5 credit]
Chemical Analysis for Environmental Engineering

ENVJ 5908 [0.5 credit]
Anaerobic Digestion

ENVJ 5909 [0.5 credit]
Biological Nutrient Removal

ENVJ 5911 [0.25 credit]
Unit Operations of Water Treatment Lab

ENVJ 5912 [0.25 credit]
Advanced Water Treatment Processes Lab

ENVJ 6002 [0.5 credit]
Sludge Processing, Utilization

ENVJ 8191 [0.5 credit]
Selected Topics in Chemical Engineering

Environmental Engineering (ENVE) Courses

ENVE 5001 [0.5 credit] (CVG 7160)
Biofilm Processes
Physical, chemical properties, microbial ecology of biofilms. Biofilm processes, attachment, growth, sloughing. Transport and interfacial transfer phenomena; mass transfer models, mass transport in biofilms, deposition of solids. Modeling biofilm systems; species models, mass balance equations, boundary conditions, moving boundary problem, analytical and numerical solutions.

ENVE 5003 [0.5 credit] (EVG 7143)
Advanced Ultraviolet Processes
Fundamentals and applications of ultraviolet (UV) light-based processes for water and wastewater treatment; principles of photochemistry and photobiology, methods of UV dose determination, UV disinfection of microorganisms, advanced oxidation processes, and design of UV disinfection systems and reactors.

ENVE 5004 [0.5 credit] (EVG 7144)
Advanced Wastewater Treatment
Fundamentals, applications, and design of biological, physical, and chemical treatment processes employed for advanced treatment of domestic and industrial wastewater. Reuse applications and guidelines.

ENVE 5101 [0.5 credit] (EVG 5101)
Air Pollution Control
Air quality and pollution; definitions, measurement and monitoring methods. Criteria pollutants, air toxics, particulate matter, secondary pollutants. Pollutant formation mechanisms. Major sources and control methods. Meteorology and principles of dispersion modeling. Principles of receptor modeling. Indoor air quality.
Also offered at the undergraduate level, with different requirements, as ENVE 4003, for which additional credit is precluded.

ENVE 5102 [0.5 credit] (CVG 7161)
Traffic-Related Air Pollution
Pollutant formation, emission characterization, emission control technology and emission modeling from motor vehicles. Dispersion and receptor modeling for conservative pollutants in urban microenvironments. Personal exposure and health risk assessment.

ENVE 5103 [0.5 credit] (CVG 7162)
Air Quality Modeling
Dispersion modeling for simple and complex sources and complex terrain. Physical and chemical transformations for pollutants in the atmosphere. Urban and regional air pollution modeling for reactive pollutants. The urban air shed model. Regional air quality modeling case studies.

ENVE 5104 [0.5 credit] (EVG 7104)
Indoor Environmental Quality
Indoor environmental quality (air quality, thermal, visual, and acoustic comfort); physical and chemical parameters for characterization. Types and sources of indoor air pollution and discomfort; measurement techniques. Heating, ventilation, air conditioning, lighting practices and issues. Modeling of and design for indoor environmental quality.

ENVE 5105 [0.5 credit] (EVG 7105)
Atmospheric Aerosols
Atmospheric aerosol characterization and size distribution, theoretical fundamentals of physical and chemical processes that govern formation and transformation of aerosols in the atmosphere such as nucleation, coagulation, condensation/evaporation, and aerosol thermodynamics; interactions between aerosols and climate, aerosol sampling and measurement.

ENVE 5106 [0.5 credit] (EVG 7106)
Atmospheric Chemical Transport Modelling
Fundamentals of Eulerian atmospheric modelling; overview of global and regional atmospheric models, basic principles of numerical methods used in air quality models; applications of air quality models; uncertainty and sensitivity analysis in air quality modelling.

ENVE 5201 [0.5 credit] (EVG 7201)
Geo-Environmental Engineering
Landfill design; hydrogeologic principles, water budget, landfill liners, geosynthetics, landfill covers, quality control and quality assurance, clay/leachate interaction, composite liner design and leachate collection systems. Landfill operation, maintenance and monitoring. Design of environmental control and containment systems; slurry walls, grout curtains, Case studies.
Also offered at the undergraduate level, with different requirements, as ENVE 4002, for which additional credit is precluded.

ENVE 5203 [0.5 credit] (EVG 5203)
Hazardous and Radioactive Wastes
Classification of hazardous, radioactive and mixed wastes, hazardous waste treatment processes, wastes generated in the nuclear fuel cycle, radioactive waste classification, radioactive waste treatment and management of residuals, engineered systems for long-term isolation and disposal, mixed waste management.
Also offered at the undergraduate level, with different requirements, as ENVE 4101, for which additional credit is precluded.

ENVE 5204 [0.5 credit] (EVG 7134)
Resource Industry Waste Management
Application of geotechnique and hydraulics to management of resource extraction residuals such as tailings, waste rock, and sludge from hard rock mines and bitumen extraction operations. Geotechnique of conventional and high density tailings disposal. Pipeline transport of concentrated suspensions. Closure technologies for mine waste impoundments.

ENVE 5205 [0.5 credit] (EVG 7132)
Sludge Treatment and Disposal
Aspects of sludge treatment, management, and disposal; sludge generation and characterization, thickening, preliminary treatment processes, aerobic and anaerobic digestion, lime stabilization, conditioning, dewatering, composting, land application and other disposal options, and thermal processes.

ENVE 5301 [0.5 credit] (EVG 7301)
Contaminant Hydrogeology
Theory of flow through porous media; soil characterization, soil properties, anisotropy, heterogeneity. Contaminant transport. Well hydraulics and pump tests. Introduction to numerical modeling; finite difference, finite elements, conceptual model, boundary conditions. Site remediation and remediation technologies.
Also offered at the undergraduate level, with different requirements, as ENVE 4006, for which additional credit is precluded.

ENVE 5302 [0.5 credit] (CVG 7163)
Case Studies in Hydrogeology
Development of a conceptual model; chemistry, geology and hydrology, site characterization, initial and boundary conditions. Application of industry-recognized computer codes to model flow and contaminant transport at a particular site. Evaluation of remedial alternatives at a site. Modeling of the more common remediation technologies (soil vapour extraction, air sparging, pump and treat, biodegradation).

ENVE 5303 [0.5 credit] (EVG 7303)
Multiphase Flow in Soils
Theory of unsaturated flow and multiphase flow; capillary pressure-saturation relationships, relative permeability relationships, wettability, hysteresis, fluid entrapment, residual saturations, governing equations for flow and transport. Richard's Equation for unsaturated flow. Modeling of multiphase flow.

ENVE 5401 [0.5 credit] (EVG 7401)
Environmental Impacts of Major Projects
Regulatory framework and impact assessment requirements for project approvals, survey of the components of the EIA process and methodology, the review process, public participation in environmental decision-making, preparation of the EIA document, case studies of major engineering projects.

ENVE 5402 [0.5 credit] (EVG 7402)
Finite Elements in Field Problems
Use of Galerkin and Ritz finite element formulations to solve one and two dimensional field problems. Steady state and time-dependent phenomena involving heat transfer, fluid flow, diffusion, and dispersion with emphasis on practical applications. Basic knowledge of third year-level undergraduate engineering mathematics and physics required.
Also listed as CIVE 5107.

ENVE 5701 [0.5 credit] (EVG 6301)
Topics in Environmental Engineering
Courses in special topics in environmental engineering not covered by other graduate courses; details will be available some months prior to registration.

ENVE 5702 [0.5 credit] (EVG 6302)
Topics in Environmental Engineering
Courses in special topics in environmental engineering not covered by other graduate courses; details will be available some months prior to registration.

ENVE 5703 [0.5 credit] (EVG 6303)
Topics in Environmental Engineering
Courses in special topics in environmental engineering not covered by other graduate courses; details will be available some months prior to registration.

ENVE 5704 [0.5 credit] (EVG 6304)
Topics in Environmental Engineering
Courses in special topics in environmental engineering not covered by other graduate courses; details will be available some months prior to registration.

ENVE 5705 [0.5 credit] (EVG 6305)
Topics in Environmental Engineering
Courses in special topics in environmental engineering not covered by other graduate courses; details will be available some months prior to registration.

ENVE 5800 [0.0 credit] (EVG 7305)
Master's Seminar
M.A.Sc. and M.Eng (project option) students in the Environmental Engineering program are required to participate in these seminar series by attending all seminars and making at least one presentation during their graduate studies.
Registration in the course should be in the term that the presentation will take place.

ENVE 5900 [1.0 credit] (EVG 6001)
Environmental Engineering Project
Students enrolled in the M.Eng. program by course work will conduct an engineering study, analysis, or design project under the general supervision of a member of the Department.

ENVE 5906 [0.5 credit] (EVG 6108)
Directed Studies 1
Precludes additional credit for CIVE 5906.

ENVE 5907 [0.5 credit] (EVG 6109)
Directed Studies 2
Precludes additional credit for CIVE 5907.

ENVE 5909 [3.0 credits]
Master's Thesis

ENVE 6909 [8.5 credits]
Ph.D. Thesis

ENVE 7800 [0.5 credit] (EVG 6109)
Ph.D. Seminar
Ph.D. students in the Environmental Engineering program are required to participate in these seminar series by attending all seminars and making at least one presentation during their graduate studies.
Registration in the course should be in the term that the presentation will take place.

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current session and to determine the term of offering, consult the class schedule at central.carleton.ca