Master of Engineering Environmental Engineering

Summary

• Degree offered: Master of Engineering (MEng)
• Registration status options: Full-time; Part-time
• Language of instruction: English

Most of the courses in this program are offered in English. Research activities can be conducted either in English, French, or both, depending on the language used by the professor and the members of his or her research group.

• Program options (expected duration of the program):
  • with coursework and project (3 full-time terms; 12 consecutive months)
  • with coursework (3 full-time terms; 12 consecutive months)

• Academic units: Faculty of Engineering (http://engineering.uottawa.ca), Ottawa-Carleton Institute of Environmental Engineering (http://www.ociene.ca).

Program Description

Ottawa-Carleton Joint Program

Established in 2000, the Ottawa-Carleton Institute of Environmental Engineering (OCIEE) combines the teaching and research strengths of the Department of Civil Engineering and the Department of Chemical Engineering at the University of Ottawa with that of the Departments of Civil and Environmental Engineering at Carleton University.

The Institute offers graduate programs leading to the degrees of Master of Applied Science in Environmental Engineering (MASc), Master of Applied Science in Environmental Engineering (MASc) Specialization in Environmental Sustainability, a Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Environmental Engineering.

Main Areas of Research

• Water and waste processing or treatment
• Management of solid and hazardous waste
• Air pollution
• Water resources and groundwater management

Note: Further information is posted on the departmental website.

Learning Outcomes

• Autonomy in conducting research
• Autonomy in preparing scholarly publications

Fees and Funding

• Program fees:
  The estimated amount for university fees (https://www.uottawa.ca/university-fees) associated with this program are available under the section Finance your studies (http://www.uottawa.ca/graduate-studies/programs-admission/finance-studies).

  International students enrolled in a French-language program of study may be eligible for a differential tuition fee exemption (https://www.uottawa.ca/university-fees/differential-tuition-fee-exemption).

  • To learn about possibilities for financing your graduate studies, consult the Awards and financial support (https://www.uottawa.ca/graduate-studies/students/awards) section.

Notes

• Programs are governed by the general regulations (http://www.uottawa.ca/graduate-studies/students/general-regulations) in effect for graduate studies and by the general regulations of the Ottawa-Carleton Institute of Environmental Engineering (OCIEE).

• In accordance with the University of Ottawa regulation, students have the right to complete their assignments, examinations, research papers, and theses in French or in English.

Other Programs Offered Within the Same Discipline or in a Related Area

• Master of Applied Science Civil Engineering Specialization in Science, Society and Policy (MASc)
• Master of Engineering Civil Engineering (MEng)
• Doctorate in Philosophy Environmental Engineering (PhD)
• Doctorate in Philosophy Civil Engineering (PhD)

• Master of Applied Science Environmental Engineering (MASc)
• Master of Applied Science Civil Engineering (MASc)
• Master of Applied Science Environmental Engineering Specialization Environmental Sustainability (MASc)
Program Contact Information
Graduate Studies Office,
Faculty of Engineering (http://engineering.uottawa.ca/about/programs/graduate)
161 Louis-Pasteur, Colonel By Hall,
Room B111
Ottawa, Ontario, Canada
K1N 6N5

Tel.: 613-562-5800 x6189
Email: engineering.grad@uottawa.ca

Admission Requirements
For the most accurate and up to date information on application deadlines, language tests and other admission requirements, please visit the specific requirements (http://www.uottawa.ca/graduate-studies/programs-admission/apply/specific-requirements) webpage.

To be eligible, candidates must:

• Have one of the following:
  • An honours bachelor’s degree with a specialization or a major in environmental engineering (or equivalent) with a minimum average of 70% (B);
  • An honours bachelor’s degree with a specialization or a major in related engineering disciplines (civil, chemical, mechanical, etc.) with a minimum average of 70% (B);
  • An honours bachelor’s degree with specialization or a major in environmental science disciplines with a minimum average of 70% (B).

Note: International candidates must check the admission equivalencies (https://www.uottawa.ca/graduate-studies/international/study-uottawa/admission-equivalencies) for the diploma they received in their country of origin.

• Pay the $100 ($CDN non-refundable) application fee.

• Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.

• Meet the following additional requirements:
  • All students entering the program are required to have courses in mathematics, probability and statistics equivalent to courses required in undergraduate engineering programs.
  • All students entering the program are also required to have taken three undergraduate courses equivalent to the following University of Ottawa courses:
    • CHG 2312 or CVG 2116
    • CVG 2132
    • CVG 3132
  • 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. The undergraduate courses required are specified in the certificate of admission.

Language Requirements
Applicants must be able to understand and fluently speak the language of instruction (French or English) in the program to which they are applying. Proof of linguistic proficiency may be required.

Application whose first language is neither French nor English must provide proof of proficiency in the language of instruction.

Language tests recognized by the University of Ottawa:

• TOEFL: 550 (paper-based) or 79-80 (internet-based); or
• IELTS: 6.5 Overall – 5.0 Individual (paper-based or internet-based); or
• An equivalent language test (http://www.uottawa.ca/graduate-studies/programs-admission/apply/required-documents).

Note: Candidates are responsible for any fees associated with the language tests.

Notes

• The admission requirements listed above are minimum requirements and do not guarantee admission to the program.
• Admissions are governed by the general regulations (http://www.uottawa.ca/graduate-studies/students/general-regulations) in effect for graduate studies and by the general regulations of the Ottawa-Carleton Institute of Environmental Engineering (OCIEE).

Documents Required for Admission
In addition to the documents required (http://www.uottawa.ca/graduate-studies/programs-admission/apply/required-documents) for graduate and postdoctoral studies, candidates must submit the following documents:

• A resume
• A letter of intent or motivation
  Letter outlining your professional goals and proposed research area.

• Two confidential letters of recommendation from professors who have known the applicant and are familiar with their work.

• Transcripts from all universities attended:
  • Official transcripts from all universities attended must be submitted.
    This applies to all courses and programs at any university you attended, including regular programs (completed or not), exchanges, letters of permission, online or correspondence courses, courses taken as a special student or visiting student, etc.
  • If the transcript and degree certificate are not in English or French, a certified translation (signed and stamped/sealed) must be submitted.

• A preference form (http://engineering.uottawa.ca/downloads/pdf/OCIENE_Preference.pdf)

Note: Documents that are not required for admission will not be consulted, conserved or returned to the student. These documents will be destroyed according to our administrative procedures.

Information about how to apply to this program is available under the Apply Now (http://www.uottawa.ca/graduate-studies/programs-admission/apply/#apply-now) section.

Students should complete and submit their online application with supporting documentation (if applicable) by the deadline indicated above.

Program Requirements
Master’s with Coursework and Project

Candidates transferring from another university must take at least half their units at the Institute.

The Department may require students to take additional courses, depending on their backgrounds.

Students must meet the following requirements:

Compulsory Courses:
24 optional course units in environmental engineering (EVG) at the graduate level

Project:
EVG 6001 Environmental Engineering Project

Note(s)
1 A minimum of 3 course units must be selected from at least three of the following areas of study:
  • Air pollution
  • Water resources management, groundwater management and contaminant transport
  • Water and waste water treatment
  • Management of solid, hazardous, and radioactive waste and pollution prevention
  • Environmental impact assessment

List of Optional Courses
Course selection is subject to the approval of the advisor 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. Students must complete at least one course in three of the five areas. The director 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.

Air Pollution

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVG 7161</td>
<td>Traffic Related Air Pollution</td>
<td>3</td>
</tr>
<tr>
<td>CVG 7162</td>
<td>Ambient Air Quality and Pollution Modelling</td>
<td>3</td>
</tr>
<tr>
<td>CHG 8132</td>
<td>Adsorption Separation Processes</td>
<td>3</td>
</tr>
<tr>
<td>EVG 5101</td>
<td>Air Pollution Control</td>
<td>3</td>
</tr>
<tr>
<td>EVG 7104</td>
<td>Indoor Air Quality</td>
<td>3</td>
</tr>
</tbody>
</table>

Water Resources Management, Groundwater Management, and Contaminant Transport

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVG 5124</td>
<td>Coastal Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVG 5125</td>
<td>Statistical Methods Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CVG 5154</td>
<td>Random Vibration</td>
<td>3</td>
</tr>
<tr>
<td>CVG 5160</td>
<td>Sediment Transport</td>
<td>3</td>
</tr>
<tr>
<td>CVG 5162</td>
<td>River Hydraulics</td>
<td>3</td>
</tr>
<tr>
<td>CVG 7108</td>
<td>Seepage and Water Flow Through Soils</td>
<td>3</td>
</tr>
<tr>
<td>CVG 7163</td>
<td>Case Studies in Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>CHG 8158</td>
<td>Porous Media</td>
<td>3</td>
</tr>
<tr>
<td>GEO 5143</td>
<td>Environmental Isotopes and Groundwater Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>GEO 5146</td>
<td>Techniques of Groundwater Resources Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>GEO 5147</td>
<td>Geochemistry of Natural Waters</td>
<td>3</td>
</tr>
</tbody>
</table>
GEO 5148  Theory of Flow and Contaminant Transport in Geological Materials 3 Units
EVG 7301  Contaminant Hydrology 3 Units
EVG 7303  Multiphase Flow in Soils 3 Units

Management of Solid, Hazardous, and Radioactive Waste and Pollution Prevention
CVG 5133  Solid Waste Disposal 3 Units
CVG 5179  Anaerobic Digestion 3 Units
CVG 5331  Sludge Utilization and Disposal 3 Units
EVG 5203  Hazardous and Radioactive Waste Management 3 Units
EVG 7201  Geo-Environmental Engineering 3 Units
EVG 7202  Contaminant Fate Mechanisms 3 Units

Water and Wastewater Treatment
CVG 5130  Wastewater Treatment Process Design 3 Units
CVG 5132  Unit Operations of Water Treatment 3 Units
CVG 5134  Chemistry for Environmental Engineering 3 Units
CVG 5137  Water and Wastewater Treatment Process Analysis 3 Units
CVG 5138  Advanced Water Treatment 3 Units
CVG 7160  Biofilm Processes in Waste-Water Treatment 3 Units
CVG 5180  Biological Nutrient Removal 3 Units
CVG 5232  Unit Operations of Water Treatment Lab 1.5 Units
CVG 5238  Advanced Water Treatment Process Lab 1.5 Units
CHG 8181  Biochemical Engineering 3 Units
CHG 8192  Membrane Application in Environmental Engineering 3 Units
CHG 8198  Reverse Osmosis 3 Units

Environmental Impact Assessment
EVG 7401  Environmental Impact Assessment of Major Projects 3 Units
CVG 5139  Environmental Assessment of Civil Engineering Projects 3 Units

Other Courses
EVG 6108  Directed Studies I 3 Units
EVG 6109  Directed Studies II 3 Units
EVG 6300  Special Topics in Environmental Engineering I 3 Units
EVG 6301  Special Topics in Environmental Engineering II 3 Units
EVG 6302  Special Topics in Environmental Engineering III 3 Units
EVG 7402  Finite Elements in Field Problems 3 Units
GNG 5121  Planning of Experiments in Engineering Design 3 Units
GNG 5122  Operational Excellence and Lean Six Sigma 3 Units

Dynamic Processes
CHG 8186  Modelling of Steady-State Processes 3 Units
CHG 8194  Membrane Separation Processes 3 Units
CHG 8195  Advanced Numerical Methods in Transport Phenomena 3 Units

Transport Phenomena
CHG 8196  Interfacial Phenomena in Engineering 3 Units
CVG 7140  Statistics, Probabilities and Decision-Making 3 Units
CVG 7150  Intercity Transportation, Planning and Management 3 Units
CVG 7151  Traffic Engineering 3 Units
CVG 7153  Urban Transportation and Management 3 Units

Minimum Requirements
The passing grade in all courses is B.

Students who fail six units, or the thesis proposal, or whose research progress report is deemed unsatisfactory are required to withdraw from the program.

Fast-track from Master’s to PhD
Students enrolled in the master’s program in environmental engineering at the University of Ottawa may be eligible to fast-track directly into the doctoral program without writing a master’s thesis. For additional information, please contact the graduate studies office of the Faculty of Engineering.

Research

Research Fields & Facilities
Located in the heart of Canada’s capital, a few steps away from Parliament Hill, the University of Ottawa is among Canada’s top 10 research universities.

uOttawa focuses research strengths and efforts in four Strategic Areas of Development in Research (SADRs):

• Canada and the World
• Health
• e-Society
• Molecular and Environmental Sciences

With cutting-edge research, our graduate students, researchers and educators strongly influence national and international priorities.

Research at the Faculty of Engineering
Areas of research:

• Chemical and Biological Engineering
• Civil Engineering
• Electrical Engineering and Computer Science
• Mechanical Engineering

For more information, refer to the list of faculty members and their research fields on Uniweb (https://uniweb.uottawa.ca/#farts/themes).

Courses
Course selection is subject to the approval of the advisor 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. Students must complete at least one course in three of the five areas. The director 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. Only a selection of courses given in a particular academic year.

**EVG 5001 Biofilm Processes in Wastewater Treatment (3 crédits / 3 units)**
- **Volet / Course Component:** Cours magistral / Lecture
- This course is equivalent to ENVE 5101 at Carleton University.

**EVG 5101 Air Pollution Control (3 units)**
- This course is equivalent to ENVE 5101 at Carleton University.
- **Course Component:** Lecture

**EVG 5203 Hazardous and Radioactive Waste Management (3 units)**
- This course is equivalent to ENVE 5203 at Carleton University.
- **Course Component:** Lecture

**EVG 5800 Seminar for Master's Candidates in Environmental Engineering (1 crédits)**
- Ce cours est équivalent à ENVE 5800 à la Carleton University.
- **Volet :** Recherche

**EVG 5801 Seminar for Doctoral Candidates in Environmental Engineering (3 crédits)**
- Ce cours est équivalent à ENVE 7800 à la Carleton University.
- **Volet :** Recherche

**EVG 6001 Projet en génie de l'environnement / Environmental Engineering Project (6 crédits / 6 units)**
- Ce cours est équivalent à ENVE 5900 à la Carleton University. / This course is equivalent to ENVE 5900 at Carleton University.
- **Volet / Course Component:** Recherche / Research

**EVG 6108 Directed Studies I (3 units)**
- This course is equivalent to ENVE 5906 at Carleton University.
- **Course Component:** Research

**EVG 6109 Directed Studies II (3 units)**
- This course is equivalent to ENVE 5907 at Carleton University.
- **Course Component:** Research

**EVG 6300 Special Topics in Environmental Engineering I (3 units)**
- **Course Component:** Lecture

**EVG 6301 Special Topics in Environmental Engineering II (3 units)**
- This course is equivalent to ENVE 5701 at Carleton University.
- **Course Component:** Lecture

**EVG 6302 Special Topics in Environmental Engineering III (3 units)**
- This course is equivalent to ENVE 5702 at Carleton University.
- **Course Component:** Lecture

**EVG 6508 Études dirigées I (3 crédits)**
- **Volet :** Cours magistral

**EVG 6509 Études dirigées II (3 crédits)**
- **Volet :** Cours magistral

**EVG 7104 Indoor Air Quality (3 units)**
- This course is equivalent to ENVE 5104 at Carleton University.
- **Course Component:** Lecture

**EVG 7201 Geo-Environmental Engineering (3 units)**
- This course is equivalent to ENVE 5201 at Carleton University.
- **Course Component:** Lecture

**EVG 7202 Contaminant Fate Mechanisms (3 units)**
- This course is equivalent to ENVE 5202 at Carleton University.
- **Course Component:** Lecture

**EVG 7301 Contaminant Hydrology (3 units)**
- This course is equivalent to ENVE 5301 at Carleton University.
- **Course Component:** Lecture

**EVG 7303 Multiphase Flow in Soils (3 units)**
- This course is equivalent to ENVE 5303 at Carleton University.
- **Course Component:** Lecture

**EVG 7401 Environmental Impact Assessment of Major Projects (3 crédits)**
- This course is equivalent to ENVE 5401 at Carleton University.
- **Volet :** Cours magistral

**EVG 7402 Finite Elements in Field Problems (3 crédits)**
- This course is equivalent to ENVE 5402 at Carleton University.
- **Volet :** Cours magistral

**EVG 7999 Thèse de M.Sc.A. / Master's Thesis**
- Ce cours est équivalent à ENVE 5909 à la Carleton University. / This course is equivalent to ENVE 5909 at Carleton University.
- **Volet / Course Component:** Recherche / Research

**EVG 9998 Examen de synthèse / Comprehensive Examination**
- **Volet / Course Component:** Recherche / Research

**EVG 9999 Thèse de doctorat / Ph.D. Thesis**
- Ce cours est équivalent à ENVE 6909 à la Carleton University. / This course is equivalent to ENVE 6909 at Carleton University.
- **Volet / Course Component:** Recherche / Research