

Fall 2026
ENVE 4005/5008 WASTEWATER TREATMENT PRINCIPLES AND DESIGN
Department of Civil and Environmental Engineering
Carleton University

Teaching Team

Instructor:

Name: Dr. Banu Örmeci, Professor and Jarislowsky Chair in Water and Health
Email address: banuormeci@cunet.carleton.ca
Office location: 3438 Mackenzie Building
Office hours: Wednesdays at 1 pm

TA:

Irem Simsek
iremsimsek@cmail.carleton.ca
Office hours: TBD

Course Description and Requirements

1) Course schedule

Lectures on Mondays, 2:35-5:25 pm, [REDACTED]
Labs on Wednesdays, 11:35-2:25 pm, [REDACTED]
Tutorials on Fridays, 10:35 – 11:25 am, [REDACTED]

2) Course description

Theoretical aspects of unit operations and processes for wastewater treatment with design applications. Topics include wastewater characteristics, flow rates, primary treatment, chemical unit processes, biological treatment processes, advanced wastewater treatment, disinfection, and biosolids treatment and disposal. Lectures three hours a week, problem analysis one hour a week, laboratory three hours alternate weeks.

3) Precluded courses

Also offered at the graduate level, with different requirements, as [ENVE 5008](#) for which additional credit is precluded.

4) Prerequisites and recommended knowledge

ENVE 3001

5) Learning Outcomes

Learn the fundamentals and science of wastewater treatment

Learn and design physical treatment processes

Learn and design chemical treatment processes

Learn and design biological treatment processes

Learn and design advanced treatment processes

Learn and design biosolids treatment processes

Learn and design on-site treatment processes

Assess water reuse options

Understand and integrate technical, environmental, financial, political, and ethical criteria in decision-making

Learn and compare wastewater regulations in Canada and other countries
 Collaborate with team members on a design assignment
 Write engineering reports to a client

6) Graduate Attributes

The Canadian Engineering Accreditation Board (CEAB) requires graduates of undergraduate engineering programs to possess 12 attributes. Courses in all four years of our programs evaluate students' progress towards acquiring these attributes. Aggregate data (typically, the data collected in all sections of a course during an academic year) is used for accreditation purposes and to guide improvements to our programs. Some of the assessments used to measure GAs may also contribute to final grades; however, individual students' GA measurements are not used to determine a student's year-to-year progression through the program or eligibility to graduate. The following list provides the GAs to be measured in this course, along with the Learning Outcomes intended to develop abilities related to these attributes.

GA	Assessment Tool
GA 1.8C Discipline-specific concept CEE-8 Water/Wastewater Engineering	Students will receive a rubric score based on their cumulative performance on the knowledge-based essay questions in the exams.
GA 3.1 Complex Problem Assessment	The course includes an open-ended design assignment in which students are given an existing town/city and asked to design a wastewater treatment plant/system.
GA 3.2 Design of Experiment	Lab 3 Sludge Dewatering, which requires students to search for and identify the optimum polymer dose, will be used to assess rubric GA 3.2.
GA 3.3 Experimental Procedure	Lab 4 Disinfection, which includes chlorine (chemical) and UV (physical) disinfection and culturing of E. coli (biological), has a comprehensive experimental procedure and will be used to assess rubric GA 3.3.
GA 3.4 Data reduction methods and results	Lab 2, Phosphorus Precipitation, which uses alum and lime for phosphorus removal and generates sufficient data to evaluate data reduction methods and results, will be used to assess rubric GA 3.4.
GA 3.5 Interpretation of data (synthesis) and discussion	Lab 1, Wastewater Characteristics, in which students are asked to identify the type of wastewater and are provided with nine discussion questions, will be used to assess rubric GA 3.5.

For information on GAs and continual curriculum improvement, visit the [Accreditation section of Engineers Canada website](#).

7) Accreditation Units

Math	Natural Science	Complementary Studies	Engineering Science	Engineering Design
-	-	-	25%	75%

8) Text book(s)/Learning Materials and their costs

Students are not required to purchase textbooks or other learning materials for this course.

9) Topics and tentative plan

Week	Subject	Labs
Week 1 (Sept 14)	Wastewater characteristics and flow rates	Lab 1 – Group A
Week 2 (Sept 21)	Preliminary treatment	Lab 1 – Group B
Week 3 (Sept 28)	Primary treatment	Lab 2 – Group A
Week 4 (Oct 5)	Chemical treatment	Lab 2 – Group B
Week 5 (Oct 12)	Aerobic biological treatment processes	Lab 3 – Group A
Week 6 (Oct 19)	Aerobic biological treatment – cont.	Lab 3 – Group B
Week 7 (Oct 26)	FALL BREAK	
Week 8 (Nov 2)	Anaerobic biological treatment processes	Lab 4 – Group A
Week 9 (Nov 9)	Advanced wastewater treatment	Lab 4 – Group B
Week 10 (Nov 16)	Disinfection processes	Lab 5 – Group A
Week 11 (Nov 23)	Biosolids treatment and disposal	Lab 5 – Group B
Week 12 (Nov 30)	Decentralized wastewater treatment and water reuse	
Week 13 (Dec 7)	Presentation of the design projects	

10) Evaluation and marking scheme

Grading

Mid-term	30%	(November 2, Monday)
Final	40%	(Final examination will be set by Examination Services).
Laboratory reports	15%	(due one week after the Lab session)
Design project	15%	(December 7, Monday)

The dates are tentative and subject to change if needed.

Lab reports

Your reports should have the following parts: Introduction, Materials and Methods, Results, Discussion, and Conclusions. Experimental data will be shared within a group, and each group will submit one report. Sharing data, graphs, and reports with other groups is not allowed. Lab reports will be submitted one week later.

Design Project

Consulting firms (teams of three to four students) will work together on the design project. Each group will submit one report at the end of the term.

- i) The arithmetic average of your mid-term and final exam must be a minimum of 50/100 to pass this course.
- ii) Mid-term and final exams will be closed-book exams. Bring your calculator. No cheat sheets.
- iii) Mid-term and final exams will be on campus and proctored.
- iv) For each late design project or laboratory report, 5% of the grade will be deducted for each day late. Weekends are included.
- v) Final exams are for evaluation purposes and will not be returned to students.

Deferred term work and self-declaration

Students who claim extenuating circumstances, as defined in the Academic Consideration Policy, as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternative arrangements with the instructor in all cases. This must occur no later than three (3) days after the term work was due. The alternate arrangement must be made before the last day of classes in the term as published in the academic schedule. Consult [Section 4.4 of the University Calendar](#).

Deferred Final Examinations

Students who are unable to write the final examination because of extenuating circumstances, as defined in the [Academic Consideration Policy](#), may apply for accommodation by contacting the Registrar's office. Consult [Section 4.3 of the University Calendar](#).

11) Academic dates

Students should be aware of the academic dates (e.g. last day for academic withdrawal) posted on the Registrar's office website <https://carleton.ca/registrar/registration/dates/academic-dates/> or the [Calendar website](#).

Academic Integrity and Plagiarism

- a) Please consult the Faculty of Engineering and Design information page about the Academic Integrity policy and our procedures: <https://carleton.ca/engineering-design/current-students/fed-academic-integrity> Violations of the Academic Integrity Policy will result in the assignment of a penalty such as reduced grades, the assignment of an F in a course, a suspension or expulsion.
- b) One of the main objectives of the Academic Integrity Policy is to ensure that **the work you submit is your own**. As a result, it is important to write your own solutions when studying and preparing with other students and to avoid plagiarism in your submissions. The University Academic Integrity Policy defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This includes reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source.

Examples of violations of the policy include, but are not limited to:

- any submission prepared in whole or in part by someone else;
- using another’s data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one’s own; and
- failing to acknowledge sources of information through the use of proper citations when using another’s work and/or failing to use quotation marks.

Unauthorized Dissemination

As per Carleton’s [Academic Integrity Policy](#), Unauthorized Dissemination is a violation of the standards of academic integrity to publish, disseminate, or otherwise make available to a third party instructional material where the instructor has explicitly prohibited their dissemination.

The materials (including the course outline, slides, posted notes, videos, labs, projects, assignments, quizzes, exams, and solutions) created for this course are intended for personal use only. They may not be reproduced, redistributed, or disseminated in any form or by any means—electronic, mechanical,

photocopying, recording, or otherwise—without written permission from the author(s), both during and after the semester.

Generative Artificial Intelligence (GenAI)

To prepare students for AI-assisted future jobs, the use of AI tools is permitted in this course. A description of how AI was used must be included in the assignments.

Safer Learning and Working Environment

Carleton University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the [Department of Equity and Inclusive Communities](#) at equity@carleton.ca, [Ombuds Services - Carleton University](#) or submit an anonymous human rights concern through [this form](#).

Academic Accommodations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website (students.carleton.ca/course-outline)

Engineering Academic Advising

[The Engineering Academic Support Service](#) assists undergraduate engineering students with course selection, registration, and learning support from first-year through to graduation. Academic Advisors Contact can be found here: <https://carleton.ca/engineering-design/current-students/undergrad-academic-support/undergraduate-advisors/>.

Student Mental Health and Wellness

As a university student, you may experience a range of mental health challenges that can significantly impact your academic success and overall well-being. Carleton's [Wellness Services Navigator](#) is designed to help students connect with mental health and wellness resources. If you need to talk to someone from the department for more information and support with connecting to resources, you can contact the following faculty members, depending on your program. Or contact the department.

Department: CEEUGChair@cunet.carleton.ca

Prof. Shoeleh Shams

Email: shoelehshams@cunet.carleton.ca, Office: 4242 Mackenzie

ACSE: Prof. Cara Lozinsky

Email: caralozinsky@cunet.carleton.ca, Office: 2374 Mackenzie

CIVE: Prof. Christian Viau

Email: Christian.Viau@carleton.ca, Office: 4535 Mackenzie

ENVE: Prof. Cole Van De Ven

Email: cole.vandeven@carleton.ca, Office: 6210 Canal Building

Here is a list of on-campus and off-campus recourses:

1. [Emergencies and Crisis](#)
2. **Carleton's Wellness Desk:** Located at [204A MacOdrum Library](#), is a space for students to learn about resources, connect with our Wellness Coordinator, and decompress during stressful times of the year. You can pop into the Wellness Desk any time during its hours of operation – no appointments necessary! <https://wellness.carleton.ca/mental-health/wellness-desk/>
3. **Carleton's Care and Support Team:** The role of a Care and Support Team is to support students with any questions or concerns they may have relating to their academics, well-being, finances or any other challenges they may be experiencing. <https://wellness.carleton.ca/mental-health/student-care-and-support-team/>
4. **Carleton's Health and Counselling Services:** To book an appointment visit the [CHR Connect App](#) or contact the main clinic by calling 613-520-6674 ext. 2. If urgent, let the Patient Care Coordinator know or go in person to the main clinic (2500 Carleton Technology and Training Centre Building) and indicate that they are in crisis and need to speak to someone right away. <https://wellness.carleton.ca/counselling/>
5. **Carleton's Single Session Counselling:** To book an appointment visit the CHR Connect App. <https://thconnect.telushealth.com/mobile-app-information/xz6lzGrv>
6. **Residence Counselling and Wellness Service:** Counselling services specifically for students in residence. To book an appointment call 613-520-2600 ext. 8061. <https://carleton.ca/health/residence-counselling/>
7. **Carleton's Therapy Dogs:** Carleton's therapy dogs are around campus with their owners (who are Carleton University staff and faculty) to comfort and provide support to help you thrive as a university student. <https://wellness.carleton.ca/mental-health/therapy-dogs/>
8. **Good2Talk (1-866-925-5454):** Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/36 <https://good2talk.ca/>
9. **The Walk-In Counselling Clinic (off-campus community resource):** The Walk-in Counselling Clinic has offices in various locations across Ottawa and the greater Champlain region that are open 7 days a week. Individuals will be assisted, with no appointment, on a first-come, first-serve basis during the Walk-in Counselling Clinic hours. The Walk-in Counselling Clinic **offers services in many languages** and is free and confidential. More information can be found at: <https://walkincounselling.com/>
10. **Distress Centre of Ottawa and Region:** Available 10am-11pm, 7 days/week, 365 days/year. **Distress Line:** 613-238-3311, **Crisis Line:** 613-722-6914 or 1-866-996-0991, **Text:** 343-306-5550. <https://www.dcottawa.on.ca/>
11. **Distress and Crisis Ontario,** Available for chat 2 pm – 2 am EST. <https://www.dcontario.org/>
12. **BounceBack Ontario (Toll-Free: 1-866-345-0224)** is a free skill-building program managed by the Canadian Mental Health Association (CMHA). It is designed to help adults and youth 15+ manage low mood, mild to moderate depression and anxiety, stress or worry. Delivered over the phone with a coach and through online videos, you will get access to tools that will support you on your path to mental wellness. <https://bouncebackontario.ca/>