

Winter 2024
Municipal Hydraulics
Department of Civil and Environmental Engineering
CIVE 4307

Instructor:

Prof. Jennifer Drake

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Office Hours: TBD

I have an open-door policy. I encourage you to make of this flexible policy to drop by to chat about anything that is related to the course or to discuss how I could better support your learning. Please visit my office anytime or message me on **Microsoft TEAMS** during regular weekday working hours (9 AM – 4 PM). I will be available for in-person office hours which will be set the first week of class.

TA(s): Information will be posted on Brightspace

1) Course schedule

Lectures: Tuesday 1& Thursday :05 – 2:25 Tory Building Room 240,

Tutorials: Fri 11:35 – 12:55 PM Tory Building Room 447

2) Course description

Fluid flow fundamentals. Hydraulics of pipe systems. Open channel flow. Prediction of sanitary and storm sewage, flow rates. Design of water distribution systems, culverts, sanitary and storm sewers. Pumps and measuring devices. Hydraulic and flow control structures.

3) Precluded courses

NA

4) Prerequisites and recommended knowledge

MAAE 2300 Fluid Mechanics 1

5) Learning Outcomes

The course covers the physics (not chemistry) involved in our three primary municipal water systems: (1) piping and pumping for water, (2) wastewater and (3) stormwater. When you have completed this course, you will:

- Understand the hydraulic processes involved in our municipal water pipe systems
- Use current methods to design municipal water pipe systems
- Use computer models effectively as a part of the design process
- Become familiar with relevant guidelines and regulations related to municipal water pipe systems.

6) Graduate Attributes

Engineering programs are accredited by the Canadian Engineering Accreditation Board (CEAB). As part of this process, we collect GA data to assess how effectively we are teaching or conveying the GAs with the goal of continually improving our programs. The GA data are aggregate data for a course and are NOT linked to student names or student numbers. The GAs assessed in this course include the following:

GA - Indicator	Assessment Tool
Design	Midterm and final exam
Use of Engineering tools	Assignments

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

7) Text book(s)/References

I strongly recommend **Water Resources Engineering** by David Chin, 4th Edition, 2020. I will be referring to this book throughout the term. Older versions are acceptable. *Water Resources Engineering* (2nd edition) is available on reserve at the library.

Alternative textbooks:

- *Practical Hydraulics and Water Resources Engineering* by Melvyn Kay, 3rd Edition, 2017. Available online through Carleton Library, Doi: <https://doi-org.proxy.library.carleton.ca/10.1201/9781315380674>
- *Hydrology and Hydraulics* by Ram Gupta, 4th Edition 2017

8) Computing

STUDENTS ARE REQUIRED TO USE PERSONAL COMPUTERS RUNNING A WINDOWS ENVIRONMENT.

Assignments may require the use of municipal pipe modelling programs:

- EPANET <https://www.epa.gov/water-research/epanet>
- EPA-SWMM <https://www.epa.gov/water-research/storm-water-management-model-swmm>

9) Topics and Tentative Plan

(Subject to change)

Week	Class topic	Tutorial	
1	Jan 9	Intro, review fluid properties, continuity, energy and momentum	No tutorial
2	Jan 16	Single pipelines	
3	Jan 23	Pipe networks	Quiz 1
4	Feb 30	Water cavitation, water hammer, pumps	
5	Feb 6	Water demand and water distribution system components	Aqualibrium Water Competition
6	Feb 13	Modelling and section re-cap	Midterm
-	Feb 20	No class (Reading week)	
8	Feb 27	Open Channel flow: friction, Manning's, specific energy, critical flow	EPANet Assignment
9	Mar 5	Water surface profiles, hydraulic control structures	
10	Mar 12	Sanitary sewer hydraulics	
11	Mar 19	Sanitary sewer systems	Quiz 2
12	Mar 26	Stormwater collection systems	
13	Apr 2	Stormwater collection systems	SWMM Assignment

Final examination will be set by Examination Services.

10) Evaluation and Marking Scheme

Final grades will be determined in the following manner:

- Quizzes 10%
- Computational Modelling assignments (EPANET and EPA-SWMM) 15%
- Midterm 25%
- Final 50%

a) Missed Term work

Students who claim illness, injury or other extraordinary circumstances beyond their control as a reason for missed term work are held responsible for immediately informing the instructor concerned and for alternate arrangements with the instructor and 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](#).

b) Final Examination

- i) Final exams are for evaluation purpose and will not be returned to students.
- ii) Students who are unable to write the final examination because of a serious illness/emergency or other circumstance beyond their control may apply for accommodation by contacting the Registrar's office. Consult the [Section 4.3 of the University Calendar](#).

c) Late Submission Policy

I follow a flexible policy for assignment submissions. Each student will receive **three 12-hour grace tokens**. They can be used in combination or individually and will be applied automatically by the teaching team. For example, you can use all four tokens to extend one assignment by 1.5-days or use the tokens individually to extend assignment submission time by 12 hours each.

You do not need to ask to use a grace token. They will be applied automatically by the teaching team.

No additional extensions will be provided without justification.

All assignments should be prepared for submission as if you are in a professional environment. Appropriate writing should be used to introduce the problems you are assessing and discuss/describe results, regardless of whether the assignment asks for a write-up. Your name and the name of the assignment should appear at the top of your assignments. Points will be deducted for poor grammar and spelling.

11) Academic dates

Students should be aware of the academic dates (eg. last day for academic withdrawal) posted on the Registrar's office web site <https://carleton.ca/registrar/registration/dates/academic-dates/>

12) 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 quotations marks.

13) Copyright

The materials (including the course outline and any slides, posted notes, videos, labs, project, assignments, quizzes, exams and solutions) created for this course and posted on this web site are intended for personal use and may not be reproduced or redistributed or posted on any web site without prior written permission from the author(s).

14) Inclusivity in the classroom

We will strive to create an environment of mutual respect for all through equity, diversity, and inclusion within this course. The space (physical or virtual) which we work in will be safe for everyone. Please be considerate of everyone’s personal beliefs, choices, and opinions.

15) Addressing Human Rights Concerns

The 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

16) Academic Accommodations

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at **613-520-6608** or pmc@carleton.ca.

You should request your academic accommodations in the [Ventus Student Portal](#), for each course at the beginning of every term. For in-term tests or midterms, please request accommodations at least two (2) weeks before the first test or midterm. For final exams, the deadlines to request accommodations are published in the [University academic calendars](#) for both undergraduate and graduate students.

Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the [Senate Policy on Accommodation for Student Activities \(PDF\)](#).

Pregnancy Obligation: Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the [Student Guide to Academic Accommodation \(PDF\)](#).

Religious Obligation: Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the [Student Guide to Academic Accommodation \(PDF\)](#).

Survivors of Sexual Violence: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit the [Sexual Violence Prevention & Survivor Support](#).

17) 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 at orCEEUGChair@cunet.carleton.ca.

ACSE: Prof. [Scott Bucking](#)

Email: scott.bucking@carleton.ca, Office: 5209 Canal Building

CIVE: Prof. [Heng Khoo](#)

Email: heng.khoo@carleton.ca, Office: 3364 Mackenzie

ENVE: Prof. [Shoeleh Shams](#)

Email: shoeleh.shams@Carleton.ca, Office: 4242 Mackenzie

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

1. **Carleton's Health and Counselling Services:** To book an appointment contact the main clinic by calling (613) 520-6674. 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. For more information, please see <https://carleton.ca/health/>
2. [Emergencies and Crisis](#) and [Emergency Numbers](#)
3. **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/>
4. **Empower Me:** Undergraduate students have access to free counselling services in the community through Empower Me, either in person, by telephone, video-counselling or e-counselling. **This free service is accessible 24/7, 365 days per year.** Call **1-844-741-6389 (toll free)** to make an appointment with a counsellor in the community. More information is available <https://students.carleton.ca/services/empower-me-counselling-services/>
5. **The Walk-In Counselling Clinic (off-campus community resource):** The walk-in Counselling Clinic have 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/>

6. **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/>
7. **Distress and Crisis Ontario,** Available for chat 2 pm – 2 am EST. <https://www.dcontario.org/>
8. **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/>.