Civil Engineering
CIVENG – 4L04/6L04
Design of Water Resources Systems
Winter 2024

Instructor Information

Name: Ahmed Elsayed

Email: elsaya5@mcmaster.ca

Office:

Office Hours: Friday 10:30 – 11:59 am

Class Times

Lectures: **Tuesday & Friday** 9:30 – 10:20 am

Tutorials: **Thursday** 2:30 – 4:20 pm

Labs: **Monday** 11:30 – 2:20 pm

Class Format

In Person

Course Dates: 01/08/2024 – 04/10/2024

Units: 4.00

Course Delivery Mode: In Person

Course Description: Investigation, planning, analysis and design of water resources systems, climate change. Introduction to GIS tools. Frequency analysis, design storms, urban drainage and analysis, floodplain analysis and flood control. Prerequisite(s): CIVENG 3M03

Important Links

- Mosaic
- Avenue to Learn
- Student Accessibility Services - Accommodations
- McMaster University Library

Course Learning Outcomes

By the end of this course, students should be able to:

- Recognize water budgest, water resources management and sustainability of water resources.
- Identify and formulate applicable theories about hydraulic processes such as energy, momentum and hydrostatic forces.
- Distinguish between the fundamental procedures for designing different hydraulic systems such as pipelines and open channels.
- Understand the hydraulics of open channels.
- Understand the main hydrologic processes including precipitation, infiltration and surface runoff.
- Understand basic probabilistic concepts and frequency analysis to estimate outcomes and uncertainties in appropriate data collection and obtain substantiated conclusions from the data analysis.
- Formulate appropriate models and methods using state-of-the-art tools and identify assumptions and constraints in the design of hydraulic and hydrologic systems.
- Explore different areas of research pertaining to water resources design and climate change.

Graduate Attributes

The Canadian Engineering Accreditation Board (CEAB) is a division of Engineers Canada and is responsible for accrediting undergraduate engineering programs across Canada. Accreditation by the CEAB ensures that the engineering programs meet a national standard of quality and cover essential educational requirements. Graduate Attributes are a set of qualities and skills that the CEAB expects engineering graduates to possess. These attributes are a benchmark for the learning outcomes of accredited engineering programs. This section lists the Graduate Attribute Indicators associated with the Learning Outcomes in this course. CEAB Learning Indicators measured in this course as included in parenthesis above are:

1.3 Competence in Engineering Fundamentals

1.4 Competence in Specialized Engineering knowledge

2.1 Identifies and states reasonable assumptions and suitable engineering fundamentals, before proposing a solution path to a problem.

3.2 Synthesizes the results of an investigation to reach valid conclusions.

4.3 Develops models/prototypes; tests, evaluates, and iterates as appropriate.

5.1 Evaluates engineering tools, identifies their limitations, and selects, adapts, or extends them appropriately.

6.1 Actively contributes to the planning and execution of a team project.

Lab Safety

The Faculty of Engineering is committed to McMaster University's Workplace and Environmental Health and Safety Policy which states: "Students are required by University policy to comply with all University health, safety and environmental programs". It is your responsibility to understand McMaster University Workplace and Environmental Health and Safety programs and policies. For information on these programs and policies please refer to McMaster University Health and Safety. The Lab Safety Handbook is available here, as well as on A2L.

It is also your responsibility to follow any specific Standard Operating Procedures (SOPs) provided for some of the experiments and the laboratory equipment. A laboratory-specific set of rules can also be added to ensure that students fully understand laboratory safety rules that are in place prior to their first session.

Course Schedule

Week	Topic
Week 1	Introduction to Water Resources Engineering
Week 2	Hydraulic Processes: Flow and Hydrostatic Forces
Week 3	Hydraulic Processes: Pipe flow
Week 4	Hydraulic Processes: Design of Open Channels
Week 5	Hydraulic Processes: Open Channel Hydraulics
Week 6	Research Project & Midterm Review
Week 7	Midterm Recess (No classes)
Week 8	Review of Hydrologic Processes
Week 9	Hydrologic Processes: Precipitation, Evaporation and Infiltration
Week 10	Surface Runoff
Week 11	Stream Flow Routing
Week 12	Hydrogeologic Processes: Groundwater
Week 13	Research Project Presentations
Week 14	Research Project Presentations & Course Review

This schedule is tentative — the Instructor and the University reserve the right to modify elements of the course during the term. Any changes will be announced in class and/or posted on A2L.

Required Materials and Texts

Textbook Listing: https://textbooks.mcmaster.ca

The designated textbook for the course is Water Resources Engineering, Larry W. Mays, John Wiley & Sons, Inc., 2nd or 3rd Edition, which will be complemented by lecture notes (designed to be self-sufficient) and class discussions, and students are encouraged to refer to the textbook for independent study.

In addition, there are numerous text books on water resources systems available in the Thode Library.

Course Evaluation

Assessment	Weight
Quizzes	20%
Midterm Exam	35%
Research Project and Report	10%
Lab Projects and Reports	35%

Grading Scale

Grade	Equivalent Grade Point	Equivalent Percentages
A+	12	90-100
A	11	85-89
A-	10	80-84
B+	9	77-79
B	8	73-76
B-	7	70-72

C+	6	67-69
C	5	63-66
C-	4	60-62
D+	3	57-59
D	2	53-56
D-	1	50-52
F	0	0-49

Late Submissions

Late submissions will not be accepted.

Absences, Missed Work, Illness

If you submit an MSAF, you are granted the following reliefs, based on the missed work:

- Quizzes: If you submit an MSAF for a missed quiz, you will be given a chance to take the quiz on another date.
- Midterm: If you submit an MSAF for the midterm exam, you will be given a chance to take the exam on another date.
- Lab Report: If you submit an MSAF for a lab report, you are granted a 72-hour extension of the deadline.

It is the student's responsibility to notify the instructor about the MSAF submission. For the main lab project report/presentation and research report/presentation, MSAF will NOT be accepted.

Communications

The major form of communication in this course will be the classroom. Therefore, course attendance is expected. There is also an avenue to learn site, where course notes, lab manuals, tutorial problem sets and other course materials will be posted.

In this course we will be using avenue. Students should be aware that, when they access

the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the 2 same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor. (From: http://www.mcmaster.ca/policy/Students-AcademicStudies/index.html – Undergraduate Course Management, accessed August 17th, 2016).

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their "@mcmaster.ca" alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

Additional Information

- The McMaster Standard Calculator (Casio fx991) may be used on examinations.
- The marks on different components of the course will be maintained according to the percentage scale and only the final mark will be converted to a letter grade.
- Course notes will be posted on the 4L04 avenue to learn site in sections over the duration of the term. You may print these notes and add the necessary details during class, or you can take your own notes in class. The course notes are not intended to replace class or the text book.

Generativ AI: Use Prohibited

Students are not permitted to use generative AI in this course. In alignment with McMaster academic integrity policy, it "shall be an offence knowingly to … submit academic work for assessment that was purchased or acquired from another source". This includes work

created by generative AI tools. Also state in the policy is the following, “Contract Cheating is the act of “outsourcing of student work to third parties” (Lancaster & Clarke, 2016, p. 639) with or without payment.” Using Generative AI tools is a form of contract cheating. Charges of academic dishonesty will be brought forward to the Office of Academic Integrity.

APPROVED ADVISORY STATEMENTS

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy.

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

Equity, Diversity, and Inclusion

The Faculty of Engineering is committed to creating an environment in which students of all genders, cultures, ethnicities, races, sexual orientations, abilities, and socioeconomic backgrounds have equal access to education and are welcomed and treated fairly. If you have any concerns regarding inclusion in our Faculty, in particular if you or one of your peers is experiencing harassment or discrimination, you are encouraged to contact the Chair, Associate Undergraduate Chair, Academic Advisor or to contact the Equity and Inclusion Office.

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

Academic Advising

For any academic inquires please reach out to the Office of the Associate Dean (Academic) in Engineering located in JHE-Hatch 301.

Details on academic supports and contact information are available from: https://www.eng.mcmaster.ca/programs/academic-advising

Requests for Relief for Missed Academic Term Work

In the event of an absence for medical or other reasons, students should review and follow the Policy on Requests for Relief for Missed Academic Term Work.

Academic Accommodation for Religious, Indigenous, or Spiritual Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a

course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.