Western University - Faculty of Engineering
Department of Civil and Environmental Engineering

CEE 3355b – Municipal Engineering Design – Course Outline 2025

This course applies the principles of hydraulics and hydrology in the design of municipal water systems and introduces the student to design and analysis tools that are used in practice. The general objectives are for the student to become able to:

- apply knowledge of hydrology and statistics to describe rainfall events;
- use appropriate models to quantify the volume and rate of runoff resulting from rainfall events;
- use current methods to design stormwater drainage structures;
- recognize the effect of urbanization on stormwater runoff and design effective measures to mitigate this impact;
- use stormwater computer models effectively as part of the design process;
- understand municipal sanitary sewer and water distribution systems;
- improve communication skills by documenting design decisions in coherent and legible design calculations, preparing professional engineering reports and delivering effective oral presnetations;
- recognize the need for life-long learning to keep abreast of new design and construction methods, enhance one's abilities as a designer, and maintain one's professional competence.

Calendar Copy:

Application of hydraulics and hydrology in design of water-related municipal systems. Topics include municipal water requirements and waste volumes; surface and ground water supplies; water treatment, transportation and distribution; sewerage, drainage and flood control. 0.5 Course.

Prequisites: CEE 2224

Corequisites: None

Antirequisite: None

Note: It is the **student's responsibility** to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the **student's responsibility** to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

Contact Hours:

Lectures:

2 lecture hours per week. Lecture content will be delivered asynchronously through videos and notes posted to the course OWL site. The lecture sessions will be held in person. These sessions will follow a flipped classroom approach, with the instructor presenting worked examples and answering questions related to the previous week's posted lecture material. Attendance at these sessions is mandatory. Review of lecture material and self-study should take approximately 4 hours per week.

Tutorials:

2 tutorial hours per week. Tutorial sessions will be held in person on a weekly basis. In this session, students will work in teams to complete the first part (Part A) of the weekly assignment, which should be submitted at the end of the session although the deadline will be 9:00 am the following morning. The second part of the weekly assignment (Part B) will be completed individually by each student and submitted at the start of the following week. The course teaching assistant and the course instructor will be available to answer questions related to both parts of the assignment during the tutorial sessions and may also make arrangements for additional office hours later in the week.

Instructor:

Jon Southen, P.Eng. ; SEB 3116 ; jsouthen@uwo.ca

Office hours: By appointment – contact via email to make arrangements.

Textbook:

Class notes and other pertinent material will be made available via the course website (http://owl.uwo.ca).

Other References:

Urban Hydrology, Hydraulics and Stormwater Quality: Engineering Applications and Computer Modeling, A. O. Akan & R. J. Houghtalen, John Wiley & Sons, 2003.

Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change
https://www.ontario.ca/document/stormwater-management-planning-and-design-manual-0

City of London Design Specifications and Requirements Manual.
Standards (roadauthority.com)

Low Impact Development Stormwater Management Planning And Design Guide
https://cvc.ca/wp-content/uploads/2014/04/LID-SWM-Guide-v1.0_2010_1_no-appendices.pdf

Computing:

Students are required to use personal computers running a Windows environment. Assignments may require the use of stormwater modelling programs:

PCSWMM (https://www.pcswmm.com/)

EPA-SWMM (http://www.epa.gov/water-research/storm-water-management-model-swmm)

OTTHYMO (https://civi.ca/visualotthymo-single-and-continuos-events/)

Units:

Both SI and US units will be used in lectures and examinations

Specific Learning Objectives:

1. Hydrologic Modelling [**ET1**, ET2, KB4]
   - Define watershed characteristics (Area, length, slope, soil characteristics, land use, channel geomorphology, travel time)
   - Develop a unit-hyetograph for a watershed
   - Apply the Intensity-Duration-Frequency curve of rain
   - Develop a design storm of given frequency, duration and cumulative rain distribution
   - Use infiltration models to calculate the component of rain that contributes to runoff
2. Rainfall Excess, Open-Channel Flow and Runoff Rates in Urban Watersheds [**ET1, ET2,** KB4]
   - Investigate the hydraulics of open-channel and overland flow
   - Determine the run-off coefficients and time of concentrations of drainage areas
   - Apply the unit hydrograph method to calculate runoff hydrographs at the outlet of a watershed
   - Apply the rational method to calculate peak flows in storm sewers
3. Design of Stormwater Drainage Structures [D1, **D2, D3**]
   - Design drainage structures for street pavements
   - Design storm sewers
   - Design culverts
   - Design open channels for surface drainage
4. Storm Water Management [**D1,** D2, D3, KB4, PA1, PA2, PA3, PR1, IESE2, IESE3]
   - Recognize the detrimental effect of urban development on the quality and quantity of water released into streams and lakes.
   - Compare pre-development and post-development discharge hydrographs
   - Carry out flood routing calculations
   - Design a detention facility to manage stormwater quantity
5. Stormwater Pollution and Stormwater Quality Control [ET2, **D1,** D2, D3, PA1, PA2, PA3, PR1, IESE2, IESE3]
   - Use models to estimate stormwater quality
   - Design detention facilities and other methods of stormwater quality control
   - Recognize appropriate best management practices for stormwater quality
6. Stormwater Computer Modelling [**ET1, ET2,** CS2, LL1, LL2]
   - Become familiar with current stormwater management models
   - Use these models in the design of stormwater management systems
7. Sanitary Sewers and Water Distribution [D1, D2, D3]
   - Estimate sewerage and water demands in a municipal context
   - Determine required pipe sizing for a sanitary sewer system
   - Calculate working storage, emergency storage and fire-fighting storage requirements
   - Identify the components of a municipal water supply system and their design capacities
   - Learn about the type of pumps used in the water industry and their hydraulic behaviour

The instructor may modify course material as appropriate.

General Learning Objectives

E=Evaluate, T=Teach, I=Introduce (*Advanced Level*)

Knowledge Base	T	Engineering Tools	E	Impact on Society	I
Problem Analysis	T	Team Work		Ethics and Equity	
Investigation		Communication	T	Economics and Project Management	
Design	E	Professionalism	I	Life-Long Learning	T

Accreditation Units:

Engineering Science = 25% ; Engineering design = 75%

Evaluation:

The final course mark will be determined as follows:

Assignments:	30%
Tests:	20%
Group Project:	10%
Final examination:	40%
Total	100%

Note:

(a) Students must pass the final examination to pass this course. Students who fail the final examination will be assigned the aggregate mark, as determined above, or 48%, whichever is less.

(b) Students who have failed this course previously must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted.

(c) Should any of the tests conflict with a religious holiday that a student wishes to observe, the student must inform the instructor of the conflict no later than two weeks before the scheduled test.
(For further information on Accommodations for Religious Holidays see http://www.uwo.ca/univsec/handbook/appeals/accommodation_religious.pdf)

1. Weekly Assignments

A two-part assignment based on the previous week's lecture material will be posted to OWL each week. The first part of the assignment will be completed in a team assigned by the course instructor and due at 9:00 am the day following each week's tutorial session. The second part of the assignment will be completed individually and submitted to OWL by 9:00 am on the Monday following the tutorial. Problems and assignments will be discussed during the tutorial hours. Weekly assignments must be submitted for marking by the deadline specified to the course OWL site. Late submissions will be assigned a mark of zero unless an extension has been negotiated in advance with the instructor.

2. Tests and Examinations:

Two 60 minute tests will be held during tutorial periods, tentatively scheduled on February 8 and March 14. Both tests and the final examination will be **OPEN BOOK**, and **programmable calculators are permitted.**

3. Group Project:

A group project will be assigned during the term. Teams will work on completing the project throughout the course, with the content of weekly assignments frequently contributing to the final project. The deliverables for the project will consist of a group report with supporting drawings and calculations as well as a group presentation delivered during a scheduled lecture period. Further details will be provided.

4. Use of English

In accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Activities in which collaboration is permitted:

- Homework Assignments – Part A
- Group project

Activities in which students must work alone (collaboration is not permitted):

- Homework Assignments - Part B
- Tests
- Final Exam

Course content

The lecture notes and online lecture videos are copyrighted to the instructor and legally protected. Do not post these videos and lecture notes on any other website or online forums. The recording of the live/synchronous sessions of the course without the permission from the instructor is prohibited. The illegal posting and sharing of the copyrighted course content could be subjected to legal actions.

I. Missed/Late Accommodation Policy:

1. Students missing a test/assignment/lab or examination you will report the absence by submitting Academic Consideration Request form through STUDENT ABSENCE PORTAL.
2. Documentation must be provided as soon as possible.

II. Exam Accommodation:

1. If you are unable to write a final examination, report your absence using the Academic Consideration Request Form through STUDENT ABSENCE PORTAL.
2. Be prepared to provide the Undergraduate Services Office with supporting documentation (see next page for information on documentation) the next day, or as soon as possible (in cases where students are hospitalized). The following circumstances are not considered grounds for missing a final examination or requesting special examinations: common cold, headache, sleeping in, misreading timetable and travel arrangements.

3. In order to receive permission to write a Special Examination, you must obtain the approval of the Chair of the Department and the Associate Dean and in order to apply you must submit an the Academic Consideration Request Form through STUDENT ABSENCE PORTAL.
   PLEASE NOTE: It is the student's responsibility to check the date, time and location of the Special Examination.

III. Late Assignments:

1. Students must advise the course instructor if they are having difficulty completing an assignment on time (prior to the due date of the assignment).
2. Students should be prepared to submit the Academic Consideration Request Form and provide documentation if requested to do so by the course instructor (see reverse side for information on documentation).
3. If granted an extension, a revised due date should be established with the course instructor. The approval of the Chair of your Department (or the Assistant Dean, First Year Studies, if you are in first year) is not required if assignments will be completed prior to the last day of classes.
4. This course has 15 assignments with only 12/15 assignments counted towards your final grade. Academic consideration will not be granted for missed assignments. If students miss 3/15 assignments, the remaining 12 assignments will be used in the calculation of the final grade. If students miss more than 3 assignments, they will receive a grade of zero on each missed assignment.
5. This course employs flexible deadlines for assignments. The assignment deadlines can be found above in the course outline. For each assignment, students are expected to submit the assignment by the deadline listed. Should illness or extenuating circumstances arise, students are permitted to submit their assignment up to 72 hours past the deadline without academic penalty. Should students submit their assessment beyond 72 hours past the deadline a grade of zero will be assigned. As flexible deadlines are used in this course, requests for academic consideration will not be granted. If you have a long-term academic consideration or an accommodation for disability that allows greater flexibility than provided here, please reach out to your instructor at least one week prior to the posted deadline.
6. Extensions beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean, Undergraduate Studies. Documentation is mandatory.

Note: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

IV. Medical Accommodation:

1. Requests for Academic Consideration Request Form through STUDENT ABSENCE PORTAL.
2. Requests for academic consideration must include the following components:
    a. Self-attestation signed by the student (*This is only accepted for the first/one absence*)
    b. Medical note
    c. Indication of the course(s) and assessment(s) affected by the request
    d. Supporting documentation as relevant
3. Requests without supporting documentation are limited to one per term per course.
4. **Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment.**
5. Once the request and supporting documents have been received and reviewed, appropriate academic consideration, if granted, shall be determined by the instructor in consultation with the academic advisor, in a manner consistent with the course outline. Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, or re-weighting of course requirements. Some forms of academic consideration, such as arranging Special Examinations, assigning a grade of Incomplete, or granting late withdrawals without academic penalty, may only be granted by the Academic Advising office of the Faculty of Engineering.

V. Religious Accommodation:

When scheduling unavoidably conflicts with religious holidays, which (a) require an absence from the University or (b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), no student will be penalized for absence because of religious reasons, and alternative means will be sought for satisfying the academic requirements involved. If a suitable arrangement cannot be worked out between the student and instructor involved, they should consult the appropriate Department Chair and, if necessary, the student's Dean.

It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

VI. Academic Integrity:

In the Faculty of Engineering, we encourage students to create a culture of honesty, trust, fairness, respect, responsibility, and courage, befitting the professional degree you are pursuing.

Please visit Academic Integrity Western Engineering for more information

VII. Academic Offences:

Plagiarism means using another's work without giving credit. The university has rules against plagiarism and other scholastic offences. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is zero on the course work and a repeat offence will earn you zero on the course. A third offence may lead to expulsion from the university.
Scholastic Discipline for Undergraduate Students & Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know

Students must write their reports, essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

All required papers may be subject to submission for textual similarity review to commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents on the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between the University of Western Ontario and Turnitin.com (http://www.turnitin.com). Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

VIII. Faculty of Engineering AI Policy:

The use of generative Artificial intelligence (GenAI) tools won't be discouraged in the Faculty of Engineering. As we pride ourselves on building the future we can't hide from the use of GenAI tools to contribute to the understanding of the course materials. However, the use of GenAI tools in any assignment or contribution during the course will have to be disclosed, as a resource. GenAI tools use won't be permitted in any type of examination or other assessments where the faculty have prohibited their use. If use of GenAI tools is detected by the instructor in these instances, academic offences penalties might be imposed against the student.

IX. Use of English Policy:

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally, poorly written work except for the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

X. Accessibility:

Western is committed to achieving barrier free accessibility for persons with disabilities studying, visiting and working at Western. As part of this commitment, there are a variety of services, groups and committees on campus devoted to promoting accessibility and to ensuring that individuals

have equitable access to services and facilities. To help provide the best experience to all members of the campus community, please visit the Accessibility Western University for information on accessibility-related resources available at Western.

Students with disabilities may arrange for academic accommodation at Western. For a more detailed explanation, please visit Academic Support & Engagement -Academic Accommodation.

XI. Inclusivity, Diversity, and Respect:

The Faculty of Engineering at Western University is committed to creating equitable and inclusive learning environments that value diverse perspectives and experiences. We recognize that university courses often marginalize students based on social identity characteristics such as, but not limited to, Indigeneity, race, ethnicity, nationality, ability, gender identity, gender expression, sexuality, age, language, religion, and socioeconomic status. Understanding this, we strive to facilitate equitable experiences and inclusion within the classroom by respecting and integrating multiple ways of knowing, being, and doing. Please visit the Office of Equity, Diversity and Inclusion.

XII. Health and Well-Being:

- Health & Wellness Services – Students - Offers appointment-based medical clinic for all registered part-time and full-time students.
- Mental Health Support - Provides professional and confidential services, free of charge, to students needing assistance to meet their personal, social and academic goals. Services include consultation, referral, groups and workshops, as well as brief, change-oriented psychotherapy.
- Crisis Support - For immediate assistant, please visit Thames Hall Room 2170 or call 519-661-3030. The crisis clinic operates between 11:00 am - 4:30 pm. For after-hours crisis support, click here.
- Gender-Based Violence and Survivor Support - Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced gender-based or sexual violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts, here. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Important Contacts:

Engineering Undergraduate Services	SEB 2097	519-661-2130	engugrad@uwo.ca
Civil & Environmental Engineering	SEB 3005	519-661-2139	civil@uwo.ca
Office of the Registrar/Student Central	WSSB 1120	519-661-2100	

Important Links:

- WESTERN ACADEMIC CALENDAR
- ACADEMIC RIGHTS AND RESPONSIBILITIES