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

CEE 9632a – Advanced Stormwater Management
Course Outline – 2022 FT

COURSE OUTLINE

DESCRIPTION
To understand the issues of urban development related to stormwater quantity and quality control and learn the design of Stormwater Management (SWM) system using SWM Best Management Practices (BMPs) and Low Impact Developments (LIDs). Understand the interdisciplinary nature of stormwater pollution control and provide an insight into the design and modeling of SWM system.

ENROLLMENT RESTRICTIONS
Enrollment in this course is restricted to graduate students in environmental and water resources engineering only, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

INSTRUCTOR CONTACT INFORMATION
Dr. Imtiaz Shah, FEC, P.Eng.
Adjunct Professor
Department of Civil and Environmental Engineering
ishah5@uwo.ca

Contact policy:
- Contact instructor via email (above) or through messages in OWL. A meeting will be arranged if required.

PREREQUISITES
Knowledge in hydrology and hydraulics and familiarity with computers including Excel spreadsheets.

COURSE FORMAT
This course will be delivered in the class.
"In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online at the discretion of the course instructor"

TOPICS
Detailed Tentative Schedule for the Advanced SWM Fall 2022 course is uploaded to OWL. The excel spreadsheet outlines details of the course schedule and topics to be covered etc.

Topics #	Descriptions	Learning Activities	Tentative Timeline
1	• Lectures slides	Introduction to SWM	Week 1

2	• Lectures slides	Analytical Tools for Simulation of Stormwater Controls	Week 2
3	• Lectures slides • Tutorials	Effects of Stormwater on Receiving Waters	Week 3
4	• Lectures slides • Tutorials	Performance Goals for Stormwater Controls	Week 4
5	• Lectures slides • Tutorials	Selection Criteria and Design Considerations	Week 5
6	• Lectures slides • Tutorials	SWM Plan and Design	Week 6
7	• Lectures slides • Tutorials	SWM Plan and Design	Week 7
8	• Lectures slides • Tutorials	SWM Plan and Design	Week 8
9	• **Reading Week (No Class)**		Week 9 **No Class**
10	• Lectures slides • Tutorials	Performance Assessment and Life Cost of SWM Controls Maintenance of Stormwater Controls	Week 10
11	• Lectures slides • Tutorials	SWM Water Quality and Pollution	Week 11
12	• Presentations	Projects Presentation Online	Week 12
13	• Open book written exam completed in person as per the University directions.	Final Exam*	Week 13

***The date for the final exam will be confirmed and communicated through OWL.**

SPECIFIC LEARNING OUTCOMES EVALUATION

Degree Level Expectation	Weight	Assessment Tools	Outcomes
Depth and breadth of knowledge	20%	• Assignments • Course Project • Quizzes	• Understanding of advanced concepts and theories • Awareness of important current problems in the field of study • Understanding of computational and/or empirical methodologies to solve related problems
Research & scholarship	20%	• Assignments • Course Project	• Ability to conduct critical evaluation of current advancements in the field of specialization • Ability to conduct coherent and thorough analyses of complex problems using established techniques/principles and judgment
Application of knowledge	20%	• Assignments • Course Project	• Ability to apply knowledge in a rational way to analyze a problem • Ability to use coherent approach to design an engineering system using existing design tools

Professional capacity / autonomy	20%	• Assignments • Course Project	• Awareness of academic integrity • Ability to implement established procedures and practices in the coursework • Defends own ideas and conclusions • Integrates reflection into his/her learning process
Communication skills	20%	• Course Project • Project Presentation	• Ability to communicate (oral and/or written) ideas, issues, results, and conclusions clearly and effectively

ASSESSMENTS

The final course grade will be based on the assessment of the student in the following subcategories:

Assessment Type	Material Covered	Tentative Due Date	Weight
Assignments	See excel table uploaded to OWL.	Approximately one assignment per two weeks due in two weeks.	20%
Course Project	See project detail document and project list uploaded under the project Tab in OWL.	Due by December* , 2022	20%
Project Presentation	Project report	Due by December* 2022	10%
Quizzes	Topics covered before the quizzes	Approximately every 3-4 weeks	20%
Final Exam	Open book written exam completed in person as per the university direction.	December*, 2022	30%

*Due dates will be provided accordingly after the start date of the semester will be announced.

Activities in which collaboration is permitted:

Collaboration is allowed in the following activities:

- Course project
  Collaboration is allowed within group members but not outside your group.

- Project Presentation
  Collaboration is allowed within group members but not outside your group

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

Collaboration is not permitted in the following activities and the students must work alone:

- Assignments
- Final Exam
- Quizzes

REQUIRED TEXTBOOK

Class notes and reference materials.

OPTIONAL COURSE READINGS

1.Viessman Jr, Warren, Lewis, Gary L, *Intorudcuctio to hydrology*, 5th edition;
2.VenTe Chow, *Open-Channel Hydraulics*, McGraw-Hill. 1998.
3. M. Hanif Chaudhry, *Open-Channel Flow*, 2008.
4. Ministry of Environment (MOE), *Stormwater Management Planning and Design Manual* 2003;
5. PCSWM user's manual; and
6. Visual Otthymo*and other* user's Manuals for hydraulic and hydrologic software's.

CHEATING, PLAGIARISM/ACADEMIC OFFENCES

Academic integrity is an essential component of learning activities. Students must have a clear understanding of the course activities in which they are expected to work alone (and what working alone implies) and the activities in which they can collaborate or seek help; see information above and ask instructor for clarification if needed. Any unauthorized forms of help-seeking or collaboration will be considered an academic offense. University policy states that cheating is an academic offence. If you are caught cheating, there will be no second warning. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Academic offences are taken seriously and attended by academic penalties which may include expulsion from the program. Students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence at the following website:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers and or reports may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in 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).

CONDUCT

Students are expected to follow proper etiquette to maintain an appropriate and respectful academic environment. Any student who, in the opinion of the instructor, is not appropriately participating in course activities and/or is not following the rules and responsibilities associated with the course activities, will be reported to the Associate Dean (Graduate) (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Graduate), the student could be debarred from completing the assessment activities in the course as appropriate.

HEALTH/WELLNESS SERVICES

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several health and wellness related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate

chair), or other relevant administrators in their unit. Faculty of Engineering has a Student Wellness Counsellor. To schedule an appointment with the counsellor, contact Kristen Edwards (khunt29@uwo.ca) via confidential email and you will be contacted by our intake office within 48 hours to schedule an appointment.

Students who are in emotional/mental distress should refer to Mental Health@Western: http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

SICKNESS

Students should immediately consult with the Instructor (for a particular course) or Associate Chair (Graduate) (for a range of courses) if they have problems that could affect their performance. The student should seek advice from the Instructor or Associate Chair (Graduate) regarding how best to deal with the problem. Failure to notify the Instructor or the Associate Chair (Graduate) immediately (or as soon as possible thereafter) will have a negative effect on any appeal. Obtaining appropriate documentation (e.g., a note from the doctor) is valuable when asking for accommodation due to illness.

Students who are not able to meet certain academic responsibilities due to medical, compassionate or other legitimate reason(s), could request for academic consideration. The Graduate Academic Accommodation Policy and Procedure details are available at:
https://www.eng.uwo.ca/graduate/current-students/academic-support-and-accommodations/index.html

ACCESSIBLE EDUCATION WESTERN (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program. Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW): http://academicsupport.uwo.ca/accessible_education/index.html

AEW is a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

NOTICE:

Students are responsible for regularly checking their email, and the course OWL site for new notices related to the course.