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). 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.

TOPICS
Detailed Tentative Schedule for the Advanced SWM Fall 2023 course is uploaded to OWL. The
excel spreadsheet outlines details of the course schedule and topics to be covered etc.

<table>
<thead>
<tr>
<th>Topics #</th>
<th>Descriptions</th>
<th>Learning Activities</th>
<th>Tentative Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lectures slides</td>
<td>Introduction to SWM</td>
<td>Week 1</td>
</tr>
<tr>
<td>2</td>
<td>Lectures slides.</td>
<td>Analytical Tools for Simulation of Stormwater Controls</td>
<td>Week 2</td>
</tr>
<tr>
<td>3</td>
<td>Lectures slides. Tutorials</td>
<td>Effects of Stormwater on Receiving Waters</td>
<td>Week 3</td>
</tr>
<tr>
<td>Week</td>
<td>Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
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<td></td>
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</tbody>
</table>
| 4    | - Lectures slides.  
- Tutorials  
- Performance Goals for Stormwater Controls |
| 5    | - Lectures slides.  
- Tutorials  
- Selection Criteria and Design Considerations |
| 6    | - Lectures slides.  
- Tutorials  
- SWM Plan and Design |
| 7    | - Lectures slides.  
- Tutorials  
- SWM Plan and Design |
| 8    | - **Reading Week (No Class)** |
| 9    | - Lectures slides.  
- Tutorials  
- SWM Plan and Design |
| 10   | - Lectures slides.  
- Tutorials  
- Performance Assessment and Life Cost of SWM Controls Maintenance of Stormwater Controls |
| 11   | - Lectures slides.  
- Tutorials  
- SWM Water Quality and Pollution |
| 12   | - Presentations  
- Projects Presentation Online |
| 13   | - **Open book written exam completed in person as per the University directions.**  
- Final Exam* |

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

**SPECIFIC LEARNING OUTCOMES EVALUATION**

<table>
<thead>
<tr>
<th>Degree Level Expectation</th>
<th>Weight</th>
<th>Assessment Tools</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| **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. |
ASSESSMENTS
The final course grade will be based on the assessment of the student in the following subcategories:

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Material Covered</th>
<th>Tentative Due Date</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>See excel table uploaded to OWL.</td>
<td>Approximately one assignment per two weeks due in two weeks.</td>
<td>20%</td>
</tr>
<tr>
<td>Course Project</td>
<td>See project detail document and project list uploaded under the project Tab in OWL.</td>
<td>Due by December*, 2023</td>
<td>20%</td>
</tr>
<tr>
<td>Project Presentation</td>
<td>Project report</td>
<td>Due by December*, 2023</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Topics covered before the quizzes</td>
<td>2 or 3 Quizzes every 3-4 weeks</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Open book written exam completed in person as per the university direction.</td>
<td>December*, 2023</td>
<td>30%</td>
</tr>
</tbody>
</table>

*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
OPTIONAL COURSE READINGS
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](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](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/](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. Information on how to schedule an appointment with the counsellor is available at: https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/Student-Wellness-Counselling.html

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.