CIVÉ 440 – Hydrology and Hydraulics

Term – Summer 2019 (201905)

Instructor
Dr. Tara Troy
Phone: (250) 472-5084
E-mail: tjtroy@uvic.ca

List all prerequisites and co-requisites: CIVE 340 and 345

LECTURE DATES*
Section: A /CRN30117 Days: Tuesday & Friday Time: 11:30-12:50 Location: Clearihue A202

* Note that the class time is scheduled as lecture, but it will be a combination of lecture, active problem solving, and laboratory exercises.

TA Name
Xander Huggins
xander.huggins@gmail.com

Reference Materials:
If needed, they will be distributed through coursespace.

COURSE OBJECTIVES:
The purpose of this course is to acquaint students with the following:

1. Various aspects of hydrology and hydraulics;
2. Role of probability analysis in hydrology and hydraulics;
3. Stormwater management and design;
LEARNING OUTCOMES: At the end of this course, students will be able to:

- Describe how water moves through the natural and built environment
- Analyze produced surface run-off from watersheds;
- Design a pipe for water distribution or stormwater;
- Identify return period and corresponding risks for hydrological events;
- Describe open-channel hydraulics principles;
- Design a culvert; and
- Discuss and critique i) Canadian hydrological events and ii) green stormwater infrastructure design

<table>
<thead>
<tr>
<th>Weight &amp; Date(s) of Assessments:</th>
<th>Weight</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>% 10</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>% 15</td>
<td></td>
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<tr>
<td>Labs</td>
<td>% 10</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>% 17.5</td>
<td>June 7</td>
</tr>
<tr>
<td>Exam 2</td>
<td>% 17.5</td>
<td>July 19</td>
</tr>
<tr>
<td>Project 1</td>
<td>% 15</td>
<td></td>
</tr>
<tr>
<td>Project 2</td>
<td>% 15</td>
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</tbody>
</table>

ASSIGNMENTS

There will be three assignments in the first half of the course that you will turn in for marking. They will be done in groups of two. Class time will be provided to work on the assignments. The format of each assignment will be specified, but will typically take the form of a short memo describing the data used, approach taken, and results presented in figures. Assignments will be due at the start of class unless otherwise specified.

<table>
<thead>
<tr>
<th>Assignment #</th>
<th>Topic</th>
<th>Start</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unit Hydrograph</td>
<td>5/10</td>
<td>5/17</td>
</tr>
<tr>
<td>2</td>
<td>IDF Curve</td>
<td>5/24</td>
<td>5/31</td>
</tr>
<tr>
<td>3</td>
<td>Flood frequency and floodplain delineation</td>
<td>5/31</td>
<td>6/11</td>
</tr>
</tbody>
</table>

LABORATORIES

The laboratory sessions will be during the scheduled lecture time. The dates below are tentative, pending laboratory staff availability and course progress. The laboratories will involve taking measurements in a flume, performing calculations, and comparing measurements. Guidelines on the expected laboratory reports for each lab will be provided. The labs will be done in teams. Labs will be due at the start of class.

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Topic</th>
<th>Start</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flow over vertical transition</td>
<td>6/18</td>
<td>6/21</td>
</tr>
<tr>
<td>2</td>
<td>Hydraulic jump</td>
<td>6/25</td>
<td>6/28</td>
</tr>
<tr>
<td>3</td>
<td>Gradually varied flow</td>
<td>7/2</td>
<td>7/5</td>
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</tbody>
</table>
PROJECTS:

There will be two small projects throughout the course that will be done as groups. The project will involve proposing a specific event/infrastructure type for each topic to the instructor. After receiving approval, the group will research the project, pulling from engineering reports, available data, and other sources. The deliverable for each project will be a paper. For the second project, lightning-style presentations will also be given to the class.

<table>
<thead>
<tr>
<th>Project #</th>
<th>Topic</th>
<th>Start</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Canadian hydrologic or hydraulic disaster</td>
<td>5/7</td>
<td>6/18</td>
</tr>
<tr>
<td>2</td>
<td>Green infrastructure for water</td>
<td>6/21</td>
<td>8/2</td>
</tr>
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</table>

QUIZZES:

There will be approximately 10 quizzes throughout the term at the start of class. Rather than collect homework problems, the practice problems and their solutions will be posted together so that you can work through more examples at your own pace. Quizzes will be based on the homework problems, typically taking the form of a twist on an assigned homework problem. Each quiz will be marked out of 10 points. The lowest quiz grade will be dropped. If you miss a quiz for any reason (excused or unexcused absence), this will be your dropped quiz. Quizzes will be closed book/notes/everything, but you will be provided with an equation sheet identical to those posted on coursespace.

NOTES:

- Any work turned in after the specified due date and time will receive 50% credit in the first 24 hours after the due date. After that, assignments will be marked at your request, but will not count towards your final course grade. This includes, but is not limited to, assignments, projects, and laboratory reports. This excludes coursework for which an extension was given prior to the due date by the instructor.
- There will be no make-up quizzes or labs. An unexcused absence will result in a zero grade. In the case of an excused absence for a lab, the student's grade will be based on the other work.
- Make-up exams will be given in special circumstances when the absence is excused. Make-up exams will be oral exams rather than written.
- Unless otherwise specified, no phones are permitted in class.
- There is zero tolerance for academic integrity violations. All suspected cases will be reported.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

COURSE LECTURE NOTES

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

There will be no supplemental examination for this course.
Syllabus statement
A note to remind you to take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone.

Counselling Services - Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.  
https://www.uvic.ca/services/counselling/

Health Services - University Health Services (UHS) provides a full service primary health clinic for students, and coordinates healthy student and campus initiatives. http://www.uvic.ca/services/health/

Centre for Accessible Learning - The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations https://www.uvic.ca/services/cal/. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Elders' Voices - The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students, staff, faculty and administration in Indigenous ways of knowing and being.  
https://www.uvic.ca/services/indigenous/students/programming/elders/index.php
**GENERAL INFORMATION**

**Note to Students:**

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair’s Secretary to set up an appointment.

**“Attendance**

Students are expected to attend all classes in which they are enrolled. An academic unit may require a student to withdraw from a course if the student is registered in another course that occurs at the same time....

An instructor may refuse a student admission to a lecture, laboratory, online course discussion or learning activity, tutorial or other learning activity set out in the course outline because of lateness, misconduct, inattention or failure to meet the responsibilities of the course set out in the course outline. Students who neglect their academic work may be assigned a final grade of N or debarred from final examinations.

Students who do not attend classes must not assume that they have been dropped from a course by an academic unit or an instructor. Courses that are not formally dropped will be given a failing grade, students may be required to withdraw and will be required to pay the tuition fee for the course.” UVic Calendar, (2019-2020) http://web.uvic.ca/calendar/undergrad/info/regulations/attend ance.html

**Accommodation of Religious Observance**

The University recognizes its obligation to make reasonable accommodation for students whose observance of holy days might conflict with the academic requirements of a course or program.

Students are permitted to absent themselves from classes, seminars or workshops for the purposes of religious or spiritual observance.

In the case of compulsory classes or course events, students will normally be required to provide reasonable notice to their instructors of their intended absence from the class or event for reasons of religious or spiritual observance. In consultation with the student, the instructor will determine an appropriate means of accommodation. The instructor may choose to reschedule classes or provide individual assistance.

Where a student’s participation in a class event is subject to grading, every reasonable effort will be made to allow the student to make up for the missed class through alternative assignments or in subsequent classes. Students who require a rescheduled examination must give reasonable notice to their instructors. If a final exam cannot be rescheduled within the regular exam period, students may request an academic concession.

To avoid scheduling conflicts, instructors are encouraged to consider the timing of holy days when scheduling class events. For further information, including a list of days of religious observances, please contact the Equity and Human Rights Office or visit their website: <web.uvic.ca/eqhr>

**Discrimination and Harassment Policy (GV0205)**

http://web.uvic.ca/calendar/general/policies.html

**Standards for Professional Behaviour**

“It is the responsibility of all members of the Faculty of Engineering, students, staff and faculty, to adhere to and promote standards of professional behaviour that support an effective learning environment that prepares graduates for careers as professionals...”

You are advised to read the Faculty of Engineering Document Standards for Professional Behaviour which contains important information regarding conduct in courses, labs, and in the general use of facilities. https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

**Policy on Academic Integrity**

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the Undergraduate Calendar http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html for the UVic policy on academic integrity.

**Equality**

This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation.

Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.

The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.”
## Course Schedule

<table>
<thead>
<tr>
<th>Module</th>
<th>Topics</th>
<th>Date/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rainfall-runoff approaches. Design storms, curve numbers, hydrographs and streamflow routing.</td>
<td>5/7-5/28</td>
</tr>
<tr>
<td>2</td>
<td>Flood hydrology and probability in hydrology. Extreme value distributions, flood frequency analysis, floodplain delineation.</td>
<td>5/10; 5/31-6/4</td>
</tr>
<tr>
<td>3</td>
<td>Open channel flow. Uniform flow; critical, subcritical, and supercritical flow; hydraulic jumps; gradually varied flow.</td>
<td>6/11-6/28</td>
</tr>
<tr>
<td>4</td>
<td>Pipe flow and culverts. Pipes in parallel, series, and branching; pumps; cavitation and water hammers; culvert design.</td>
<td>7/2-7/23</td>
</tr>
<tr>
<td>5</td>
<td>Climate change impacts on hydrology and hydraulics</td>
<td>7/26</td>
</tr>
</tbody>
</table>