Course Outline

GEOG 3103A: Watershed Hydrology
September – December 2019

Instructor: Dr. Jennifer Totten
Office: Loeb B209
Office Hours: Wednesdays 1:00 to 2:00 p.m.
E-mail: jennifer.totten@carleton.ca (typically the best way to get in touch with me – I do not answer emails on weekends)
Lectures: Mondays 2:35 p.m. 5:25 p.m., Richcraft Hall (RB), rm 1200
Labs: A1 (Fri 11:35 – 13:25 hrs); A2 (Wed 14:35 – 16:25 hrs), Loeb A237
TA: TBD
Pre-Requisite: GEOG 2013A

Course Objectives:

Hydrology can be defined as the study of the hydrologic cycle: the continuous movement of water from the atmosphere to the surface of the earth, into the surface, through the subsurface, and back to the atmosphere. The objective of this course is for the students to develop a sound understanding of the various components of the hydrological cycle. The knowledge of the functioning of these components and the measurement thereof are very important for monitoring and assessing water availability as a resource. The plan for the semester also includes the analysis of specific hydrological regimes and hydrological extremes. As hydrology is a quantitative science, the students will also acquire practical experience with hydrological data analysis assignments involving calculations and the use of spreadsheets in the lab sessions as well as an outdoors field assignment.

General areas of study:
1. Hydrological cycle & world water balance
2. Precipitation
3. Interception
4. Evaporation and Evapotranspiration
5. Infiltration
6. Soil moisture and groundwater hydrology
7. Surface runoff
8. Snow hydrology
9. Urban hydrology
10. Drylands hydrology
11. Wetlands hydrology
12. Extreme hydrological events: floods & droughts
13. Water quality and pollution
**Reading material:**

There are readings associated with each week’s lectures which will be posted on the cuLearn website. It is the responsibility of each student to familiarize themselves with this material. Material contained in the course readings will be included on the final exam. Additional material may be assigned during the term.

Classroom teaching and learning activities, including outlines, lectures, PowerPoint presentations, discussions, posted notes, labs etc., by both instructors and students, are copy protected and remain the intellectual property of their respective author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s). Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).”

**Course assessment:**

The assessment for the course will be based on several components:

1. There will be 5 assignments on various aspects of the hydrological cycle. These will comprise 60% of the total grade.
2. A final examination worth 40% of the total grade will be given, which will be made up of both long and short answer questions. You MUST pass the exam to pass the course.
3. All elements of the course will be marked both for content (e.g. ideas, structure of arguments, research, citations etc.) and presentation (e.g. quality of writing, grammar, spelling, and graphical presentation). When the assignment involves substantial written work such as analyses, discussion, etc., this must be typed. HAND WRITTEN ASSIGNMENTS WILL BE RETURNED WITH A ZERO GRADE. Electronic submissions will NOT be accepted unless otherwise stated.

**Exercise topics:**

1. Flow and precipitation data 15%
2. Recurrence intervals 10%
3. Field Exercise (attendance mandatory) 10%
4. Water use journal 10%
5. Storm & flow events 15%

**Attendance and submission policy for course**

All 5 Labs contribute to your grade. Completion of all labs and the final exam are required for successful completion of the course. Submission dates are important. Lab reports are due to the TA at the beginning (first 15 minutes) of the lab on the date specified (see attached schedule). Beyond this time, papers will be considered 1 day late automatically. Assignments will only be accepted for 2 days beyond the due date with a penalty of 5% (of the lab itself) per day, unless prior arrangements have been made. Late papers may be submitted to the Geography Department drop
box (Loeb B342). The only exception is for reasons of illness or equivalent circumstances (e.g. bereavement). These types of situations must be fully documented in writing (medical certificates, accident reports etc.) within one week of the assignment due date. If in doubt, please come and see me.

Unless otherwise specified, group work is not acceptable. The TA will be returning the assignments in the lab periods, and providing feedback at that time. If you have any questions about the grading, please see your TA, or come and see me.

Standing in this course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

**Academic Integrity & various offences**

Instructional offences include among other activities cheating, contravening examination regulations, plagiarism, submitting similar work in 2 or more courses without prior permission, and disrupting classes. Conduct offenses apply in areas of discrimination and sexual harassment. Further information about University regulations which define and regulate these offences is found at: [http://www2.carleton.ca/studentaffairs/academic-integrity](http://www2.carleton.ca/studentaffairs/academic-integrity)

The University Senate defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This can include:

- reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs."

Plagiarism is a serious offence which cannot be resolved directly with the course instructor. A rigorous investigation is conducted by the Office of the Faculty Dean, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of “F” for the course.

**Academic Accommodation**

You may need special arrangements to meet your academic obligations during the term because of disability, pregnancy or religious obligations. Please review the course outline promptly. For an accommodation request, the processes are as follows.
**Pregnancy obligation:** write to me with any requests for academic accommodation during the 1st two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the Student Guide.

**Religious obligation:** write to me with any requests for academic accommodation during the 1st two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the Student Guide.

**Academic Accommodations** for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), Psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairment in mobility, hearing and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally scheduled exam.

**Survivors of Sexual Violence**
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: https://carleton.ca/equity/sexual-assault-support-services.

**Accommodation for Student Activities**
Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodations at equity@carleton.ca

**Important dates for this term:** (Lecture Schedule and Required Readings):
Note: the dates on which individual lectures are presented may not be exactly as shown. *Assignment due dates and field work dates are fixed.*

<table>
<thead>
<tr>
<th>Sep 4 &amp; 6: no labs this week</th>
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### Sep 11 & 13 lab sessions: Assignment 1 given & explained, due Sept 25/27

<table>
<thead>
<tr>
<th>2</th>
<th>Monday, Sept 16</th>
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<th>Precipitation – continued</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<td>Interception;</td>
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### Sep 18 & 20 lab sessions: Lab working periods, T.A. present to help during your lab period.

<table>
<thead>
<tr>
<th>3</th>
<th>Monday, Sept 23</th>
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<th>Evaporation &amp; evapotranspiration</th>
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<td>Infiltration</td>
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### Sep 25/27 lab sessions. Assignment 1 DUE

**Assignment 2 – given, due Oct 9/11 at start of lab period.**

<table>
<thead>
<tr>
<th>4</th>
<th>Monday, Sept 30</th>
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<th>Soil moisture &amp; groundwater hydrology</th>
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### Oct 2/4 lab sessions: Lab working periods, T.A. present to help during your lab period

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<tr>
<th>5</th>
<th>Monday, October 7</th>
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<th>Surface hydrology</th>
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### Oct 9/11 lab sessions: Assignment 2 DUE

**Assignment 3 – given, due Oct 30/Nov 1 at start of lab period.**

*Field assignment – come prepared to work outside for full lab period – dress appropriately!*

**Monday October 14: Thanksgiving Day – No class (will be made up on Friday Dec 6th)**

### Oct 16/18 lab sessions: Lab working periods, T.A. present to help during your lab period

**Oct 21 - 25: Reading Week, no classes or lab sessions**

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<th>6</th>
<th>Monday, October 28</th>
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<th>Snow hydrology</th>
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### Oct 30/Nov 1 lab sessions. Assignment 3 DUE

**Assignment 4 – given, due Nov 13/15 at start of lab period.**

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<th>7</th>
<th>Monday, Nov 4th</th>
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<th>Urban Hydrology</th>
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**Nov 6/8 lab sessions:** Lab working periods, T.A. present to help during your lab period

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**Nov 13/15 lab sessions:** **Assignment 4 DUE**

**Assignment 5 – given, due Nov 27/29** at start of lab period.

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**Nov 20/22 lab sessions:** Lab working periods, T.A. present to help during your lab period

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**Nov 27/29 lab sessions:** **Assignment 5 DUE** at start of lab, official end of lab program

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<table>
<thead>
<tr>
<th>Date</th>
<th>Friday Dec 6th</th>
<th>Water quality</th>
<th>As above</th>
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<tr>
<td></td>
<td></td>
<td>Review of Course &amp; Exam format</td>
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As above