

**University of Western Ontario  
Department of Geography  
Geography 3341b Hydrology  
2017 Fall Term**

### 1. *Course Description and Prerequisites*

The study of water in the environment. Selected aspects of the terrestrial hydrological cycle, including: runoff generation, flooding and drought, snow and ice. Applied aspects will be considered in each topic covered. Prerequisites: One of Geog 2330a/b Geomorphology and Hydrology or Geog 2310a/b Weather and Climate or Geog. 2320a/b Introductory Biogeography or permission of instructor. (Geog 2210b Spatial Analysis (or equivalent) highly recommended.)

### 2. *Objectives*

- a) To provide an overview of hydrological processes and the terrestrial water cycle from the water resource perspective, sufficient to the commissioning, oversight and interpretation of a hydrological consulting report.
- b) To provide exposure to a range of general analytical techniques which are part of the tools of the trade of the environmental professional.

### 3. *Personnel*

|  |  |
|--|--|
| Instructor: Dr.C.C. Smart, Room 1402 SSC Tel. 85007      | Teaching Assistant: Kayla Goguen                   |
| E-mail: <a href="mailto:CSMART@UWO.CA">CSMART@UWO.CA</a> | <a href="mailto:kgoguen@uwo.ca">kgoguen@uwo.ca</a> |
| Office hours Tues. 10:00-12:00 (or by appt.)             | Tues. 13:00-14:30                                  |

### 4. *Course Format*

A two hour lecture period: Wednesday. 1:30-3:30 SSC 1302 (PGLL)

A two hour lab period: Wednesday. 3:30-5:30 SSC 1425 (SDAL Lab)

Two ~one hour *lecture sessions* will run each week with a short break between. Lab exercises will be posted on-line, introduced and explained during lab sessions that immediately follow the lecture.

### 5. *Marking Scheme*

|   |     |
|---|-----|
| Exercises (five @8%) .....                              | 40% |
| Fall mid-term test, 1h (Provisionally 1:30pm. 24/02/16) | 20% |
| Final Exam (2h in December).....                        | 40% |

The lectures provide most “raw material” for the course. Lecture support materials and exercises will be posted on line. Lecture materials and exercise instructions are provided orally in class. Attendance at class and lab sessions is therefore critical in passing the course. Tests and examinations are the primary means of *evaluation*, and may therefore appear to be much more demanding.

*Exercises* will consist of laboratory problems devised to demonstrate fundamental aspects of measurement, data processing and analysis for hydrological problems. You will normally be allowed just under two weeks to tackle the assignment and raise questions in scheduled classes and labs. Exercises will require work between class sessions to allow efficient use of laboratory time. You are encouraged to work in small groups, but unless stated otherwise your assignment should be explicitly written up independently.

Exercises are generally designed to generate a single electronic file in Word or Excel. These reports are to be posted to Owl or delivered to the TA by 5pm on the designated Monday. Name submissions using the following convention: “Geo3341 17 ex# *your name*”. Unattributed files will not be marked. Deadlines will be enforced.

Tests are usually short answer and calculation format. The final examinations will also incorporate a "pre-

announced" essay topic of strictly limited length, typically 200 words. Brief in-class tests ("pop" tests) worth 2% each may be introduced as an incentive to be adequately prepared for each lecture. Key concepts from previous lectures will be assessed. The mid-term and exercise weighting will be reduced to accommodate such tests. In tests, basic calculators are permitted, no electronic communication devices are permitted.

## 6. Texts

Background information can be found in texts used in earlier Geography courses. The "texts" for the course are expensive, so I have not ordered them. They are available in the Taylor Library

George M. Hornberger, Jeffrey P. Raffensperger, Patricia L. Wiberg 1998. *Elements of Physical Hydrology* Taylor [GB661.2.E44 1998](#)

Dingman, S.L., 1993. *Physical Hydrology*. Prentice Hall Taylor [GB661.2.D56 2008](#)

Ward, R.C., and Robinson, M. 2004. *Principles of hydrology* McGraw Hill. Weldon [GB661.2.W35 2000](#)

Some copies of Dingman may be available second hand (possibly listed under Earth Sciences). This and Hornberger are excellent, but rather expensive books that cover material to a far more advanced level than required for the course. As a purchase, it would be best suited to those wishing to have a superior reference source at their disposal for future studies or work. Ward and Robinson is less technical, but rather long winded. Web retailers list books at very variable prices. More basic texts can be found in the library by perusing the stacks and selecting something appropriate to particular needs. Online resources are widely available and should be used in reviewing lecture notes.

7. *Course Outline* (Note that the full curriculum may not be covered in this course. Examinations adjusted accordingly.)

1. Water: an anomalous compound. Measurement of hydrological fluxes.
2. The hydrological cycle: reservoirs and fluxes
  - Lab 1. Current metering and the discharge rating curve
  - Lab 2. Dilution gauging and contaminant transport
3. Hydro-climatology: Precipitation, interception and evapotranspiration. (Lab 3. Thiessen polygons)
4. Soil water (see Geog 3342a/b for more advanced groundwater course)
5. Surface water hydrology: Hillslopes, Catchments, modelling, statistical analysis
  - (Lab 4. Hydrological modelling, Lab 5. Time series analysis
- {6. Limnology}[Snow hydrology]

The course material is cumulative, i.e. you are expected to keep up with the material week by week. Discuss problems with your peers, review and research your notes and make use of the open question forum at the beginning of each lecture. If you do not keep up with the material, you may find subsequent lectures difficult. Revision should be weekly, not exclusively the night before an examination.

*Field work* is only practical early in the fall term when it is planned to work on Medway Creek in support of Exercises 1 and 2 (Stream flow gauging).

Much work in hydrology is technical. Geography 2210 (or equivalent) level of *statistical analysis* and rudimentary *Windows* and *Excel* skills are assumed. Quick tutorials may be arranged. *Spreadsheets* provide exceptionally useful general management and analysis tools, relevant not only in hydrology, but in many areas of employment. Accordingly, the exercises are generally framed in an Excel format, and the labs are held in SSC1316a. You must have a Social Science student account for access. Non-social science students will have to synchronise their accounts.

### Lab and Assessment Schedule

| 3341a Lab and test schedule |  |             |            |
|-----------------------------|--|-------------|------------|
| Date                        | Exercise and notes                                   | Lab due     |            |
| 13/09/2017                  |  |             |            |
| 20/09/2017                  | Exercise 1. Stream gauging                           | Field work? |            |
| 27/09/2017                  | No Lecture (Field Course)                            |             |            |
| 04/10/2017                  | Exercise 2. Dilution gauging & contaminant transport | Exercise 1  | 02/10/2017 |
| 11/10/2017                  | Reading week   |             |            |
| 18/10/2017                  |  |             |            |
| 25/10/2017                  | Exercise 3. Rainfall GIS                             | Exercise 2  | 23/10/2017 |
| 01/11/2017                  | Mid term 1:30 1 hour                                 |             |            |
| 08/11/2017                  | Exercise 4. Hydrologic modelling                     | Exercise 3  | 06/11/2017 |
| 15/11/2017                  |  |             |            |
| 22/11/2017                  |  |             |            |
| 29/11/2017                  | Exercise 5. Time series analysis                     | Exercise 4  | 27/11/2017 |
| 06/12/2017                  |  |             |            |
| 13/12/2017                  | Last Class (review)                                  | Exercise 5  | 11/12/2017 |
| 10/12/17                    | Examinations (through 21st Dec.)                     | 2 hours     |            |

### Expectations from the course

You are expected to develop knowledge of the component processes of the land surface hydrological cycle, their measurement, implementation in a water balance and analysis using graphical and statistical tools. In addition, you are expected to understand how humans interact with and influence the hydrological cycle. Capacity to implement, operate and report on spreadsheet based data analysis is also expected.

### Accommodation for unavoidable absence

Late assignments may be accepted at the discretion of the marker up to the date of return of the marked assignments. A penalty will apply. Generally, exercises are submitted (electronically) *by five pm on Monday* with the intent to return marked exercises the following Wednesday. This may not be possible with all exercises.

Where unavoidable conflict prevents submission of an exercise, the exercise may be waived and the exercise component calculated from completed exercises. The content of the exercise may be material in subsequent exercises or evaluations.

There is no make up for the mid term test. Students unable to write the test should review a copy to gain experience in the format and understand expectations. The mid-term mark will be allocated equally to exercise and final examination weighting (50% each).

Final examinations makeup dates are scheduled through the Department of Geography. Note that to avoid breach of confidentiality, makeup examinations may differ in form and content from the regularly scheduled examination.

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department. Note that the final examination period extends to the 21 December.

For UWO Policy on Accommodation for Medical Illness and a downloadable SMC see:  
[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf)

## Use of computers and electronic devices

Personal computers are permitted to assist note taking during lectures. They are not to be used for other purposes that may distract the user and others in the classroom. Computer users are requested to occupy rear seats in the classroom to avoid screen distraction for others. *Personal communication devices are not to be used during classes.*

## Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf). Additionally,

A) *If written work will be assigned in the course and plagiarism-checking software might be used, the following statement to this effect must be included in the course outline:*

All required papers 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> ).

B) *If computer-marked multiple-choice tests and/or exams will be given, and software might be used to check for unusual coincidences in answer patterns that may indicate cheating, the following statement must be added to course outlines:*

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

## Mental Health

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit the site below for more information on mental health resources: <http://www.uwo.ca/uwocom/mentalhealth/>.

## Western's commitment to accessibility

The University of Western Ontario is committed to achieving barrier free accessibility for persons studying, visiting and working at Western.

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

## Support Services

Registrarial Services: <http://www.registrar.uwo.ca/>

Student Development Services: <http://www.sdc.uwo.ca/>