

## GEOG 2330B – Geomorphology and Hydrology Course Outline: Section Winter 2019

### 1. Course Information

1. Classroom Location:

Lectures:	Mon. 10:30 – 12:30 p.m.	SSC 1004
Labs:	Lab section 1 Thur. 2:30-4:30 p.m.	SSC 1302
	Lab section 2: Thur. 4:30-6:30 p.m.	SSC 1302

2. Contact Information:

Instructor: Anna Marie Soleski  
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Office Hours: Mon 1:30-2:30 p.m.

Teaching Assistants:  
Lara Middleton ([lmiddle7@uwo.ca](mailto:lmiddle7@uwo.ca))  
Kayla Goguen ([kgoguen@uwo.ca](mailto:kgoguen@uwo.ca))

### 2. Calendar Description

1. Course Description

Water and sediment cycles at the Earth's surface and description and explanation of the resulting landforms. The interconnection of geomorphic and hydrologic systems to environmental change, with applications to environmental management. 2 lecture hours, plus 2 laboratory hours each week, 0.5 course.

Prerequisite(s): 1.0 course from Geography 1100, Geography 1300A/B, Geography 1400F/G, Geography 1500F/G, Geography 2131A/B, Geography 2153A/B (taken after September 2012); or 0.5 course from Earth Sciences 1022A/B, Earth Sciences 1070A/B, Earth Sciences 1081A/B, or Environmental Science 1021F/G; or enrolment in the Major in Physical Geography or in an Honors Earth Science Program for Professional Registration. **Prerequisite checking is the student's responsibility.**

2. Senate Regulations

Senate Regulations state, "unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites."

### 3. Textbook

**There is no required textbook for this course.**

Weekly reading assignments will be posted on OWL as we cover each topic. Excerpts from textbooks, articles and various websites will be chosen to support, extend and provide cases related to each course topic and the lab assignments.

**There are three main physical geography / geomorphology textbooks from which I will select readings:**

1. Fundamentals of the Physical Environment by Smithson et al, 4th edition (Weldon library reserve readings). This is an introduction to physical geography and Chapters 1, 10, 13, 14, 15, 17 and 24 are especially useful for this course. There is also an e-book of the 3rd edition of this book accessible from the Western Libraries catalogue.
2. An Introduction to Physical Geography and the Environment, Joseph Holden (editor). Chapters 11, 13, 14 and 18.
3. Key Concepts in Geomorphology, P.R. Bierman and D.R. Montgomery. (2014) W.H. Freeman, New York. Chapters 1, 4, 5, 6, 7, 9.
4. The “vignettes” and images on the website for this book are also useful:  
<http://serc.carleton.edu/vignettes/index.html>  
<http://www.uvm.edu/~geomorph/gallery/>

**For introductory background I recommend referring to the relevant parts of an introductory Physical Geography textbook such as:**

R. Christopherson and M.L Byrne, 2012. Canadian Geosystems; An Introduction to Physical Geography, 3rd Canadian Edition, Toronto, Pearson Education Canada (this is the textbook for Geography 1300 Physical Geography). See especially parts or all of Chapters 9, 12, 13, 14 and 17.

### 4. Course Objectives and Format

Lectures will cover the following main topics:

1. Introduction - the scope of physical geography as the science of the physical environment of the Earth's surface, the place of hydrology and geomorphology in systematic physical geography, spatial and temporal scales of study.
2. Geomorphology and hydrology as physical systems - energy and mass transfer and budgets, endogenic and exogenic processes, the relief of continental surfaces and their denudation, global water cycle.
3. Physical properties of earth materials and application to hillslope erosion - soil moisture and shear strength, processes of mass movement and their role in hillslope evolution, slope stability as a geomorphic hazard and its mitigation.

4. Hillslope and drainage basin hydrology - the water balance and water movement at the local scale. Components of the water balance and the physical processes of water transfer: interception and evapotranspiration; soil moisture storage, movement and infiltration; groundwater; generation of surface and subsurface stormflow; streamflow analysis; flooding and flood hazards; fluvial erosion on hillslopes. The effects of land-use change on hillslope hydrology and erosion.
5. Drainage basin geomorphology - the drainage basin as a fundamental unit for geomorphology, surface hydrology and environmental management; quantitative analysis of stream network and drainage basin morphology and development; the drainage basin sediment cascade; processes of stream channel initiation; physics of flow and sediment transport in stream channels; stream channel form; effects of climate, land use and flow regulation on stream systems.
6. Glaciation - the significance of glaciation to geomorphology and hydrology in Canada; glacier mass balance; physics of glacier flow, erosion and deposition; landforms of continental and alpine glaciation.

### Class Schedule

<b>Lecture Description</b>	<b>Date</b>
Lecture #1 – Introduction	Jan. 7 <sup>th</sup>
Lecture #2a – Global Cascading Systems, Uplift and Denudation Lecture #2b – Landscape Evolution Case Study	Jan. 14 <sup>th</sup>
Lecture #3 – Weathering & Hillslope Morphology	Jan. 21 <sup>st</sup>
Lecture #4 – Mass Movement Processes	Jan. 28 <sup>th</sup>
Lecture #5 – Assessment of Slope Stability	Feb. 4 <sup>th</sup>
Lecture #6 – Hillslope Erosion by Water	Feb. 11 <sup>th</sup>
<b>Spring Reading Week (Feb 18<sup>th</sup> – 22<sup>nd</sup>)</b>	<b>No Class</b>
Lecture #7 – Hillslope & Drainage Basin Hydrology	Feb. 25 <sup>th</sup>
Lecture #8 – Drainage Basin Geomorphology and Sediment Cascade	Mar. 4 <sup>th</sup>
Lecture #9a – River Processes and Morphology	Mar. 11 <sup>th</sup>
Lecture #9b – River Processes and Morphology	Mar. 18 <sup>th</sup>
Lecture #10 – Glacial Systems	Mar. 25 <sup>th</sup>
Lecture #11 – Glacial Processes and Landforms	Apr. 1 <sup>st</sup>
Special Lecture - Research Methods in Fluvial Geomorphology	Apr. 8 <sup>th</sup>

## Lab Sessions

First Lab Session is Thursday, January 17<sup>th</sup>

Lab sessions will be used for completing a variety of exercises designed to consolidate and elaborate on lecture material and may be incorporated into examinations at the instructor's discretion. The labs are also used to teach and apply some simple practical skills in geomorphology and hydrology and will involve short field excursions near the campus. The laboratory sessions will be supervised by your teaching assistants, Kayla and Lara, who will also be responsible for assessment of lab work. During the lab sessions you may be asked to work and report in small groups. Some lab exercises will require a calculator and, in some cases, make use of computer-based exercises. **There is no laboratory manual for the course.**

## Lab Schedule

Description	Date
Lab #1 - Map and Air Photo Interpretation	Jan. 17 <sup>th</sup>
Lab #1 - Map and Air Photo Interpretation	Jan. 24 <sup>th</sup>
Lab #2 - Slope Stability Analysis – Part 1: Hillslope Morphology <ul style="list-style-type: none"><li>• <b>Lab Report #1 to be handed in at the beginning of class</b></li></ul>	Jan. 31 <sup>st</sup>
Lab #2 - Slope Stability Analysis – Part 2: Slope Stability Analysis	Feb. 7 <sup>th</sup>
Suspended Sediment Data Collection and Demonstration (Field Work) <ul style="list-style-type: none"><li>• <b>Lab Report #2 to be handed in at the beginning of class</b></li></ul>	Feb. 14 <sup>th</sup>
<b>Spring Reading Week (Feb 18<sup>th</sup> – 22<sup>nd</sup>)</b>	<b>No Lab</b>
Lab #3 - Experimental Geomorphology Data Collection	Feb. 28 <sup>th</sup>
Lab #3 - Experimental Geomorphology Data Analysis and Discussion	Mar. 7 <sup>th</sup>
Lab #4 - Medway Creek Slope Survey (Field Work) <ul style="list-style-type: none"><li>• <b>Lab #3 to be handed in at the beginning of class</b></li></ul>	Mar. 14 <sup>th</sup>
Lab #4 - Medway Creek Channel Survey (Field Work)	Mar. 21 <sup>st</sup>
Lab #4 - Field Data Analysis and Discussion	Mar. 28 <sup>th</sup>
<ul style="list-style-type: none"><li>• <b>Lab #4 to be handed in to the Geography Main Office Assignment Drop Box no later than 4:30 PM</b></li></ul>	Apr. 4 <sup>th</sup>

## 5. Learning Outcomes

In completion of this course you should be able to:

1. Recognise, describe and characterize geomorphic landforms shaped by water;
2. Understand and explain the physical principles of common geomorphic and hydrologic processes, and the function of water and sediment cascades;
3. Explain the development of landforms in relation to relevant geomorphic and hydrologic processes and anticipate the effects of environmental change on both process and landforms;
4. Discuss, with the help of case studies, the application of geomorphology and hydrology to environmental management;
5. Apply simple techniques such as map analysis, air photo reading, exploratory data analysis and use of physical theory to the solution of geomorphic and hydrologic problems.

## 6. Evaluation

There are three main components in the course assessment:

1. Four short reports based on hands-on field work and practical lab work distributed through the term during laboratory sessions. There will be three lab periods spent in the field in Medway Creek valley adjacent to campus. Two of the reports relate to aspects of the geomorphology and hydrology of the valley as an example of some of the principles discussed during lectures and applied to this local case study.
2. Midterm test. A **1-hour** test with short written answer format, **in class on Monday, February 25th.**
3. Final exam. A **2-hour** exam with both short answers and essay type questions. The final exam will cover all aspects of the course, including the labs and readings.

Evaluation Components	Percentage of Course Grade	Assignment Schedule
Lab and field work reports		
1. Air photo and map report	10%	Thursday, Jan. 31 <sup>st</sup>
2. Slope Stability Analysis	10%	Thursday, Feb. 14 <sup>th</sup>
3. Experimental Geomorphology	10%	Thursday, Mar. 14 <sup>th</sup>
4. Medway fieldwork report	10%	Thursday, Apr. 4 <sup>th</sup>
Midterm	20%	Monday, Feb 25 <sup>th</sup>
Final	40%	TBA

## 7. Course Policies

Students are responsible for material covered in the lectures and labs as well as all weekly reading assignments either posted on OWL or accessible from the Western Libraries catalogue.

- **Submitting Assignments, late assignments and missed examinations:** Except where otherwise posted, all assignments are due two weeks after distribution. **Late assignments will be penalized 10% per day including holidays (weekend counts as only one day).** Delay beyond the date on which graded assignments are returned to the class will result in a grade of zero. Late assignments are to be submitted in your next formal lab session or to the Geography Main Office Assignment Drop-Box. All assignments must be submitted in hard copy form with the following information: NAME, STUDENT NUMBER, COURSE CODE, INSTRUCTOR and TA's NAME. You must keep a copy for your files. Emailed assignments will not be accepted.

- **Non-medical absences**

If you miss, or anticipate missing, an assignment deadline or test for non-medical reasons, either contact the instructor to discuss the circumstances for possible accommodation ahead of time if you anticipate difficulties completing an assignment on time or attending a test or as soon as possible afterwards if the absence was un-anticipated.

Absence from a test will result in a grade of zero without valid reason for absence or notification ahead of time. Accommodation and alternative test time can be granted if there are valid reasons for the absence

- **Illness**

For Western's Policy on Accommodation for Medical Illness and a downloadable Student Medical Certificate please refer to the [Academic Handbook](#):

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf)

Students seeking 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 the department. As indicated on page 5, there are no components to this course that are worth less than 10% of the total course grade.

**Grades will not be adjusted on the basis of need. It is important to monitor your performance in the course. Remember: *You* are responsible for your grades in this course.**

## 8. Make-up Examinations

Makeups will be granted with approved documentation only. All documentation for missed exams must be provided the Academic Counselling Office and Instructor within 48 hours of the scheduled exam. For missed exams, you must take your documentation to Academic Counselling within 48 hours of the exam. Otherwise, the instructor will assign a grade of zero. The format and content of make-ups may differ substantially from the scheduled test or examination.

## 9. Use of Electronic Devices

No electronic devices will be allowed during tests and examinations.

## 10. Communication by Email

Students are encouraged to ask questions in class and during office hours. All emails must be from a UWO account and include the course code in the subject heading with your full name signed in text. Emails will normally be returned within 48 hours. Questions that require extensive responses are to be asked during office hours or in class, not via email.

## 11. Class Conduct

Respectful behaviour towards the instructor and your classmates is mandatory during class and in all correspondence dealing with the course. This includes arriving to class on time, not talking during lectures and turning off cell phones (including text messaging). Use of a laptop computer for note taking is acceptable, however, please avoid internet browsing, email and other forms of social media during class time.

## 12. Copywrite in Instructional Settings

No photography, sound-recording, or video-recording will be permitted during the lecture, laboratory sessions, office hours or field work presentations without permission. If a student wished to reproduce lecture presentations, course notes, or other similar materials provided by the instructor and TA's, they must obtain the instructor's written consent before hand.

Otherwise, all such reproductions is an infringement of copywrite and absolutely prohibited. In the case of private use by students with accessibility needs, the instructor's consent will not be unreasonably withheld.

## 13. 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 website: [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)

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> ).

## 14. Academic Conduct

Students should also be familiar with the University Academic Policies and Regulations and Academic Rights and Responsibilities in the Academic Calendar on the Registrar's website and in the printed calendar. <https://www.uwo.ca/univsec/pdf/board/code.pdf>

## 15. Western's Commitment to Accessibility

The Department of Geography strives at all times to provide accessibility to all faculty, staff, students and visitors in a way that respects the dignity and independence of people with disabilities.

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 519-661-2147 for any specific question regarding an accommodation. [Information regarding accommodation of exams](#) is available on the Registrar's website.

More information about "[Accessibility at Western](#)" is available.

## 16. Medical Issues

The University recognizes that a student's ability to meet his/her academic responsibilities may, on occasion, be impaired by medical illness. The Student Services website provides greater detail about the University's policy on [medical accommodation](#). This site provides links the necessary forms. In the event of illness, you should contact Academic Counselling as soon as possible. The Academic Counsellors will determine, in consultation with the student, whether or not accommodation should be requested. They will subsequently contact the instructors in the relevant courses about the accommodation. Once the instructor has made a decision about whether to grant an accommodation, the student should contact his/her instructors to determine a new due date for tests, assignments, and exams.

Students must see the [Academic Counsellor](#) and submit all required documentation in order to be approved for certain accommodation.

## 17. Mental Health

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit Western's [Health and Wellness website](#) for more information on mental health resources.

## 18. Support Services

[Student Support Services](#)

[Student Development Services](#)

## 19. Important Dates

January 7: Classes resume

January 15: Last day to add a second term half course

February 18: Family Day – Department Office Closed

February 18 to 22: Spring Reading Week (No classes; Department Office open)

March 7: Last day to drop a second term half course without penalty

April 9: Classes end

April 10: Study day

April 11-30: Examination Period