

UNIVERSITY OF WESTERN ONTARIO  
DEPARTMENT OF GEOGRAPHY

**Geography 2330A - Geomorphology and Hydrology**

*Fall 2013*

**Class Times**

Lectures:	Wed. 12:30 – 2:30 p.m.	SSC 2028
Labs:	Thurs. 2:30-4:30 p.m.	SSC 2333
	Thurs. 4:30-6:30 p.m.	SSC 2333

**Instructor**

Dr. Peter Ashmore

Room 1405 SSC

Ext. 85026

Email: pashmore@uwo.ca

Office hours: by appointment

**Calendar 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.

**Prerequisites**

**1.0 course from Geography 1100, 1300A/B, 1400F/G, 1500F/G, 2131A/B, 2153A/B (taken after September 2012), or the former Geography 020E; or 0.5 course from Earth Sciences 1022A/B or 1081A/B; or enrollment in the Major in Physical Geography or in an Honors Earth Science Program for Professional Registration.**

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may 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.

**Course objectives**

At the conclusion of the course you should be able to:

1. recognise, and describe the characteristics of, common landforms;
2. understand and explain the physical principles of common geomorphic and hydrologic processes, and the functioning of the water and sediment cascades;
3. explain landform development in relation to the relevant geomorphic and hydrologic processes and anticipate the effects of environmental change on both the processes and

landforms;

4. discuss, with the help of case examples, 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.

## **Course content**

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.

## Course Schedule

Topic	Lecture
Course introduction, earth systems	Sept. 11
Uplift and denudation, regional landforms	Sept. 18
<b>Hillslopes:</b>	
a) weathering	Sept. 25
b) hillslopes & mass movement	Oct. 2
c) hillslope stability & water erosion	Oct. 9
<b>Drainage basins:</b>	
a) hillslope and streamflow hydrology	Oct 16
b) drainage basins and rivers	Oct 23, Nov. 6, 13
<b>Glaciers:</b>	
a) glacial processes	Nov. 20
b) glacial landforms	Nov 27
<b>Summary and Prospect</b>	Dec.4

**Midterm test on October 30th, in class**

## Reading:

There is no required textbook for this course. I will place weekly reading assignments on OWL each week as we cover each topic. These will be excerpts from books, articles and various websites. The readings will be chosen to support, extend and provide cases related to each course topic and the lab assignments.

If you have not had much background in physical geography (e.g. have not taken Geography 1100 or 1300) I recommend referring to the relevant parts of an introductory Physical Geography textbook. There are a few options:

1. **Fundamentals of the physical environment by Smithson et al, 4<sup>th</sup> edition.** 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 3<sup>rd</sup> edition of this book accessible from the library catalogue
2. Another useful reference is **Chapters 11, 13,14 and 18 of “An Introduction to Physical Geography and the Environment”** Joseph Holden (editor).
3. It may be useful for you also to refer to parts of an introductory text book on physical geography. I suggest the text that is assigned for Geography 1300 **“Canadian Geosystems”** by Christopherson and Byrne, especially parts or all of **Chapters. 9, 12, 13, 14 and 17.**

There are several intermediate textbooks on geomorphology that you might refer to. These include:

1. “**Global Geomorphology**” by M.A. Summerfield. **Chapters, 1, 6-9, 12 and 15** are most relevant for this course and might be useful as a supplement to this year’s textbook.
2. **Geomorphology; A Canadian Perspective** by Alan Trenhaile. The Third edition (2007) and Fourth (2010) editions are best.
3. **Fundamentals of Geomorphology** by Richard Huggett 2<sup>nd</sup> Edition. 2007.

Some of the assigned readings may come from these books also.

I have arranged to put several of them on 2 hour reserve in Weldon Library.

## **Laboratory Sessions**

**First lab session is September 16<sup>th</sup>**

**There is no lab session Oct 31 (Fall Study Break)**

Labs will be used for completion of a variety of exercises designed to consolidate and elaborate on the lecture material and lab material will be incorporated into examinations. The labs are also used to teach and apply some simple practical skills in geomorphology and hydrology and may involve short field excursions in the vicinity of the campus. The laboratory sessions will be supervised by teaching assistants who will also be responsible for assessment of lab work. During the lab sessions you will often work and report in small groups. In many cases assessment will be ‘formative’ – i.e. you will receive feedback from the TAs but no formal grade that counts towards the course grade. Details will be given to you in the lab sessions, including dates for handing in the graded reports. Some lab exercises will require a calculator and in some cases labs will make use of computer-based exercises. ***There will be several field work sessions and some hands-on laboratory work.***  
**There is no laboratory manual for the course.**

## **Assessment**

**There are four main components in the course assessment:**

1. **Lab /field reports:**
  - a) a **summary report** and accompanying maps/illustrations on the geomorphology and hydrology of Medway Creek valley adjacent to campus. This will be the culmination of several weeks of field work and other information gathering and analysis. **Due November 20th**
  - b) **Two short laboratory reports** based on individual lab sessions and done during the lab session. Details will be given later in the term. Exact date and assignment details will be given in the lab sessions.
2. A 1 hour, short written answer, **mid-term test**, in class on **Wednesday, October 30th**.
3. A 2 hour **final exam** with both short answers and essay type questions. The final examination will cover all aspects of the course, including the lab component and readings.

Do not make any firm travel plans until you know the date of the final exam.

**Mark allocation for the course grade is:**

Field work report	20%
Lab reports	20% (2 x 10%)
Midterm:	20%
Final exam:	40%

Late assignments or absences from the mid-term test without prior permission, documentation or medical reasons will be given a grade of zero.

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**Scholastic 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/handbook/appeals/scholastic\\_discipline\\_under\\_grad.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_under_grad.pdf)

**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 p 33-41 of the printed calendar.

[http://www.westerncalendar.uwo.ca/western/web/2007\(new\)/ACADEMIC\\_INFORMATION\\_301621.html](http://www.westerncalendar.uwo.ca/western/web/2007(new)/ACADEMIC_INFORMATION_301621.html)

**Electronic Devices**

No electronic devices will be allowed during tests and examinations.

**Plagiarism**

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> )

**Illness**

For UWO Policy on Accommodation for Medical Illness and a downloadable SMC see:

[http://www.uwo.ca/univsec/handbook/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf)

Downloadable Student Medical Certificate (SMC): <https://studentservices.uwo.ca> under the Medical Documentation heading

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.

## **Mental Health**

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.

## **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.

Registrarial Services: <http://www3.registrar.uwo.ca/index.cfm>

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