

THE UNIVERSITY OF WESTERN ONTARIO
DEPARTMENT OF GEOGRAPHY

Geography 3334a - Geomorphology of River Channels

Fall 2015

Class Times

Lecture:	Mon.	10:30 a.m.- 12:30 p.m.	SSC 1302
Lab:	Tues	1:30 p.m.- 3:30 p.m.	SSC 1302

Instructor

Dr. Peter Ashmore

Room 1405 SSC

Tel. 661-2111 Ext. 85026

Email:pashmore@uwo.ca

Calendar Description

The mechanics of alluvial rivers, including fluvial hydraulics and sediment transport, river channel morphology and dynamics, floodplain sedimentation, the response of rivers to environmental change and selected applications to river management and conservation.

Prerequisite:

One of Geography 2310A/B, 2320A/B or 2330A/B, **or** at least 3rd year standing in an Environmental Science or Earth Sciences program.

Unless you have either the pre-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.

Course Outline and Objectives

Rivers are agents of erosion and sediment transport. One of the outcomes of this is the development a variety of landforms which are the focus for fluvial geomorphology. But rivers are also dynamic: they are a hazard, a habitat and a resource. They are often managed and manipulated to reduce hazards or enhance their value. The understanding of natural fluvial processes and forms is vital to their effective utilization and protection. The general objective of the course is to describe and explain the geomorphic processes and landforms associated with river systems and their geographic variation. The course approaches some elements quantitatively, using physical principles of water flow and sediment transport in stream channels as the foundation. Thus, you can expect to use some simple mathematics and elementary physics in parts of the course, and in some of the practical exercises. The course also looks at applications of fluvial geomorphology to river management and conservation / restoration. Some of the practical work and project assignment involves using data in Excel and doing some statistical analysis. Geography 2210 (or equivalent) will be an asset here, but is not a necessity or requirement.

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

1. recognize, describe and explain the origins of common fluvial landforms and river morphology
2. understand the physical analysis of the processes of flow and sediment transport in rivers
3. explain the relationship between fluvial processes and fluvial landforms
4. explain, using examples, the physical effects of environmental change and human intervention on fluvial processes and landforms
5. describe applications of fluvial geomorphology to river management and other fields of fluvial science
6. apply techniques of data analysis and map and air photo reading to the solution of problems in fluvial geomorphology
7. give some case examples of river morphology, dynamics and consequences of human intervention from rivers around the world

Course Content and Reading

There primary textbook is:

Ro Charlton. *Fundamentals of Fluvial Geomorphology*, Routledge, 2008, ISBN 9780415334549.
There are copies in the Campus Bookstore.

I will assign a few other short readings for some topics and for the lab project.

A more advanced book that you may find useful on specific topics is:

E. Wohl. *Rivers in the Landscape: Science and Management*. Wiley-Blackwell, 2014.
ISBN: 978-1-118-41489-7

References to more general texts on geomorphology may also help. I recommend:

Process Geomorphology by D.F. Ritter (4th or 5th edition) which has two or three chapters on rivers and fluvial processes.

Key Concepts in Geomorphology (2014) P.R. Bierman and D.R. Montgomery. Chapters 4, 6, 7. A new text book with some excellent diagrams and up-to-date concepts

Topic	Reading in Charlton book
The fluvial system.	Ch 1 and 2 & 3-5
Fluvial processes: flow, erosion and sediment transport in rivers.	Ch 6 & 7
River morphology: bedforms and channel form	Ch 8 117-133
Channel pattern types and sedimentary processes	Ch 8 117-133
Floodplain formation and sedimentology	Ch 8 133-156
River channel change	Ch 9
River management and applications of fluvial geomorphology	Ch 10

Assessment

There are five components:

1. Midterm test: Monday, October 26th in class.

2. “My river”. Case study report on geomorphic characteristics of a river of your choice. A short written report plus participation in class discussion session about your rivers. Details in a separate handout and in class.

3. Lab Report

The lab component of the course consists of:

- a) Some practical exercises designed to allow opportunity for discussion and learning. This will include 3-4 lab sessions spent doing field-work on Medway Creek. Their purpose is to help you learn and develop skills in independent study and assessment, as well to allow you to gauge your understanding of the course material without penalty.
- b) A short project report in the form of a summary analysis of the geomorphology of Medway Creek based on your field results. Several of the lab sessions will be devoted to this project and you will be required to spend additional time on the project outside the lab times. This will be graded at the end of term and constitutes your grade for the lab component of the course.

The lab work will include elements of both individual and group work, but the assessment will be individual.

4. Applied Geomorphology Case Study

A short report on one case study of the impact of human activity on river channel morphology and dynamics or applications of geomorphology to river management, river ‘design’ and restoration. This will be based mainly on your review of one published article from a research journal. You will hand in a short summary to be graded and there will be a class session to summarize the collective results from the whole group.

5. Final Examination

<u>Assessment</u>	<u>Date</u>	<u>Course marks</u>
• Mid-term test	Oct 26 (Mon)	20%
• Lab Project	Dec 8 (Tues)	30%
• ‘My river’ example case summary	Nov 16	10%
• Applied geomorphology case study	Dec 14 th (Mon)	10%
• Final exam	TBA	30%

University Regulations and academic information

1. Non-medical absences

If you miss, or anticipate missing, an assignment deadline or a test for non-medical reasons please:

- *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.
- There is no automatic mark deduction for late assignments but a penalty may be applied if there are not valid reasons for the delay or absence. Delay beyond the date on which graded assignments are returned to the class will result in a grade of zero.
- Absence from a test will result in a grade of zero without a 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.

2. Illness

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

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform_15JUN.pdf

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.

For assignments worth less than 10% no medical documentation is required but you must contact the instructor before the assignment due date, or as soon as possible afterwards, to notify them of the medical absence and for arranging academic accommodation.

3. Scholastic Offenses

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.

4. 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.

<http://www.uwo.ca/univsec/pdf/board/code.pdf>

5. Electronic Devices: No electronic devices will be allowed during tests and examinations.

6.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>)

7.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.

8.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.

9. Support Services

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

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