EOSC 330
Principles of Geomorphology
Course Outline

University of British Columbia, Department of Earth and Ocean Sciences, Fall term, 2016

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Co-Instructor 2016: Matthias Jakob: mjakob@bgcengineering.ca
Co-Instructor 2016: Wayne Savigny: wsavigny@bgcengineering.ca
TAs: Kathryn Grodzicki: kgrodzic@eos.ubc.ca
      Arthur Hazell: ajshazell@gmail.com
      Brandon Nguyen: quynguyen604@gmail.com
      Birgit Rogalla: birgit.rogalla@gmail.com

Lectures: Monday / Wednesday / Friday 12:00-13:00, Rm. 2012, ESB
Labs: EOS Main
        L1A Monday 14:00-16:00 Rm 105
        L1B Tuesday 11:00-13:00 Rm 101
        L1E Tuesday 15:00-17:00 Rm 101
        L1C Thursday 13:00-15:00 Rm 101

Objectives of the course:
1) to introduce landform morphology and the processes of landform development
2) to practice techniques for recognition and analysis of landforms and processes
3) to describe typical applications of geomorphology to geoscience, engineering and environment protection

Prerequisites:
One of GEOB 103, EOSC 110 or EOSC 210, or instructor approval.

Programme:
1. Lectures (outline follows)
2. Reading: There will be a reading assignment each week from the course textbook or other.
3. Laboratories and problems: There will be 5 lab exercises. There will also be a project, equivalent to one lab.
    NOTE: All labs are due in your lab section on the date of the subsequent lab (unless otherwise specified by the TA).
4. Examinations: There will be two mid-term quizzes and a final examination.

Evaluation:

Laboratories:	25% (5 x 5% each)
Project:	10%
Two quizzes:	15% (2 x 7.5% each)
Final exam:	50%
Total:	100%

Textbook:
Trenhaille, A.S., 2016. Geomorphology, a Canadian Perspective. 6th. Edition, Oxford, N.Y.
NOTE: The 3rd, 4th or 5th editions are also acceptable, though the chapter assignments may not agree. The course will not follow the textbook very closely, the readings are intended for enrichment. Material in the textbook often differs from that in the lecture notes. The examination and quizzes will be based only on the lecture content (written and spoken).

OUTLINE OF LECTURES AND LABS (Handout #)

Week 1	Introduction
Sept. 5	**No class, Labour Day**
Sept. 7	Lecture missed because of scheduling mixup
Sept. 9	Introduction to the course and to geomorphology (01) – Jakob
Lab: No laboratory this week. Make sure you sort out your lab section.	
Reading:	Trenhaile Chapter 1
Week 2	**Tools in Geomorphology and Endogenic Processes**
Sept. 12	Advanced tools and methods in geomorphology (02) – Guest (Lau)
Sept. 14	Tectonics and Isostacy (03) - Savigny
Sept. 16	Folds and fold landforms (04) - Savigny
Lab: No lab this week	
Reading:	Trenhaile Chapter 2 (pages 23 to 56)
Week 3	**Endogenic Processes (continued)**
Sept. 19	Faults and fault landforms (05) - Savigny
Sept. 21	Intrusions and volcanoes (06) - Savigny
Sept. 23	Volcanic landforms (07) - Savigny
Lab 1: Introduction to airphoto and map analysis	
Reading:	Trenhaile Chapter 2 (pages 56 to 75)
Week 4	**Exogenic Processes – Weathering and Erosion**
Sept. 26	Volcanic hazards (08): http://volcanoes.usgs.gov/hazards/ - Savigny
Sept. 28	Physical and chemical weathering (9) - Savigny
Sept. 30	Tropical residual soils (11) and karst (10) - Savigny
Lab 2: Structural landforms; Lab 1 due this week	
Readings:	Trenhaile Chapters 3, 4 and 15
Week 5	**Exogenic Processes – Fluvial Processes & Periglacial Processes**
Oct. 3	Surface erosion (11) – Jakob
Oct. 5	Channel morphology (12) – Guest (Davidson)
Oct. 7	Periglacial processes and landforms (13) _ Guest (Arenson)
Lab: Independent project assigned; Lab 2 due this week	
Reading:	Trenhaile Chapters 9 and 10
Week 6	**Exogenic Processes – Glacial Processes**
Oct. 10	**No class, Thanksgiving Holiday**
Oct. 12	**Quiz 1: Everything to date (20 minutes)**
Oct. 14	Glacial deposits and landforms (ice and ice-contact) (14) - Savigny
Lab: No lab this week	
Reading:	Trenhaile Chapters 6 and 7
Week 7	**Exogenic Processes – Fluvial and Glacial Processes (continued)**
Oct. 17	Glaciations, glaciers and glacial erosion (15) - Savigny
Oct. 19	Hydrology and drainage networks (16) – Guest (Davidson)
Oct. 21	Glacial deposits and landforms (proglacial) (17) - Savigny

Reading:	Trenhaile Chapters 6 and 7 (limited from chapters 10 and 11)
Week 8	**Exogenic Processes - Mass Wasting**
Oct. 24	Landslide classification (18) - Savigny
Oct. 26	Falls and topples (19) - Savigny
Oct. 28	Slope Stability (20) – Savigny
Lab 3: Fluvial landforms	
Reading:	Hungr et al., 2013 (copy supplied on web site) and Trenhaile Chapter 5
Week 9	**Exogenic Processes - Mass Wasting (continued)**
Oct. 31	Flow slides, debris flows (21) - Jakob
Nov. 2	Other flow-like landslides (22) - Jakob
Nov. 4	Hazard and risk assessment (23) - Jakob
Lab 4: Landslides; Lab 3 due this week	
Reading:	Trenhaile Chapter 5
Week 10	**Exogenic Processes – Fluvial Processes (continued)**
Nov. 7	Sediment transport (24) - Jakob
Nov. 9	**Quiz 2: Everything to date (20 minutes)**
Nov. 11	**No Class – Remembrance Day Holiday**
Lab 5: Glacial landforms; Lab 4 due this week	
Reading:	Trenhaile Chapters 10 and 11
Week 11	**Exogenic Processes – Coastal Processes**
Nov. 14	Terraces, fans and deltas (25) - Jakob
Nov. 16	Coastal processes and landforms (26) - Jakob
Nov. 18	Class trip to the UBC bluffs – Jakob (27)
Lab: No lab this week; Lab 5 due this week	
Reading:	Trenhaile Chapters 11 and 13
Week 12	**Climate Change and Hazard/Risk Assessment**
Nov. 21	Aeolian processes and landforms (28) - Jakob
Nov. 23	Climate change (29) – Jakob
Nov. 25	Snow avalanches (30) – Jakob or Guest (Johnston)
*Lab: No lab this week; Independent Project due **by Friday** this week*	
Reading:	Trenhaile Chapters 12 and 16
Week 13	**Applications of Geomorphology**
Nov. 28	Applied geomorphology – Landform design (32) – Guest (McKenna)
Nov. 30	BC terrain classification system (31) - Jakob
Dec. 2	Review and discussion (33) - Jakob
Lab: No lab this week	
Reading:	Review Trenhaile Chapter 16 and as needed based on review discussion

SOME GOOD REFERENCE BOOKS IN GEOMORPHOLOGY:

The following list of books is for information only. You may wish to use these titles for more detailed reading on topics of particular interest. The list may also prove useful in other related courses and assignments as well as in professional work.

Allaby, A. and Allaby, M. 1991. *The concise Oxford dictionary of earth science*. Oxford U.P. Call no. QE5 C66 1990 (Sci.ref.)

Bates, R. L. and Jackson, J. A., editors. 1984. *Dictionary of geological terms*. 3rd ed. American Geological Institute and Doubleday.   Call no. QE5 A48 1984

Benn, D. I. and Evans, D. J. A. 1998. *Glaciers and glaciation*. Arnold.

Church, M., 2006. Bed Material Transport and the Morphology of Alluvial River Channels. Annual Review, Earth and Planetary Sci., 34:325–54

Easterbrook, D.J. 1999. *Surface Processes and Landforms*. (2nd. Ed.). Prentice-Hall.

Fairbridge, R. W. 1968. *The encyclopedia of geomorphology*. van Nostrand Reinhold. Call no. GB10 F3

Fookes, P.G., Lee, E.M. and Griffiths, J.S., 2007. Engineering Geomorphology. CRC Press, Boca Raton, Florida (US edition).

French,H.M. 1996. *The periglacial environment*. 2nd ed. Longman.

Fulton, R. J., editor. 1989. *Quaternary geology of Canada and Greenland*. Geological Survey of Canada. Geology of Canada, vol. 1.   Call no. QE71 G48 V.K:1

Hambrey,M. 1994. *Glacial environments*. UBC Press.

Holland, S. S. 1964. *Landforms of British Columbia*. British Columbia Ministry of Energy, Mines and Petroleum Resources, Bulletin 48.   Call no. GB132 B7 H6

Knighton, D. 1998. *Fluvial forms and processes*. 2nd ed. Arnold. (1st ed. in library; call no. GB1205 K64 1984)

Price, R. 2002. *Scotland's Golf Courses*. 2nd ed. Mercat Press Ltd.

Ritter, D. F., Kochel, R. C. and Miller, J. R. 1995. *Process geomorphology*. 3rd ed. W. C. Brown. Call no. GB402 R57 (2nd ed.)

Selby, M. J. 1985. *Earth's changing surface*. Oxford U.P.   Call no. QE401.5 S45

Selby, M. J. 1993. *Hillslope materials and processes*. Oxford U.P. Call No. GB448 S44 1993

Sharp, R. P. 1988. *Living ice: understanding glaciers and glaciation*. Cambridge U.P. Call no. GB2403.2 S5

Sidle, R.C., Pearce, A.J. and O'Loughlin, C.L. 1985. *Hillslope stability and land use*. Call No. TA710 S419 1985

Summerfield, M. A. 1991. *Global geomorphology*. Longmans. Call no. GB4015 S82 1991