

McGill University
Department of Geography
GEOG-203: ENVIRONMENTAL SYSTEMS
COURSE OUTLINE 2014

This course presents a systems approach to the study of the temporal and spatial variability of the natural environment near the earth's surface. Emphasis is on understanding the processes of mass and energy exchange that drive the variability in the earth's climate, its water cycle, soil development, biogeochemical cycles, plant production, and distribution of plant communities. The knowledge gained sheds light on environmental processes of increasing interest, such as global warming feedback mechanisms involving the water cycle and vegetation, the impacts of agriculture, deforestation and acid precipitation on water and nutrient cycles, soil erosion, and eutrophication of aquatic systems.

There are two lectures per week, Monday and Wednesday, 11:5-12:55, starting September 3 in MDHAR G-10. The sequence of 23 lectures and 2 in-class tests is divided into three sections, covering fundamental aspects of the atmosphere, hydrosphere, lithosphere and biosphere, with a focus on interactions at the drainage basin scale. The two instructors approach the course topics within a common, integrated Earth Surface Systems viewpoint.

SECTION 1: EARTH SURFACE CLIMATOLOGY AND DRAINAGE BASIN HYDROLOGY

Instructor: **Dr. Tim Moore** (BH 626, tim.moore@mcgill.ca)

September 8 - Oct. 1: seven lectures, one assignment, one in-class test (Wednesday, October 1).

The parts, processes and patterns of the atmosphere: composition, global energy system, air temperature, winds, atmospheric moisture and precipitation, weather systems. The water cycle and hydrological processes at the scale of the drainage basin: precipitation, interception, evapotranspiration, infiltration, and runoff. Water stores. Effects of changes in land use, such as urbanization and deforestation, on the water cycle.

SECTION 2: SOIL FORMATION AND EROSION AND BIOGEOCHEMICAL CYCLING IN DRAINAGE BASINS

Instructor: **Dr. Tim Moore** (BH 626, tim.moore@mcgill.ca)

October 6 - November 5: eight lectures, one assignment, one in-class test (Friday November 5).

An examination of the processes and controls on soil formation, the important soil properties and the consequences of soil erosion. Discussion of the cycling of nutrients and elements between the atmosphere, the biosphere and the hydrosphere. The effects of anthropogenic disturbances such as forest removal and acid precipitation on biogeochemical cycles and system recovery.

SECTION 3: BIOGEOGRAPHY

Instructor: **Dr. Gail Chmura** (BH 628, gail.chmura@mcgill.ca)

November 10 - December 3: eight lectures, one assignment requiring self-guided field trip to the Montreal Botanical Garden. *You will be examined on this material in the final exam.*

This is an introduction to ecological biogeography covering: distribution of the world's biota and environmental controls with an emphasis on vegetation disturbance and succession in terrestrial and aquatic ecosystems. We will consider energy and carbon flow in the environment, as they relate to global warming and environmental sustainability.

Course Evaluation

3 assignments (one per section, 8.3% each)	25%
2 in-class tests (Oct. 1 and Nov. 5, 25% each)	50%
Final Exam (during exam period)	25%

The two **in-class tests** are administered during regular lecture periods. The tests are not cumulative: the test on October 1 covers material from section 1; the test on November 5 covers material from section 2. The **final exam** is held during the formal exam period in December on a date set by the University later in the term. The final exam covers section 3.

The Deferred Exam is administered by the University in spring 2015 and will be worth 25% of the course grade and covers only the final section.

READINGS

The following are available at the McGill Bookstore and on reserve at the McLennan Library.

Required readings will come from:

- Text: Christopherson, R.W, Byrne, M.-L. and Giles, P. 2013. *Geosystems: An Introduction to Physical Geography, 3rd Canadian Edition*, Pearson, 655 pp. Call number is GB54.5 C475 2013. **OR** Christopherson, R.W. and Byrne, M.-L. 2009. *Geosystems: An Introduction to Physical Geography, 2nd Canadian edition*, Pearson, 709 pp. Call number is GB54.5 C475 2009. Students have told us they find a comprehensive text such as this to be a useful reference, particularly in upper level Geography courses. The two editions are very similar in content.
- There will be additional readings available on-line.

Recommended:

- Northey, M. and Knight, D.B. (various publication years) *Making Sense: a Student's Guide to Research and Writing in Geography and Environmental Sciences*. Oxford University Press. Call number G74 N67 2012. This book will be useful throughout your university career. It provides guidance in using the university library, writing essays, and doing research (such as will be required in your third assignment). Sections on preparation of reports and presentations will be useful in your upper level courses.

OTHER REQUIREMENTS

One of your assignments will require that you visit the Montreal Botanical Gardens (<http://www2.ville.montreal.qc.ca/jardin/en/propos/propos.htm>), easily accessible by the metro. Student admission is ~\$14 with your student ID and further discounted for Quebec residents and those who hold an ACCESS Montreal card.

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see <<http://www.mcgill.ca/integrity>> for more information).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

For information on university and department policies for student assessment, please go to <http://www.mcgill.ca/geography/studentassessment>

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 514-398-6009 (<http://www.mcgill.ca/osd/>) before you do this.

Additional policies governing academic issues which affect students can be found in the McGill Charter of Students' Rights ([here](#)).