

## GEOG 360: Analyzing Sustainability

**Instructor:**

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Transitioning to sustainability is one of the grand challenges this century. While we may not know all of the solutions needed—or how best to realize them at different scales—major advances have been in terms of understanding and addressing complex sustainability challenges, such as climate change and natural resources management. This course will introduce you to some key concepts in sustainability science as well as the application of relevant tools and approaches to analysing sustainability. The course is structured to encourage dialogue and 'learning by doing.' The course comprises four modules on the following themes: (1) Cost-benefit analysis; (2) Climate change ethics and climate policy; (3) Balancing tradeoffs among multiple ecosystem services; and (4) Conservation planning and protected areas design. Other concepts will be addressed in class discussions.

### COURSE CALENDAR DESCRIPTION

Examines challenges to sustainability through a series of case studies to illustrate the analytical approaches used to understand the linkages between scientific-technological, socio-economic, political-institutional, ethical, and human behavioural aspect of systems. Includes cases that are thematic and place-based, national and international, spanning from the local to global scales.

**PREREQUISITES:** ENVR 201 or equivalent; and GEOG 203 or ENVR 200 or ESYS 200 or equivalent; or permission of instructor.

Note: Students from multiple academic backgrounds take this course, but you are expected to have some experience (and motivation) in working with analytical methods related to interdisciplinary environmental problems. Useful backgrounds include courses in systems modelling, introductory statistics, quantitative methods, or GIS. **Strong knowledge of Microsoft Excel is required (e.g., formula entry, plotting, absolute versus relative cell references, etc.).**

**COURSE STRUCTURE:** 3 credits. The course is taught on Wed/Fri from 8:35-9:55am in BH 511 (the electronic classroom of the 5th floor GIC library). It is structured as 4 modules, dealing with different case studies and analytical tools, spanning interdisciplinary sustainability themes in environmental studies and environmental science. Typically, we will cover a module over a series of class meetings (including lectures, labs, and discussions), as shown in the preliminary weekly schedule on the next page. Students will be expected to participate in class discussions, and there will be some opportunity to present the results of group work in April.

*Preliminary Course Outline, Winter 2017*

**WEEKLY SCHEDULE** (*preliminary, subject to change*)

Module	Date	Topic	Description
Intro	Jan 4, Wed	Introduction to class	Lecture/discussion
Intro	Jan 6, Fri	Excel tutorial: From basic to advanced functions	Lab
1.1	Jan 11, Wed**	Intro to Cost-benefit analysis (CBA)	Lecture ( <i>Assignment distributed</i> )
1.2	Jan 13, Fri	Cost-benefit analysis of a national park I	Lecture/Lab
1.3	Jan 18, Wed	Cost-benefit analysis of a national park II	Lab
1.4	Jan 20, Fri	Payment for Ecosystem Services (PES): an example from Beijing	Prof. Brian Robinson
1.5	Jan 25, Wed	Cost-benefit analysis of a national park III	Lab
1.6	Jan 27, Fri	CBA and PES: case studies	Paper discussion
2.1	Feb 1, Wed	The ethics of climate change policy	Lecture ( <i>Assignment distributed</i> )
2.2	Feb 3, Fri	Climate change ethics I	Lab
2.3	Feb 8, Wed	Climate change ethics II	Lab
2.4	Feb 10, Fri	Climate change ethics III	Lab
2.5	Feb 15, Wed	Ethics and global climate change: Emissions accountability and responsibility	Paper discussion (and exercise)
3.1	Feb 17, Fri	Ecosystem services: tradeoffs and interactions	Lecture ( <i>Assignment distributed</i> )
3.2	Feb 22, Wed	Ecosystem service tradeoffs I	Lab
3.3	Feb 24, Fri	Ecosystem service tradeoffs II	Lab
—	Mar 1, Wed	Reading Week	No class
—	Mar 3, Fri	Reading Week	No class
3.4	Mar 8, Wed	Ecosystem service tradeoffs III / Revisiting Excel tutorial	Lab
3.5	Mar 10, Fri	Modeling land use and multiple ecosystem services at the landscape scale	Paper discussion
Exam	Mar 15, Wed	Midterm Exam (practical)	In-class exam
4.1	Mar 17, Fri	Conservation planning: basic principles	Lecture ( <i>Group assignment distributed</i> )
4.2	Mar 22, Wed	Marine protected area (MPA) design I	Lab
4.3	Mar 24, Fri	Marine protected area design II	Lab
4.4*	Mar 29, Wed	MPA proposals: Group presentations I	Presentations
4.5*	Mar 31, Fri	MPA proposals: Group presentations II	Presentations
Finale*	Apr 5, Wed	Sustainability standards and certification	Exercise and discussion
Finale	Apr 7, Fri	Analysing Sustainability: Review & synthesis	Lecture/Discussion ( <i>Exam distributed</i> )

\*\* Deadline to add/drop class is Jan 17, 2017 (Tues).

\* The class will meet in Burnside Hall Room #426 on March 29, March 31, and April 5

## LEARNING OUTCOMES, ASSESSMENT & TEACHING STRATEGIES

Outcomes	Assessment	Strategies
<i>To recognize different dimensions of sustainability and key concepts</i>	Paper summaries and contribution to discussions.	Read papers, write summaries, and participate in discussions.
<i>To use existing tools that measure different aspects of sustainability</i>	Lab reports and presentations. Mid-term and final exam.	Work on problem solving and data analysis.
<i>Interpret the results of the analysis within a broader social and environmental context (i.e., the many dimensions of sustainability)</i>	Paper summaries and contribution to discussions. Lab reports and presentations. Final exam.	Read papers, write summaries, and participate in discussions. Work on problem solving assignments.
<i>Practice leadership skills through team-based activities</i>	Teamwork and consensus building. Group presentations.	Collective engagement in problem solving tasks. Present as a group.
<i>Communicate complex concepts in accurate but broadly understood ways</i>	Presentation skills. Paper summaries.	Present as a group. Critically read papers.

## COURSE EVALUATION

Lab Reports [3] & Group presentation [1] (4 total, at 12.5% each)	50%
Summaries of papers or mini-exercises [4] (at 2.5% each)	10%
Mid-term exam (in-class practical exam)	10%
Final exam (take-home)	25%
Overall class participation*	5%

\*NOTE: attendance at lectures, discussions, and labs is *ESSENTIAL*.

## Due dates for assignments and final exam

- Lab reports are generally due at the beginning of class of the next module (but check the specific due dates stated on the assignment handout available on *myCourses*).
- Paper summaries (3) are due at the beginning of the paper discussion period, while mini-exercises may be due the day before the associated class (please see *myCourses*).

**Final exam** (take-home): tentative due date of Apr 21 (5pm), but subject to central university scheduling

## Lab reports

Please follow the instructions on the assignment hand-out in order to complete the lab reports. The instructions provide the basis for what is needed to complete the report, but it may take some hard work and time to complete all of the tasks. The instructor will indicate where and how to submit the reports, which will either be as a hard-copy in class or via *myCourses*.

### **Presentations**

For one assignment (Module #4, marine protected area design) you will work in small groups to discuss and present your work together. A group grade will be assigned to the presentation. In addition, all students will complete an evaluation of their own contributions, and their peers' contributions to the group project. Based on this peer-evaluation, as well as the instructor's own observations of contributions to group project, individual grades may be adjusted up or down from the group average grade.

### **Paper summaries**

These are 250-300 word (maximum) summaries of each article (see the example template on *myCourses* for specific details). The summaries are to be submitted as a hard-copy in class. The paper will be assigned (and posted on *myCourses*) at least one week prior to the scheduled paper discussion.

### **Participation and discussion**

Active participation and engagement in the course material is a critical component of this class, but particularly important on discussion days. Sustainability issues are complex and can only be fully understood by analyzing and debating each case from multiple perspectives. The class is therefore designed to allow as much interaction and discussion as possible, and it is hoped that you will take advantage of this opportunity to learn collectively through discussion, as well as peer support during the lab periods.

### **Exams**

The exams will test your ability to apply an analytical tool like the ones we have explored in class to solve a specific problem or issue posed to you. Your aim is then to analyze the results of the analysis in the broader context of the multiple dimensions of sustainability. It will be similar to the labs, but you will work on your own.

### **Right to submit in English or French written work that is to be graded**

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. (approved by Senate on 21 January 2009 - see also the section in this document on Assignments and evaluation.)

Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue.

### **Academic Integrity**

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 & Disciplinary Procedures (see [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/)) for more information. (approved by Senate on 29 January 2003)

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par

## *Preliminary Course Outline, Winter 2017*

conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/)).

### **Inclusive learning environment**

As the instructor of this course, I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the [Office for Students with Disabilities](#), at 514-398-6009.

### **Student assessment**

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