GEOG*4110: Environmental Systems Analysis

Fall 2020 Course Outline
Department of Geography, Environment and Geomatics, University of Guelph

Disclaimer:

Schedule of lecture topics and assigned readings may change. Any such changes will be announced via CourseLink and/or class email.

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website and circulated by email.

Course Instructor:

Dr. Faisal Moola, PhD
fmoola@uoguelph.ca (put 4110 in subject)
350 Hutt Building (Not Present due to COVID Lockdown)

Teaching Assistants:

Rachel Young: ryoung07@uoguelph.ca

Lectures:
Lectures: Tuesdays and Thursdays, 2:30-3:50 pm on Zoom

Office Hours:
Tuesday and Thursday: 12:00 – 1 pm. By appointment until further notice.

Course Description:
Humans have long been able to affect the environment, but never before on such a scale. We are now altering the Earth’s carbon cycle, which has resulted in climate change, and we have sped up, by more than 150 percent, the nitrogen cycle, which has led to acid rain, ozone depletion, and coastal dead zones, among other impacts. We have also replaced wilderness with clearcuts, mines, farms, cities and infrastructure used to pump, drill, frack, strip mine and transport fossil fuels. The loss of natural areas is leading to the precipitous loss and decline of biodiversity, including once common species, like bees and other pollinators. Human have become a new kind of biological force that is altering the physical, chemical, and biological properties of the planet on a geological scale. Indeed, Nobel Prize-winning chemist Paul Crutzen has suggested that the current geologic period should, most appropriately, be called the Anthropocene Epoch to reflect our new status as a global force in driving ecological change — “the Human Age”.

This course examines the impacts of natural and land use dynamics on ecosystems, biodiversity and ecological processes in the Age of the Anthropocene – the Human Age. We will consider the links between disturbance and biological systems and the important role spatial and temporal scale play in our understanding of these systems. Concepts and methods used in the analysis and management of biophysical systems will be reviewed and debated in class and employed as part of a group project that students will be responsible for. Particular attention will also be given to the importance of resource policy in Canada and globally.

Prerequisite(s):
GEOG*3110 or GEOG*3610

Objectives
1. To investigate the impacts of human activities on our planet in the Age of the Anthropocene, with a primary focus on land use and land use change.
2. To examine methods and applications central to understanding the consequences of human activities, using different Environmental Systems Analysis tools, employed in environmental assessment processes and other policy domains.
3. To recognize the broader social contexts in which environmental research is undertaken, including the significance of Indigenous Knowledge Systems.
4. To develop effective oral and written communication skills that will facilitate considered argument and opinion and the dissemination of research findings

Approach
The course will use a combination of lectures, seminar-style discussions and student presentations. Students will be responsible for a major project that should include original analysis of data. Students will present their project in class at the end of term.

Required Readings
There is no textbook for the course. Readings will be assigned one week before each lecture and will be available on Courselink.

Evaluation
- Anthropocene Study Critique: 10 %
- Mid-Term Exam. 20 %
- Major Group ESA Project:
  - Written Component. 20 %
  - Presentation Component. 10 %
- Final Exam. 40 %

Anthropocene Study Critique (10%). Due October 2\textsuperscript{nd}, 2020
Students will be responsible to provide a critical analysis of an assigned scientific study on the significance of the Anthropocene.
Take Home Mid-Term Exam (20 %). Due October 23rd, 2020
The objective of the mid-term is to ensure that you review and critically engage with the material introduced in lectures, films, and readings. The mid-term exam will be a mix of short answer and essay questions. It will cover material from the lectures and readings of weeks 1-7.

Major Group ESA Project (30%). Due in Weeks 10 - 12
Students will be responsible for a major project that applies one recognized method of Environmental Systems Analysis to analyze the environmental impacts and/or performance of a 1) policy, plan, programme and/or project (e.g., British Columbia’s carbon tax or proposed Kinder Morgan TMX pipeline); or 2) region or nation (e.g., the environmental footprint of the City of Toronto); 3) organization, company or industrial sector (e.g., Alberta’s oil sands); 4) product or service (e.g., electric vehicles, coffee or Nike sneakers); 5) substance (e.g., neonicotinoid pesticides).

The project must include the original analysis of data. Students will present their project in class at the end of term in weeks 10 – 12.

Take Home Final Exam (40%). Assigned Dec 14th and Due Dec 18th
The final exam will cover material from the whole term, although it will be more heavily focused on material from after the mid-term. The format will be multiple choice, short answer and essay questions.

University of Guelph Policy Statements:

Illness
The University will not require verification of illness (doctor's notes) for the fall 2020 or winter 2021 semesters.

E-mail Communication
As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the university and its students.

When You Cannot Meet a Course Requirement
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor [or the teaching assistant in the case of the proposal or essay] in writing, with your name, id#, and e-mail contact. Where possible, this should be done in advance of the missed work or event, but otherwise, just as soon as possible after the due date, and certainly no longer than one week later. Note: if appropriate documentation of your inability to meet that in-course requirement is necessary, the course instructor, or delegate, will request it of you. Such documentation will rarely be required for course components representing less than 10% of the course grade. Such documentation will be required, however, for Academic Consideration for missed end-of-term work and/or missed
final examinations. See the undergraduate calendar for information on regulations and procedures for Academic Consideration.

**Drop Date**
The last date to drop one-semester Fall 2020 courses, without academic penalty, is Friday, December 4th, 2020. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar.

**Copies of Out-of-Class Assignments**
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

**Accessibility**
The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway. Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: www.uoguelph.ca/sas

**Academic Misconduct**
The University of Guelph is committed to upholding the highest standards of academic integrity and enjoins all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. The University of Guelph takes a serious view of academic misconduct, and it is your responsibility as a student to be aware of and to abide by the University’s policy. Included in the definition of academic misconduct are such activities as cheating on examinations, plagiarism, misrepresentation, and submitting the same material in two different courses without written permission from the relevant instructors. To better understand your responsibilities, read the Undergraduate Calendar for a statement of Students’ Academic Responsibilities; also read the full Academic Misconduct Policy. You are also advised to make use of the resources available through the Learning Commons and to discuss any questions you may have with your course instructor, TA, or academic counsellor.

Instructors have the right to use software to aid in the detection of plagiarism or copying and to examine students orally on submitted work. For students found guilty of academic misconduct, serious penalties, up to and including suspension or expulsion, can be imposed. Hurried or careless submission of work does not exonerate students of responsibility for ensuring the
academic integrity of their work. Similarly, students who find themselves unable to meet course requirements by the deadlines or criteria expected because of medical, psychological or compassionate circumstances should review the university’s regulations and procedures for Academic Consideration in the calendar and discuss their situation with the instructor and/or the program counsellor or other academic counsellor as appropriate.

University Policy on Academic Misconduct

Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph. Please consult the Undergraduate Calendar for offences, penalties and procedures relating to academic misconduct.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars are the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.
<table>
<thead>
<tr>
<th>Week</th>
<th>Class</th>
<th>Theme</th>
<th>Lecture Topic</th>
<th>Required Readings, Films and Podcasts</th>
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</thead>
</table>
| 1    | 1     | 1. The Anthropocene and its Impacts on Biological and Cultural Landscapes | Course Introduction | Course syllabus  
Steffen et al 2007. The Anthropocene. Are humans now overwhelming the great forces of nature? |
| 2    | 1     | Anthropogenic Biomes of the Planet | | Williams et al. 2015. The Anthropocene Biosphere  
Interview with Robert Macfarlane |
| 2    |       | Anthropogenic Biomes of the Planet | Film: Anthropocene the Human Epoch  
Ellis and Ramankutty. 2008. Putting people in the map: anthropogenic biomes of the world |
| 3    | 1     | Anthropogenic Biomes of the Planet | Hobbs et al. 2009. Novel Ecosystems: implications for conservation and restoration |
| 2    |       | Lab #1 | Student Projects |
| 4    | 1     | Biological Landscapes | Watson et al. 2018. The exceptional value of intact forest ecosystems |
| 2    |       | Cultural Landscapes | Podcast: Speaking the Anthropocene. An interview with Robert Macfarlane  
Map: LandMark: global platform of Indigenous and community lands  
Film: High atlas cultural landscapes program |
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| 5    | 1     | 2. Environmental Systems Analysis Tools | Introduction to Environmental Systems Analysis Tools | Currier et al. 2015. Cultural keystone places: conservation and restoration in cultural landscapes  
ANTHROPOCENE STUDY CRITIQUE DUE OCTOBER 2ND 2020  
Film: Life cycle assessment – designing for sustainability |
<p>| 2    |       |       |               | Ainielski and Wilson. 2008. Counting Canada’s Natural Capital: assessing the real value of Canada’s boreal ecosystems |
| 6    | 1     |       |               | No Classes |
| 2    |       |       | ESA Tools #2: Environmental Footprint Primer on the Ecological Footprint |
| 7    | 1     |       | Lab #2        | Student Projects |
| 2    |       |       | ESA Tools #2 Environmental Footprint Galli et al. 2014. Ecological Footprint: Implications for Biodiversity |
| 2    |       |       | ESA Tools #3: Biodiversity Assessment B.C. Species and Ecosystem Explorer |
| 9    | 1     |       | Lab #3        | Student Projects |
| 2    |       |       | ESA Tools #4: Life Cycle Assessment BBC Podcast: Argentina’s White Goldrush |
| 10   | 1     |       | ESA Tools #4 Life Cycle Assessment TBD |
| 2    |       |       | ESA Tools #5 TBD |</p>
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<td>Social Life Cycle Assessment</td>
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<td>11</td>
<td>1</td>
<td>ESA Tools #5 Social Life Cycle Assessment</td>
<td>TBD</td>
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<td>2</td>
<td></td>
<td>Group Presentations</td>
<td>Group 1 - Group 2 - Group 3 - Group 4 -</td>
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<td>12</td>
<td>1</td>
<td>Group Presentations</td>
<td>Group 5 - Group 6 - Group 7 - Group 8 -</td>
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<td>2</td>
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<td>Group Presentations</td>
<td>Group 9 - Group 10 - Group 11 - Group 12 -</td>
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<tr>
<td>13</td>
<td>1</td>
<td>Final Day of Class</td>
<td>Term review and preparation for final exam</td>
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**FINAL EXAM DUE DECEMBER 18TH 2020**