EES1117H: Climate Change Impact Assessment

Class: 13:00 - 15:00 Tuesdays, MW120
Lab: 15:00 - 16:00 Tuesdays, BV471

1 Instructor

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Office Hours: W 10:00 - 12:00, and other times by appointment

2 Teaching Assistant

Name: TBA

3 Course Description

Although climate change is a global phenomenon, the varying impacts of climate change are primarily experienced at regional scales. Because many long-term planning decisions, decisions that often rely on climatological information, are made locally, we are entering an era when the availability of regional climate information at appropriate spatial scales and in accessible forms is critical. Thus, this course describes how climate information can and is being used to assess the impacts of climate change and, ultimately, inform local decision-making and adaptation strategies. The course begins by reviewing climate change over the last 150 years and the projection of future climate change using Global Climate Models (GCMs). The climate change impact assessment (CCIA) formalism is then introduced and applied to several case studies. In the computer labs, students will learn how to use open-source online tools to access projections of future climate generated by GCMs participating in the most recent phase (Phase 5) of the Coupled Model Intercomparison Project (CMIP5). Downscaling of GCM data is a key component of CCIA; both statistical and dynamical downscaling techniques will be discussed in class and explored in the computer labs. Finally, students will also acquire practical experience in CCIA by applying the techniques discussed in class to their own final project.
4 Course Web Page

The course web site is available through Blackboard: https://portal.utoronto.ca. The Blackboard system is accessible using yourUTORID which has been assigned to you as part of registration. All course information, resources, assignments and communications will be posted on Blackboard. It is your responsibility to check the information frequently. You must also ensure that you use your University of Toronto email address on Blackboard. If you are unfamiliar with Blackboard you can find a tutorial here and additional information at: http://www.utsc.utoronto.ca/technology/blackboard-portal

5 Evaluation

Your course grade will be made up of class participation, lab exercises, assignments, and a final project. All deadlines are listed below in “Section 11: Tentative Schedule”.

There will be 5 lab exercises that are designed to introduce the concepts that will be explored more deeply in the assignments. The lab exercises are worth 10% or your final mark. For these lab exercises, you are encouraged to interact with your classmates by sharing ideas and discussing the specifics of the tasks. You are, however, expected to submit your own lab exercises, and it should not be a direct copy of a classmate’s. Lab exercises will be posted on the course website.

There will be 3 assignments relating to the content of the course and the lab exercises, worth 40% of your final mark. If you need help in completing an assignment, please visit the TA and/or instructor’s office hours. The assignments are expected to be completed independently. Assignments will be posted on the course website.

The final project will consist of completing your own climate change impact assessment for a region and exposure unit of your choice. The final project is worth 40% of your final mark. Further details about the final project will be posted on the course website.

Total Grade Breakdown:

1. Participation 10%
2. Lab Exercises 10%
3. Assignments 40%
4. Final Project 40%

6 Resources

Readings and resources will be posted on the course webpage.

Recommended Resources:

Climate Change 2013, The Physical Science Basis (IPCC AR5 WGI)
Climate Change 2013, Impacts, Adaptations and Vulnerability (IPCC AR5 WGII)
7 Analysis and Plotting Software

We will be analyzing output from global climate models (GCMs) using Python data analysis software in the computer labs/tutorials and for your assignments. We will also use other online tools to access and analyze GCM data throughout the course. We will work through many examples together in labs and clear instructions will be given in the assignments.

8 Late Assignments

Assignments submitted late will not be accepted without an accompanying UTSC illness verification form (http://www.illnessverification.utoronto.ca/document/Verification%20of%20Student%20Illness%20(VOI)%20-%20Oct%2027%202016.pdf). Late assignments without an illness verification form will be deducted 10% for each 24 hour period late (weekends included).

9 Academic Integrity

Academic integrity is fundamental to learning and achieving our course goals. The assignments in this course are designed to give you an opportunity to learn important skills and concepts by making honest attempts through your own thinking, writing, and hard work.

I am strongly committed to assigning grades based on my students’ honest efforts to demonstrate learning in this course. Academic dishonesty in any form will not be tolerated in my classes. All academic work in this course must adhere to the Code of Behavior on Academic Matters.

10 Accessibility

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services as soon as possible.

AccessAbility Services staff (located in Rm SW302, Science Wing) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email ability@utsc.utoronto.ca. The sooner you let us know your needs, the quicker we can assist you in achieving your learning goals in this course.
11 Tentative Schedule

Jan. 9: 1. Introduction + Review of Past and Future Climate Change  
        *Lab Exercise*

Jan. 16: 2. The CCIA Formalism + Case Studies

Jan. 23: 3. Future Climate Change Scenarios  
         *Assignment 1 Due*  
         *Lab Exercise*

Jan. 30: 4. Statistical Downscaling

Feb. 6: 5. Case Studies using Statistical Downscaling  
        *Assignment 2 Due*  
        *Lab Exercise*

Feb. 13: 5. Guest Lecture: Monirul Mirza - IPCC Structure and WGII

Feb. 20: READING WEEK

Feb. 27: 6. Dynamical Downscaling  
         *Assignment 3 Due*  
         *Lab Exercise*

Mar. 6: 6. Case Studies using Dynamical Downscaling


Mar. 20: STUDENT PRESENTATIONS  
         *Lab Exercise*

Mar. 27: STUDENT PRESENTATIONS

Apr. 3: STUDENT PRESENTATIONS

Apr. 10: *FINAL PROJECTS DUE*