

# Biological Consequences of Global Change

## Syllabus: BIOC58H3 Fall 2021

Course Instructors: Dr. Rachel Sturge, [rachel.sturge@utoronto.ca](mailto:rachel.sturge@utoronto.ca), SW 563B  
Virtual Office hours: Mon 10:00 – 11:00 am (or by email)

TA: TBD

Recommended Textbook: Lee Hannah. *Climate Change Biology* 2<sup>nd</sup> edition  
(alternate: Erica Rosenbloom. *Global Change Biology*)

Class meeting time: Lectures Online (posted by Monday at 9am every week)  
Tutorials Tut 0001 Tues 09:00 – 11:00  
Tut 0002 Thurs 15:00 – 17:00

### 1) Course Description

This class is a lecture and tutorial course that addresses the key environmental factor that will dominate the 21<sup>st</sup> century and life on the planet: Global Climate Change. The course will examine the factors that influence climate, from the formation of the earth to the present time, how human activities are driving current and future change, and how organisms, populations, and ecosystems are and will respond to this change. Finally, it will cover human responses and policies that can permit an adaptive response to this change.

### 2) Learning Outcomes

At the end of this course, students should be able to...

1. Correctly use common biological terms and principles from the study of global climate change.
2. Describe the major factors contributing to both past climates and today's climate.
3. Compare and contrast natural and anthropogenic factors contributing to global climate change, and describe the impact of these changes on various biological systems.
4. Give examples of ways that the climate has changed in the past, and describe how biological systems have responded to those changes. Be able to use this information to predict future trends.
5. Read and interpret scientific literature from the field, and use that literature to synthesize persuasive arguments in both debates and in written form.
6. Using examples, explain how studies in the field can help us understand the impacts of climate change and how organisms have responded / continue to respond to these changes.
7. Apply the knowledge used in this course for both understanding and to inform policy in an effort to mitigate the impacts of climate change, both in this course and in your future lives.

### 3) Academic Honesty

All work in this course is covered by the University of Toronto's policies on Academic Misconduct, which outlines the behaviours that constitute academic dishonest, as well as the processes for addressing academic offences. For details regarding these policies, please see the University's Code of Behaviour on Academic Matters: <http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>. The University treats cases of cheating and plagiarism very seriously, so please **REVIEW THIS MATERIAL** as you are expected to be familiar with it.

Potential offences include, but are not limited to:

In papers and assignments:

- Using someone else's ideas or words without appropriate acknowledgement.
- Submitting your own work in more than one course without the permission of the instructor.
- Making up sources or facts.
- Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

- Using or possessing unauthorized aids.
- Looking at someone else's answers during an exam or test.
- Discussing the answers with other students during the assessment without permission from the instructor.
- Working together on exams without permission from the instructor.
- Misrepresenting your identity.

In academic work:

- Falsifying institutional documents or grades.
- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from Dr. Sturge or from other institutional resources (see <http://academicintegrity.utoronto.ca/>).

All students should have confidence in their ability to master this course material and earn an acceptable grade. If you are struggling with the material, please speak with Dr. Sturge or your Teaching Assistant. You should also consider forming study groups as research has shown that students who participate in study groups earn, on average, higher grades in courses than those who do not.

#### 4) Course Policies

- At the start of the semester, make note of all important deadlines for the course and identify times when multiple things will be due. Early identification of such time periods will provide you with advanced notice so you can plan accordingly. Do this for all of your courses so you can have advanced notice of times when items will be due in multiple courses at once.
- Stay on top of course content. Students who fall behind typically perform worse on tests, and have less time to learn the content before major assessments. By staying on top of the course content, you are reducing your workload when it is exam time.
- Check the class website(s) and the syllabus regularly to make sure you are aware of all upcoming deadlines. Start working on projects as soon as you become aware of them – this gives you more time to ensure you can complete each component in a timely manner.
- Watch each lecture as soon as possible after it has been made available, and complete all active-learning components as you proceed through the lecture. These activities are placed where they are within the lecture to reinforce concepts and provide additional practice.
- Read all material related to that day's tutorial BEFORE class, and complete any pre-class assignments in advance. Log in to tutorials on time, stay focused on tutorial content, do not distract classmates.
- Ask questions and discuss the material with other students. Group discussion promotes learning. There will be opportunities for group discussion virtually so please participate!
- Be an active learner and participate fully in all aspects of the course. Hold yourself and your teammates accountable for all tasks assigned to you / them in any group activity. Be honest with yourself if you are not contributing as fully as you should be, and make positive changes, if necessary.
- When using technology, which includes (but is not limited to) cellphones, tablets and computers, please use them responsibly. The human mind is NOT capable of multitasking (as many scientific studies have shown), and distracted learners are not high-achieving learners. Please minimize the distractions around you when you are taking part in online learning.
- Review course content often. This will be more productive than waiting until just before an assessment and studying for long blocks of time at once. The same amount of time that you might spend trying to memorize information right before a major assessment is better spent re-reading lecture notes or your answers on tutorial worksheets over a more prolonged period of time, with breaks in between to allow knowledge to shift into long term memory. In general, humans learn best with repetition, and the more often you see the same information the better you will be able to recall it on high-stakes assessments such as exams.

## 5) Accessibility

We welcome students with diverse learning styles and needs at this University and in this course. If you require some sort of accommodation, please see me and/or contact the AccessAbility Services Office (see below links) as soon as possible. We will work with you to ensure that you are able to meet the course learning objectives successfully. The UTSC AccessAbility Services staff are available by appointment to assess your specific needs, provide referrals, and to arrange appropriate accommodations. All enquiries are confidential. The sooner you let us know your needs, the quicker we can assist you in achieving your learning goals in this course.

UTSC AccessAbility: [ability.utscc@utoronto.ca](mailto:ability.utscc@utoronto.ca), (416) 287-7560, AA 142 (Arts and Administration Building)

## 6) Equity, Diversity, and Inclusion Statement

The University of Toronto is committed to equity, human rights, and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. UTSC does not condone discrimination or harassment against any persons or communities. The Department of Biological Sciences at UTSC acknowledges the barriers that people of colour and other marginalized groups face, particularly in science and academia. As a department, we are highly committed to creating a welcoming scientific community where everyone feels safe, comfortable participating, and which provides the necessary support to thrive. We acknowledge and are disheartened that Black, Indigenous and other marginalized communities are, and always have been, disproportionately impacted by systemic racism and face barriers within academia. In August 2020, our department formed an equity and inclusion task force that will meet regularly to discuss equity and inclusion and enact improvements to our departmental practices by actively engaging with the literature on best practices, and seeking ongoing input from all members of the department including students, post-doctoral fellows, staff and faculty. Among our main priorities will be a commitment to hire and support faculty and staff that are representative of our diverse student population, and to promote a departmental culture that will foster inclusive teaching and research excellence. To find out more information about this initiative, please visit <https://www.utscc.utoronto.ca/biosci/biological-sciences-edi-statement>.

## 7) Assessment

### a) Methods of instruction

The basic information of this course will be presented through virtual lectures on major topics that will be posted to the course website, TA-led literature reviews of recent articles, and individual and group-based active learning exercises. Lectures will be posted at the start of the scheduled class time and students will have 24 hours to watch the lecture and complete the related active-learning content.

Class attendance for tutorials is **mandatory** and prompt arrival is crucial. **There are no options for attending tutorial asynchronously, but students in a different time zone can gain permission to attend the tutorial time that works best for them.** We will be using TopHat Classroom for lecture participation – please see Quercus for more details.

Class participation will be graded based on active participation in any online active learning exercises / discussions / assignments and also based on prompt attendance and full participation in all tutorials. If you log in late, or you are unprepared or unwilling to participate, you will earn a lower grade. If you miss a tutorial or lecture without a valid reason, the relevant scores (quizzes / assignments / etc.) will be dropped but the absence will impact your participation score.

## b) Lectures

Lectures will be posted to TopHat Classroom every Monday by 9am. You are expected to watch the lecture content within 24-hours and will be held responsible for all material covered, including active learning components (which will be due at 11am each Tuesday). Active learning lecture components will be graded for both participation and correctness. Students are strongly encouraged to watch each lecture prior to the associated tutorial as tutorials are based on lectures and assume prior exposure to lecture content.

## c) Tutorials

We will spend time in tutorial analyzing and discussing scientific papers on topics that relate to each week's lecture. Students are expected to read the assigned paper and be prepared to discuss it in tutorial. **At the end of the discussion, students will take an online quiz designed to test their understanding of the paper.** Through these discussions, you will learn how to read scientific literature critically, and how to identify both the limits of a study and the general principles that we can draw from it. Reading scientific literature requires understanding the basics of methodology, putting effort into thinking about the research and the results, and critical thinking skills. These readings will supplement the lecture material, and the material from these papers **will be covered on exams.**

In addition to literature discussions, students will participate in active learning and group-based tutorial exercises aimed at promoting deeper thinking about the concepts introduced in this course. These exercises may include, but are not limited to, writing assignments, small presentations, debates, worksheets. Students will also work on groups to complete two major projects during the semester: a public service announcement (worth 8% of your final grade) and researching and preparing a write-up for the final debate (worth 7% of your final grade). More details regarding these assignments will be given out as the semester progresses. Assignments will be checked for originality using a plagiarism detection tool. Please see section 8 of this syllabus for more details.

### **No makeup tutorials will be permitted.**

Tutorial attendance each week is mandatory, and no makeup work will be permitted for any assignments that were completed during tutorial time – this includes the reading quizzes. Your lowest tutorial assignment and reading quiz scores will be dropped. Note this dropped score also includes all university-accepted excused absences (such as illness). Students who miss tutorial will also not be permitted to earn grades for any post-tutorial assignments. No late assignments will be accepted for work that is completed in tutorial. For all other assignments, please refer to the late penalties outlined in section **e) Grading Policies**, below.

## d) Exams

There will be a midterm exam and a cumulative final exam in this course. The value of both items can be found in section **e) Grading Policies**, below. Both exams will be based on lecture and tutorial material and on the assigned literature. Readings supplement the lecture material and are immeasurably helpful in preparing for tests / exams. Both exams will be run online and will involve virtual moderating. **It is the responsibility of all students to ensure that they have a secure wifi connection and a working device before all exams.** Students who do not have access to this technology **MUST** let the instructor know before the exam takes place in order for alternate arrangements to be made. Note: students should also let the instructor know if this will be an issue at the start of the semester so alternate arrangements can be made for all course content!

**Makeup exams:** If you miss the midterm due to a university-accepted reason, please contact me within three days of the missed test and provide documentation to support your absence. Please see <https://www.utoronto.ca/biosci/missed-term-work-policy> for details on acceptable documentation and how to submit it (Note: this information has been updated as of August 2021). Students with a valid excuse will be given a makeup exam within one week of the missed test (unless there is a valid reason for a longer delay). Students who fail to contact me within three days will earn a score of zero and no makeup exam will be permitted. Note that students who are unable to contact me within this time frame due to circumstances beyond their control are exempt from this. **Makeup midterm exams will consist solely of ten short answer questions.** If you miss the final exam, you must go through the registrar's office to request a deferred exam.

## e) Grading policies

Students are responsible for all material that is presented in lecture and tutorial. If you miss a class, you are strongly advised to obtain the notes and assignments from another student. Participation in lecture and tutorial will be an important factor in determining borderline grades, so attendance and participation are strongly advised. Please note again that that **NO MAKEUP TUTORIALS ARE PERMITTED AND ATTENDANCE IS MANDATORY.** For more details, please refer to the relevant section of this syllabus.

Category	Percent
Midterm Exam	20%
Lecture Participation*	10%
Tutorials <sup>†</sup>	15%
Tutorial Reading Quizzes	5%
Public Service Announcement Assignment	8%
Debate Assignment	7%
Final Exam (cumulative, during final exam period)	35%

\* Lecture participation is based on TopHat active learning activities. Students can opt out of TopHat usage by completing the survey posted to Quercus. For students who opt out, the grades change as follows: Midterm Exam 25%, Final Exam 40%. Students who opt out will take exams in Quercus. All other students will have a choice between Quercus and TopHat testing.

† 5% of the Tutorials grade is based on tutorial participation. This includes showing up to tutorials on time, being fully engaged in all aspects of the class, and remaining until class has ended. This also includes attending all tutorials, where possible, and providing documentation for absences as needed. Students cannot opt out of this part of the grade.

### **Late penalties**

No late assignments will be accepted for tutorial reading quizzes, lecture active learning assignments, or for other work that is completed in lecture or tutorial. For all other assignments, work that is turned in late will be penalized by 10% per day, **starting with 5 minutes after the due date / time**, unless the student provides documented proof of the reason for their tardiness. Illness on the day an assignment is due is **NOT** considered an acceptable excuse for late assignments where students had sufficient time to complete them prior to the start date of their illness (note: for longer-term illnesses, accommodations can be made – please reach out at the onset of the illness so you keep us informed). For group assignments, if you fail to participate during class and your groupmates choose to complete the assignment without you as a result, then you will earn a 0 grade unless you missed the assignment for a university-accepted reason. Putting your name on an assignment that you did not contribute to is an academic offence. If we catch you doing this, we will report you to the Office of Academic Misconduct.

### **Forms required to document missed coursework**

Students who miss class or tutorial for a university-accepted reason must provide documentation to support their absence. Please see <https://www.utoronto.ca/biosci/missed-term-work-policy> for more details on documentation. Please note that, even though we will drop your lowest tutorial score, you still need to document all absences for tutorials – if you miss one tutorial that you have properly documented, and a second tutorial for which you have no documentation, this second absence will count as a zero, lowering your tutorial grade. In addition, missed lectures and tutorials will impact your participation scores unless you submit proper documentation to support your absence.

### **One week ‘Statue of Limitations’**

All grading questions about exams, homework, quizzes, group exercises, literature reviews, etc. must be addressed **within one week** of the scores being posted online or handed out in class. **After this time, no changes will be made to existing grades unless there is a calculation error.** Thus, it is essential that you check your grades regularly and contact your TA or instructor **within one week** if you feel an error has been made or if you are unsure why you lost points.

### **f) Public Service Announcement & Debate Assignments**

Students will work in groups of 3 or 4 to complete two different assignments as part of this course. Both assignments will require students to conduct research and to disseminate that research in written, graphic and / or oral form. The first assignment (PSA) will occur during the first half of the semester and the second assignment (debate) will occur during the latter half of the semester, with a take home assignment due on the last day of classes. More details about both projects can be found on the course website. Important deadlines for both projects can be found below. Written components of both assignments will be checked for originality using a plagiarism detection tool. See section 8 of this syllabus for more details.

**Important Assignment Deadlines\***

<b>Oct 22</b>	<ul style="list-style-type: none"> <li>• PSA rough drafts are due for peer review</li> <li>• Peer reviews will be assigned through Quercus</li> </ul>
<b>Oct 29</b>	<ul style="list-style-type: none"> <li>• PSAs are due for grading</li> </ul>
<b>Nov 16 &amp; 18</b>	<ul style="list-style-type: none"> <li>• Debate paper assignments are due before tutorial</li> </ul>
<b>Nov 23 &amp; 25</b>	<ul style="list-style-type: none"> <li>• Debates take place during tutorials</li> </ul>
<b>Dec 6</b>	<ul style="list-style-type: none"> <li>• Debate take home assignments are due</li> </ul>

\* Dates are subject to change based on inclement weather, large-scale power outages, or other unforeseen circumstances. Students will be given advance notice of any changes, where possible.

**8) Plagiarism Detection Tool**

Some of your tutorial assignments will involve group and individual written work. You are expected to submit a digital copy of these assignments, when instructed to do so, through Quercus where your work will be checked via a plagiarism detection tool (PDT). The following statement is included for your information, as per University policy: *Normally, students will be required to submit their course essays for review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of PDT service are described on the University's website.*

**Schedule of Classes\*****Instructor: Dr. Rachel Sturge (rachel.sturge@utoronto.ca)****Lectures: Posted to course website every Monday at 9:00****Tutorials: Tuesdays 9:00-11:00 or Thursdays 15:00-17:00**Readings from *Climate Change Biology* 2<sup>nd</sup> ed. (or *Global Change Biology*)

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Chapter (alt Chapter)</b>
1	Sep 6	<b>NO LECTURE THIS WEEK (Monday is Labour Day)</b> <b>NO TUTORIALS THIS WEEK</b>	
2	Sep 13	Introduction & Evolution of Earth's climate <b>Tutorials start this week</b>	1, 2 (1, 2)
3	Sep 20	The Anthropocene	2 (3, 4)
4	Sep 27	Species Responses	3, 4 (5-8)
5	Oct 4	Community & Ecosystem Responses	5 (9, 10)
6	Oct 11	<b>READING WEEK - NO CLASS</b>	
7	Oct 18	<b>MIDTERM EXAM (Monday 9am to 11am)</b>	
8	Oct 25	Past Responses to Global Change	6-8 ( - )
9	Nov 1	Extinctions of the Past	9 (2)
10	Nov 8	Estimating extinction risks from climate change	10-12 ( - )
11	Nov 15	Conservation & Global Change Part 1	13-16 (11)
12	Nov 22	Conservation & Global Change Part 2	18-19 (11)
13	Nov 29	The Future	17, 20 (12)
14	Dec 6	<b>NO CLASS – use this time to study instead!</b>	
<b>FINAL EXAM WILL BE HELD DURING EXAM PERIOD</b>			

\* Schedule is subject to change based on exams, inclement weather, or other unforeseen circumstances.