Syllabus - Instructors

Instructors Revision History:
vers. 0; 2023 Aug 25: initial posting
vers. 1; 2023 Aug 27: OH venue updated

The first lecture includes this instructor info, plus building and campus maps Download building and campus mapsto the office hour venues.

Lead Instructor

Roger De Roo (he)

Lecturer IV and Associate Research Scientist
Dept. of Climate and Space Science and Engineering (CLaSP)

Office:
2543D Climate and Space Research Building
2455 Hayward St., North Campus,
Campus Zip: 2143

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campus phone number: +1(734)647-8779

Office hours:
1. In 3642 Chem conference room on Thursdays, 11:30m-1:00pm. If the location needs to change due to a prior reservation on the room, I will make an announcement on Canvas and in lecture. I will also be on Zoom for these office hours -- join via Canvas > Zoom.

2. As additional office hours, I can meet in my office in the Climate and Space Research Building (CSRB) on North Campus on Wednesdays from 2pm to 3pm. However, since these are additional to the original set of office hours, please send me a courtesy e-mail as soon as you know you plan to attend so that I know to expect you.

3. In my office in the Climate and Space Research Building on North Campus by appointment via email. My fixed obligations this semester are this class and another, so Monday thru Thursday mornings I am unavailable. Otherwise, I'd be happy to put down what I'm doing to talk with you. If you were to wander by my office, you'd find that the door would be open most of the time that I am in it. This is because I encourage drop-ins. This is convenient for my grad students in CSRB, but if you need to trek over from another campus, an appointment would be wise, as I do spend some time in meetings and in my lab.

Note: I am a visual learner, not an auditory learner. If you need me to retain anything (like a commitment to meet with you), use email to initiate the conversation or to follow-up on a face-to-face or phone discussion. Thanks!

The Student Instructor(s):

Kira Biener (she/they)

Senior in CLaSP (Climate Science program)

email: kjbiener@umich.edu

Office Hours:
Mondays and Wednesdays 3:00-4:00 in the Science Learning Center Alcove 7

Elijah Beland

Junior in CLaSP (Meteorology concentration)

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Office Hours:
Tuesdays and Thursdays 4:00-5:30 in the Dana Building Lounge

Syllabus - Grades

Grades revision history:
vers 0; 2023 Aug 25: initial posting

Grade Basis:

20% in class **participation**
20% in class **community quizzes**
20% **readings** questions, due after a reading assignment but before the material is covered in lecture
40% **homeworks**, covering material after it is presented in lecture. Homeworks will concentrate on recently covered material, but may be cumulative in nature.

The assignment structure is modeled upon our needed reaction to the climate system: there are no high-stakes events (like tests) but there is a constant stream of things to do, which won't be onerous unless you procrastinate. Between the start and end of classes, there will always be at least one assignment open.

In-class **participation** is conducted synchronously via Zoom Quiz, or, if a laptop/smartphone is unavailable, via paper handout, in the lecture hall during lecture. There will be 1% credit for each lecture in which at least one participation occurred, up to a maximum of 20%. The "at least one" rule is to give credit to those students who ponder and discuss at length... to the point of not answering in time. In my last offering there were a total of 75 activities, and each of 28 lectures (excluding the first one) will have at least 2 activities, so it is possible to get full participation credit even if you must miss several lectures due to illness or other obligation. This item is graded on participation in answering the question, not on the correctness of your answer. Collaboration and discussion with your neighbors in the lecture hall is encouraged. Questions directed at the instructor, out loud or via Zoom Chat, are also encouraged at any time.

Community quizzes are run exactly like the in-class participations, ie. synchronously via ALP or paper handout, in the lecture hall during lecture. Some lectures will have one Community Quiz, others will not have any. During a Community Quiz, collaboration and discussion with your neighbors in the lecture hall is encouraged. There will be a 2% credit for each correct answer, up to a maximum of 20%. I am planning on doing at least 12 community quizzes. The only difference between participations and community quizzes are
1) how I count them (participations are by the lecture; quizzes individually)
2) the importance of the correct answer
You can think of participations as practice for the community quizzes, if you want. Community Quizzes also count towards Participation: you will get Participation credit for answering a Community Quiz regardless of your answer.

Because I reveal the answer at the end of the Community Quiz, submissions will be locked at the end of the Quiz. I will count down to when it is closed, but do be aware that there is a lag on the audio, while there isn't a lag on the controls to Quiz. I try to take this into account, but waiting until the last second is inherently dangerous in that you may not get your response in before it closes. If you need more time, ask for more time! If you couldn't get your response in, email one of the instructors as soon as you can with your response. If a correct answer is sent after the Quiz closes, we will give you partial credit.

The **readings** questions will be primarily multiple choice. 3 to 6 questions based directly on the readings due before lecture. They will start out being due before each lecture, around October when we start the text (below) we will transition to weekly readings, due before lectures on Tuesdays. The reading questions will be posted in Canvas Quizzes, and the reading assignment itself is in the instructions for the questions. You have two opportunities to get the correct answer for each question, and there will be hints to the correct answer in the review after you submit, but you only get half the points for a correct answer if it takes two tries (the formula I'll use is the better of the overall first score, or the average of the two scores). You may not collaborate on the readings questions.

The **homework** problems will be a mix of problem types posted in Canvas Quizzes. One set per week, some weeks we will skip the homework (the first week, around Fall break, and Thanksgiving). The weekly due date is 5am on Fridays, so that you have maximum access to the instructor's and the IAs' office hours. You may consult with your fellow students (and, of course, with the instructors and the IAs) on the homework problems, but you must answer the problems yourself.

No extra credit will be offered.

Submission of Assignments and late submissions

If you missed an in-class participation or community quiz, you missed it: there will be no make-up. However, the number of Participations and Community Quizzes are sufficient that if you must miss a lecture due to illness or other obligation, you can do so without harming your final grade. The credits for Participation and Community Quizzes max out at 20%. This is designed to allow you to miss some lectures, and not have the absence impact your final grade. Canvas Grades isn't that graceful about this policy, however, so if you miss a few lectures your projected final grade will look worse than it will be by the time we get to the end of the semester, when Canvas starts to drop the "missed" Participations and Community Quizzes from its grade calculation.

Homeworks and Reading assignments are submitted via Canvas Quizzes. You can look at the assignment and save your answers as much as you like until it is due. When you are ready to submit your answers, make sure you click the submit button, and get the confirmation webpage. If you start an assignment and do not submit it prior to the deadline, Canvas will submit whatever you have entered for you at the deadline.

My late policy is modeled after the climate system: you can be late to react to the class, or climate, as it evolves, but not without penalty. Your first Late Submission (Reading or Homework) will be accepted without question and without penalty. The second Late Submission will incur a 20% penalty. The third Late Submission will incur a 50% penalty. No credit will be given for a fourth or higher Late Submission. I treat Readings and Homeworks equally as submissions under this Late Submission policy: that is, if you are late with a Homework after you have already been late with a Reading, the late Homework will incur the 20% penalty. Send an email to one of the IAs or the instructor if you wish to take advantage of this policy: we will reopen the assignment for you.

Early notice exception to the late assignment penalty

If you know of a coming time conflict such that you cannot avoid a late submission, I will grant an extension without penalty if you tell one of the IAs or me by email prior to the due date (see above policy if the deadline has passed). An early notice of a late submission does not count against the limited number of late submissions in the previous paragraph -- you can take advantage of this early notice of a late assignment as often as you need.

If Canvas misbehaves such that you cannot or suspect that you cannot submit on time, put your answers in an email and send it to an IA prior to when the assignment is due. Otherwise, I will presume that you are late in doing the assignment.

Challenging a score:

Sometimes students find a new approach to finding an answer to a question, and when they answer it in Canvas Quizzes, it gets marked as incorrect. The solutions do show how to get to the answer as I derived it, but there are plenty of problems for which alternate approaches are valid. Especially for those for which a numeric answer is needed (ie. a calculation), an alternative calculation can result in a value that is just outside the accepted range of answers. If you feel you were correct but marked as incorrect on a Homework problem, send an email to any instructor explaining in detail how you got the answer you entered. If it is a valid approach, and we get the same answer that you do following your approach, we'll give you credit for that answer. For numeric answers, we'll likely adjust the range of acceptable answers to incorporate your approach.

If your answer contains a typographical error, such as an extra zero for a small number like "0.0032," follow the same procedure above, explaining how you got the answer you did, and how you messed up. Partial credit is possible. That said, some mistakes, like an incorrect sign in a question asking about the value of Radiative Forcing, are part of the point of the question, and so no partial credit is given for such a mistake. "Fat finger" mistakes (selecting the wrong multiple choice answer via clumsiness or b/c the Quiz was taken on a device with a tiny screen) will not receive full or partial credit. It is your responsibility to take advantage of the opportunity to review your answers before hitting the "submit" button, to make sure you are submitting what you intend to submit.

Recording of Scores

Upon submission, only correct answers are shown for Readings (otherwise, what's the point of the 2nd chance?). For a 2nd submission, make sure your correct answers on the first submission are unchanged: Canvas Quizzes don't remember the first submission and will score the 2nd submission as if it were entirely new, prior to averaging the score with the first attempt score. Homeworks, since there is only one submission, will show the answer upon submission.

All scores will be recorded in Canvas Grades. Recording of some assignments will be as soon as you finish them; some need to be transcribed by hand and may take a few days to appear. Canvas Grades will show raw scores on individual assignments, and your cumulative grade.

The scores in Canvas Grades may be categorized in a temporary category that does not count towards the final grade. These scores are incomplete in some fashion for the class as whole. For example, scores for Participations from Zoom are entered first, with the scores from the paper handouts added later. Between the scoring from Zoom and the hand scoring of paper Participations, the scores are incomplete and will not be counted

in the grade calculation because for those that did it on paper, the scores are (temporarily) incorrect. Similarly, a Homework that is currently open will not count towards the final grade until after the original deadline has arrived, because some may not have completed that assignment yet.

Unsubmitted assignments will count as a zero

Canvas Grades is not graceful with respect to assignments that are not submitted. It should count them as zero, but it considers them as not having been assigned. Eventually, unsubmitted assignments will be counted as a zero for the final grade. Do keep an eye on your scores for unsubmitted assignments, and contact either of the instructors for an extension to complete them.

Grading Scale:

The grading scale for everything except an A+ is on an absolute scale:
above 96% A
92% up to 96% A-
88% up to 92% B+
84% up to 88% B
80% up to 84% B-
76% up to 80% C+
72% up to 76% C
68% up to 72% C-
64% up to 68% D+
60% up to 64% D
50% up to 60% D-
Below 50% F

The A+ grade is competitive:
A+ will be given to the top 20% of those earning straight A's, calculated at the end of the term.

In the Fall 2022 offering, the minimum score for an A+ was 99.47%
In the Fall 2019 offering, the minimum score for an A+ was 99.80%.
In the Fall 2018 offering, the minimum score for an A+ was 99.73%.
In the Fall 2015 offering, the minimum score for an A+ was 99.72%.
In the Fall 2014 offering, the minimum score for an A+ was 99.87%.

No rounding of scores will occur.

Syllabus - Policies

Course Policies

vers 0, 2023 Aug 25: initial posting
vers 1, 2023 Nov 01: lecture recordings location added

The Engineering Honor Code

This class is being taught through the College of Engineering, and thus all involved are subject to the College of Engineering Honor Code whether you are enrolled in an Engineering class (CLIMATE 105, ENSCEN 105) or not (CHEM 105, ENVIRON 105).

Full details of the Honor Code can be found at the Honor Code website: https://bulletin.engin.umich.edu/rules/Links to an external site.
Don't hesitate to ask questions of your instructors about Honor Code policies.

The proper functioning of society depends upon a certain amount of trust. The Honor Code exists because Engineering students demanded that they be entrusted with their own education, on the basis that this trust will be required of them once they graduated. Students under the Honor Code are presumed to not cheat (ie. violate the rules of the class outlined below and contained in the Honor Code), and are required to report any suspected cheating to the instructor. Allegations of academic misconduct are investigated by the Honor Council, composed of students, not the instructor. Anyone accused of academic misconduct has rights, such as the right to defend oneself, the right to confidentiality, and the right to have a friend or advisor at hearings. Allegations of misconduct do not always result in sanctions; the most common sanction for a first offense is a zero on an assignment. The most common allegation of misconduct is the abuse of a teaming or collaborative relationship between students (eg. a student taking credit for effort of another).

Universal rules:

You may always consult the internet or library resources for any information.

You may not consult with former students of '105 or '105 materials presented in prior years.

Classroom Participation:

You are expected to collaborate with your fellow students on all aspects of classroom participation activities in class, unless specifically instructed to work alone. You will be graded on your participation, not on the correctness of your answers. In fact, some questions may have multiple correct answers; some may not have any correct answer. Do not be afraid to speak up, to agree or disagree with either the instructors or your fellow students. The lecture hall is a learning environment.

Community Quizzes:

You are expected to collaborate with your fellow students on all aspects of classroom community quizzes in class, unless specifically instructed to work alone. Unlike participations, however, you will be graded on the correctness of your answers. Do not be afraid to speak up, to question either the instructors or your fellow students. The lecture hall is a learning environment.

For both Participation and Community Quizzes, you will be asked to answer questions using a Personal Response System. You may not hold more than one transmitter during PRS questions, (ie. potentially answering for another student) nor may you enter a response for another student in any way.

Reading Questions:

These are simple multiple choice questions which should be easy to answer if you did the reading assignment. Assigning a grade to them is a way for me to encourage you to do the readings prior to the lecture. If you do the readings, answering the questions should be straightforward, and therefore you may not consult your fellow students regarding these questions.

Homeworks:

Homeworks are assigned once per week and due the next week (skipped some weeks, like the first week). Homeworks are due at 5am Friday to take advantage of the day of the week with the most office hours, which is Thursday. You may discuss this homework assignment with your fellow students, and complete the work with other students in the class, including working in a group around a common table and discussing problems as you work on them. However, you must submit individual work that is not a verbatim copy of any other student's work.
Do not forget that even when you work in a group, you are individually responsible kkfor learning that should accompany homework completion. You must answer the homework questions by yourself, but you are encouraged to discuss the concepts behind the questions with the instructors and with your classmates. For example, "What did you put down for question #4?" is out-of-bounds, since it is not a discussion of the concepts behind the question. However, a question like "Did you get how photon emission and photon scattering are different?" or "How do you calculate the Radiative Forcing?" are perfectly legitimate questions to ask your classmates. If you need to calculate a numeric answer, you must do the calculation by yourself, but you are free to ask others how to do it. You may not check your answer against anyone else's, prior to submitting your answers.

Additional policies regarding scores and grades can be found in the syllabus section on Grades.

Attendance:

To earn Participation and Community Quiz credits (see Grades) one must attend lecture synchronously. That said, since the Participation and Community Quiz activities are run

through Zoom, remote attendance is possible. The lectures will be recorded for review if you miss a lecture, but one cannot use the recorded lectures to earn Participation or Community Quiz credits after-the-fact. That said, lecture recordings are found in Canvas > Zoom under the Cloud Recordings tab.

Sometimes students miss class for health or other reasons like representing the University at an athletic event. Thus, the mechanism for earning credits for Participation and Community Quizzes (the in-class activities) has a maximum that can be earned (20% of the final grade in both cases), and there are more opportunities to earn these credits than one can earn in total. Thus, you can miss some lectures without the absences hurting your final grade. So, if you feel ill or suspect you may have been exposed to Covid or something else that might be contagious, please do yourself and others a big favor and stay home. If you can, attend via Zoom. If you can't, you can make up the absence later in the term.

Artificial Intelligence

ChatGPT and other Large Language Models are rapidly becoming useful tools in academia and the workplace. This class does not have any learning-to-write or writing-to-learn activities, and so it seems that these tools do not have utility here. You are free to use them in this course, but do be aware that what they "know" is exclusively gleaned from the Internet, and especially on the subject of climate, there's a lot of politically-driven misinformation out there. While AI can craft some plausible text, it doesn't know what is true or not. I may survey you at some point during the term to gauge how many students have used it, and if so, how much AI has helped or hindered your studies in this class.

Syllabus - Lecture Outline

Tentative Lecture Outline Revision history:
vers 0, 2023 Sep 02: initial posting
vers 1; 2023 Nov 01: recordings info
(*note: Lectures may be condensed, expanded, or re-ordered, esp. Lectures 22 and onwards*)

While one cannot get Participation or Community Quiz credits without attending lecture either in the lecture hall or via Zoom while the lecture is happening, lectures are recorded for review. The recordings are in Canvas > Zoom under the Cloud Recordings tab.

L01: 2023 Aug 29 Tue - Introduction
L02: 2023 Aug 31 Thu - Weather vs. Climate
L03: 2023 Sep 05 Tue - Energy Balance

L04: 2023 Sep 07 Thu - Atmospheric Composition
L05: 2023 Sep 12 Tue - Molecules
L06: 2023 Sep 14 Thu - Radiation
L07: 2023 Sep 19 Tue - Seasons
L08: 2023 Sep 21 Thu - Atmospheric Structure
L09: 2023 Sep 26 Tue - Carbon
L10: 2023 Sep 28 Thu - Ozone
L11: 2023 Oct 03 Tue - Water Vapor
L12: 2023 Oct 05 Thu - Clouds
L13: 2023 Oct 10 Tue - Aerosols
L14: 2023 Oct 12 Thu - Wind Forces
-----: 2023 Oct 17 Tue - (Fall Break)
L15: 2023 Oct 19 Thu - Circulation
L16: 2023 Oct 24 Tue - El Nino
L17: 2023 Oct 26 Thu - Feedback
L18: 2023 Oct 31 Tue - Sensitivity
L19: 2023 Nov 02 Thu - The Cryosphere
L20: 2023 Nov 07 Tue - The Oceans
L21: 2023 Nov 09 Thu - Models and Data
L22: 2023 Nov 14 Tue - Early Earth
L23: 2023 Nov 16 Thu - Ice Ages
L24: 2023 Nov 21 Tue - Holocene
-----: 2023 Nov 23 Thu - (Thanksgiving Day)
L25: 2023 Nov 28 Tue - Scenarios
L26: 2023 Nov 30 Thu - Impacts and Mitigation
L27: 2023 Dec 05 Tue - Energy Policy Possibilities
No final exam.

Syllabus - Texts

Texts Revision History:
vers 0; 2023 Aug 25: initial posting

Class Text

We will spend October and November reviewing the findings of the Inter-Governmental Panel on Climate Change,
as summarized in the text
David Archer and Stefan Rahmstorf,
"The Climate Crisis: An Introductory Guide to Climate Change"

Cambridge University Press, 2010, 231pp.
ISBN 978-0-521-73255-0

The suggested retail price of the paperback edition of the book is $29.99, but I've found online retailers via alibris.com that offer new copies for under $15.
You are not likely to find this textbook in the local bookstores.
The library has several copies on 2-hour reserve in the Askwith Media Library on the 2nd floor of the Shapiro UGLi, and the library has two electronic copies.
The electronic copies can be read online by up to six concurrent users while connected to the library via the internet, but if you check out the electronic copy for reading on your non-connected tablet, no one else will be able to access it.

That said, students can download PDFs of individual chapters through the library's website by going hereLinks to an external site. while on a campus network, or from elsewhere via the University's Virtual Private Network (VPN)Links to an external site..
In case the link doesn't work, here are step-by-step instructions:
- Go to https://www.lib.umich.edu/Links to an external site.
- In the "Library Search" bar on the top left of the page, enter "The Climate Crisis" and hit enter
- Click on "View all Catalog results" at the bottom of the Catalog box
- The top three results have nearly identical names; scroll down to the third one. The first entry is a different book. The 2nd is our textbook but has very limited online distribution. The 3rd has three "Available Online" options, of which the first and last should work for getting chapters.
- Some of these links are to ProQuest Ebook Central, where you can download individual chapters as long as you don't exceed a specific page number limit (for me, it's 105). However, it turns out that the limit resets every 24 hours, so it doesn't prevent you from downloading the entire book in PDF form if you're willing to go back to the website on three separate days.
(thanks to Morgan Whitcomb for this recipe)

This book is not a textbook, but rather a summary of the IPCC's Fourth Assessment Report on Climate Change. As such, it does a nice job of explaining recent climate findings, but does not explain very well how the climate system works. We will explore the workings of the climate system in September, so you have a few weeks to get access to the book before we need to do the readings from it. Readings in September will be freely available websites and the URLs will be found in the instructions to the reading question assignments in Canvas Quizzes.