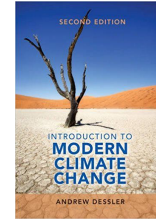


CLIMATE/CHEM/ENVIRON/ENSCEN 105
Our Changing Atmosphere
Fall 2020 (ONLINE)

- Units:** 3
- Lecture:** Online, with new lectures released Tuesday and Thursday by 10:00am Eastern Time (ET). Teaching will be conducted **asynchronously**, with class participation activities that can be answered anytime within a 24-hour window. Three exams will be held online, each of which can be completed anytime within a 24-hour window.
- Instructor:** Prof. Mark Flanner (flanner@umich.edu)
“Office hours”:
 - Tuesday 10:00-11:00 via: <https://bluejeans.com/8754517309>
 - Thursday 10:30-11:30 via: <https://bluejeans.com/8754517309>
- Instructional Assistants:** Jack Cole (jackcole@umich.edu)
Lead contact for in-class participation activities
“Office hours”:
Wednesday 2:00-4:00 via: <https://bluejeans.com/5589107666>
- Connor Todd (cwtodd@umich.edu)
Lead contact for homework assignments
“Office hours”:
Tuesday 4:00-6:00 via: <https://bluejeans.com/Connor.W.Todd>
- Adam Kelly (adamke@umich.edu)
Lead contact for exams
“Office hours”:
Wednesday 10:00-12:00 via: <https://bluejeans.com/6181774129>

Any of the IA’s may be consulted for help on concepts and material related to lectures, homework assignments, and exams.

Required text: *Introduction to Modern Climate Change, 2nd Edition*, by Andrew Dessler.
ISBN-13: 978-1107480674
ISBN-10: 1107480671
eTextbook, hardcover, and rental options available via multiple retailers



Supplemental text: *Climate Change 2013: The Physical Science Basis*, report produced by the Intergovernmental Panel on Climate Change (IPCC). Specific readings will come from this reports. Pdfs are available for free at: <http://www.ipcc.ch/report/ar5/wg1/>

Active Learning Platform (ALP) / echo360.org

ALP will be accessible through Canvas, and will be used for:

- Streaming of lectures
- Responding to in-class participation activities
- Taking notes that are linked to specific lectures and slides
- Posing questions to the instructors
- Notifying the instructors of slides you are confused about

Course Structure and Policies:

Important Dates:

- | | |
|---------------------|---|
| ● October 6: | Exam 1 (24-hour window to take exam) |
| ● November 10: | Exam 2 (24-hour window to take exam) |
| ● November 21 – 29: | Thanksgiving Break |
| ● December 15: | Final Exam (optional, 24-window to take exam) |



Full schedule

Readings:

All required readings will come from Dessler's text, or will be provided via Canvas. Readings will be useful for homework assignments, class participation, and exams.

Homework:

There will be 10 assignments, given weekly with the exception of exam weeks and the first week of lecture. The assignments will include a mix of problem types, many of which will require basic calculations. Homework sets will be assigned on Tuesdays and will be due the following

week Wednesday at 5:00pm ET. Your performance on homework will comprise 40% of your final grade. Your lowest homework score will be dropped, and your scores on the other 9 assignments will be weighted equally to derive the homework contribution to your final grade.

You may consult with your fellow students, and of course with the IA's and instructor, on homework concepts, but your calculations and responses must be prepared and completed individually by you, using your own formulations and wording. You may not check your answers against anyone else's prior to submitting your assignment. Questions of your classmates such as "What did you put down for #4?" are out-of-bounds, whereas conceptual questions like "How is a scattered photon different from an emitted photon?" are fine. You may not consult material from previous semesters.

All assignments will be submitted via Canvas. You can modify your responses as many times as you like prior to submission, but once you click "Submit Quiz", your submission is final. When you are ready to submit your assignment, please remember to click "Submit Quiz" and ensure that you receive confirmation from Canvas of your submission.

Homework late policy: The following leeway will be granted for late homework submissions occurring up to one week following the assignment due date/time. Your first late submission will be accepted without penalty (up to one week after the due date). Your second late submission will incur a 20% penalty. Your third late submission will incur a 50% penalty. No credit will be given for your fourth and subsequent late submissions. Assignments submitted more than one week after the due date will not be given any credit. If you have a sanctioned conflict that will prevent you from submitting your assignment on time, please notify the designated 'homework IA' at least 24 hours before the deadline and an extension will be granted without penalty. If Canvas misbehaves such that you cannot submit your assignment on time, please include your answers in an email and send it to the 'homework IA' and instructor prior to the due time. Otherwise, your assignment will be considered late.

Class participation:

There will be two opportunities in each lecture (after the first two lectures) to participate in short quizzes or activities, administered through the Active Learning Platform (ALP). The questions will be based on material presented in lecture and/or assigned readings. The activities will remain open for a 24-hour period starting from 10:00am ET of the day the lecture is posted. After this 24-hour window, the activities will be closed to responses. You may discuss and debate these "in-class" questions with your classmates. To facilitate small group discussion this semester, we will assign random groups of 5 students. You are encouraged to communicate with this small cohort about in-class activities, course concepts, and life in general during the pandemic. This will also hopefully offer you the opportunity to "meet" other U-M students from wherever you may be residing. The choice of technology used to communicate within these small groups can be decided by each group.

20% of your final grade will be based on these class participation activities, with half of this

element based merely on participation in the quizzes (i.e., “showing up”, the participation component) and the other half of this element based on your performance on the quizzes (the performance component). The two components will be graded as follows:

- *Participation component:* With two activities per lecture (after the first two lectures), there will be 46 activities throughout the course. **Participation in 36 out of 46 activities guarantees you full credit** (i.e., 100% or an A) for this component, allowing you to miss five full lectures due to illness, conflicts, etc without any penalty. Participation in fewer than 36 activities will result in the following grades: 32-35 activities: A- (90%); 30-31 activities: B+ (87); 28-29 activities: B (85); 26-27 activities: B- (80); 24-25 activities: C+ (77); 22-23 activities: C (75); 19-21 activities: C- (70); 16-18 activities: D+ (67); 13-15 activities: D (65), 10-12 activities: D- (55); 9 or fewer activities: E (0%).
- *Performance component:* **Correctly answering 75% or more of the quiz questions that you participate in will guarantee that you receive full credit** (i.e., 100% or an “A”) for this component. Then, the following scale applies: 70% or more correct answers: A- (90); 65% or more: B+ (87); 60% or more: B (85); 55% or more: B- (80); 50% or more: C+ (77); 45% or more: C (75); 40% or more: C- (70); 35% or more: D+ (67); 30% or more: D (65); 25% or more: D- (55); less than 10%: E (0). Your final percentage will be calculated by dividing the number of activities you answered correctly by the number you participated in.

Exams:

We will hold three exams, all administered via Canvas. For each exam, you will be given a 24-hour window in which to take the exam. Once you begin the exam, however, you will only have 60 minutes to complete it. Your lowest exam score will be dropped and only your two best exams will count towards your final grade, with 20% weighting applied to each of the two scores. If you decide not to take the final exam (and simply have Exam 1 and Exam 2 count towards your final grade), you will be given the grade reflected by your current standing in class as of the last lecture. The course material is cumulative by nature but *each exam will strongly emphasize the most recent lecture material*. The exam format will be multiple choice and short answer. The exam will be closed-book and closed-note, i.e., you may not consult notes, books, material from other students, material from previous semesters, or any online/digital material while taking the exam. You will be asked to sign an honor pledge upon completion of the exam indicating that you did not utilize any forbidden material.

You must take the exams during the scheduled exam windows. Make-up exams will only be allowed in individual cases of documented illness, emergency, or university-sponsored event. If you have a sanctioned conflict with a scheduled exam, please contact the designated ‘exam IA’ and instructor at least two weeks in advance to schedule an alternative exam.

Active Learning Platform:

Aside from enabling remote viewing of lectures and participation in the class activities, the

Active Learning Platform (ALP) offers several nice features, including the ability to ask questions to the instructors, notify instructors when you are confused by simply clicking on an icon, and record your personal notes on individual lecture slides at any time. When you pose questions via ALP, please note that the questions will be visible to everyone in the class but you will remain anonymous to your classmates. (Your identity will be known to the instructors though).

Email policy:

Email traffic associated with a class of this size can become burdensome to the instructors. We ask that you “think before you send”, and that your communications with us be clear, concise, and considerate (the three c's). Technical questions are generally answered more easily via in-person discussion and demonstration rather than via email. Hence it is better to attend the virtual office hours to address such questions. All IA's are available for discussion about course concepts. We have designated IA #1 (Jack Cole) as the lead point of contact for communication related to in-class participation activities, such as those pertaining to technical issues with ALP submissions. IA #2 (Connor Todd) is the point of contact for homework-related communication, including grade issues, and IA #3 (Adam Kelly) is the point of contact for exam-related communication, such as needs to reschedule an exam, medical-related permissions, etc.

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 via Engineering (CLIMATE 105, ENSCEN 105) or not (CHEM 105, ENVIRON 105). Information on the Honor Council can be found at: <https://elc.engin.umich.edu/honor-council/>, and basic tenants of the Honor Code are described [here](#).

The proper functioning of society depends upon a certain amount of trust. The Honor Code exists because U-M Engineering students demanded that they be entrusted with their own education, on the basis that this trust will be required of them once they graduate. Students under the Honor Code are presumed to not cheat (i.e. violate the rules of the class 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 may or may not result in sanctions.

The basic theme of the honor code is that an *unfair advantage cannot be sought*. Important rules that apply to this course include:

- You are responsible for knowing all guidelines and rules presented in this syllabus and via announcements to the class. In particular, please be aware of the guidelines for

homework collaboration described under “Homework”.

- **You may *not* utilize materials presented in prior semesters to gain assistance with homework problems, exam preparation, or in-class quizzes, or consult with students who have previously taken this course about such material.**
- You will be asked to sign a statement on your exams indicating that you did not receive or give any unauthorized aid on the exam. Your assignment or exam will not be graded without your signature.

Please do not hesitate to ask questions of your instructors about Honor Code policies.

Accommodations for Students With Disabilities:

Participants with special needs are strongly encouraged to talk to the instructor as soon as possible to gain maximum access to course information. All discussions will remain confidential. University policy is to provide, on a flexible and individualized basis, reasonable accommodations to students who have documented disability conditions (e.g., physical, learning, psychiatric, vision, hearing, or systemic) that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact UM Services for Students with Disabilities (<https://ssd.umich.edu/>) and their instructor to discuss their individual needs for accommodations.

Grading:

Final grades will be assigned using the following weights:

- 40% Exams (20% assigned to each of your two highest-scoring exams)
- 40% Homework
- 20% Class Participation

Please see descriptions in earlier subsections for details on how each component is graded. Final grades will be assigned using a **fixed scale**, meaning that grading is **non-competitive**. The following fixed scale will be applied for assigning final grades:

- A: $\geq 90.0\%$
- A-: 87-90
- B+: 85-87
- B: 80-85
- B-: 77-80
- C+: 75-77
- C: 70-75
- C-: 67-70
- D+: 65-67
- D: 55-65
- D-: 50-55
- E: < 50

Pass/Fail option: $\geq 67.0\%$ for P

CLIMATE/CHEM/ENVIRON/ENSCEN 105 Fall 2020 Schedule

<u>Lec #</u>	<u>Date</u>	<u>Topic</u>	<u>Reading</u>	<u>HW due (Wed)</u>
01	9/1	Intro / Overview		
02	9/3	Climate vs. Weather	Ch. 1	
03	9/8	Heat vs Temp, Energy Laws, Radiation	Ch. 3	HW1
04	9/10	Energy Balance, Temperature of Earth	Ch. 3	
05	9/15	A Simple Climate Model	Ch. 4	HW2
06	9/17	Atmospheric Composition		
07	9/22	Radiation and Molecules		HW3
08	9/24	Atmospheric Structure (guest lecture)		
09	9/29	Carbon Cycle	Ch. 5	HW4
10	10/1	Exam Review (LIVE LECTURE)		
11	10/6	Midterm Exam 1		
12	10/8	Radiative Forcing	Ch. 6	
13	10/13	Well-Mixed Greenhouse Gases		
14	10/15	Halocarbons and Stratospheric O3		
15	10/20	Short-Lived Gases		HW5
16	10/22	Aerosols		
17	10/27	Land Use, Solar, Volcanoes		HW6
18	10/29	Climate Feedbacks and Sensitivity	Ch. 6	
19	11/3	How do we know Climate is Changing?	Ch. 2	HW7
20	11/5	Exam Review (LIVE LECTURE)		
21	11/10	Midterm Exam 2		
22	11/12	Paleoclimate		
23	11/17	Why is Climate Changing?	Ch. 7	HW8
24	11/19	Projections of Future Climate	Ch. 8	
		Thanksgiving Break: Nov. 21-29		
25	12/1	Climate Change Impacts	Ch. 9	HW9
26	12/3	Fundamentals of Climate Change Policy	Ch. 11	
27	12/8	Mitigation Policies	Ch. 12, 14	HW10
	12/15	Final Exam, Dec 15 (Optional)		