

CLIM 101: GLOBAL WARMING: WEATHER, CLIMATE AND SOCIETY

Fall 2024 – Syllabus

(updated 19 August 2024)

Instructors:	James L. Kinter (office: 284 Research Hall, e-mail: ikinter@gmu.edu) J. Shukla (office: 105 Research Hall, email: jshukla@gmu.edu)
Class Schedule:	Sec. DL1 Tuesday & Thursday 10:30 – 11:45 am ET (online BB Collaborate) Sec. 001 Tuesday & Thursday 10:30 – 11:45 am ET (Lecture Hall #1)
Office Hours:	(Kinter) Tuesday, 11:45 am – 1:00 pm
Important Dates:	27 August 2024 First day of class 9 September 2024 Last day to drop with 100% tuition refund 10 October 2024 Mid-term Examination 5 November 2024 No Class (Election Day) 28 November 2024 No Class (Thanksgiving) 17 December 2024 Final Examination (10:30 am – 1:15 pm ET) 18 December 2024 Final grades posted

Course Overview:

Climate change is one of the defining issues of our time. This course provides a survey of relevant weather and climate processes, and the global and regional impacts of human-induced changes in concentrations of carbon dioxide and other greenhouse gases in the atmosphere. The course will focus on the phenomena of climate variability and change – inferred in the geologic past, observed in the recent past, and projected for the next century – that have impacts on ecosystems and human society. The course provides sufficient scientific background to enable students to critically examine arguments about climate change and possible solutions being discussed by policymakers and the public at large.

This **Mason Core course**, which satisfies the **Natural Science** requirement, will also review the roles of science, politics, international negotiations and the media in the current debate on what to do about climate change. The classes will consist of lectures, guest lectures, movies, in-class discussion and student debates. Lectures will include opportunities for interaction, including instant polls, question and answer sessions in which students are asked questions or may pose questions to the instructors. Students will have an opportunity to survey recent literature on the impacts of climate change in Virginia and beyond, vulnerability to climate change and strategies for adaptation, and the various policy alternatives and technological solutions for mitigating the harmful effects of climate change. Students also will have an opportunity to formally debate questions relating to the scientific and political aspects of climate change.

Goals and Learning Outcomes:

Goals

1. *Promote student interest in natural science by engaging students and fostering curiosity.* Students will gain an understanding of the scientific underpinnings of how weather and climate change and how such changes affect economies, societies, and ecosystems, both globally and regionally. The emphasis on the global warming policy debate will stimulate students to be better informed about potential problems such as heat waves, flash floods, sea level rise, trends in hurricane frequency and intensity, incidence and severity of droughts, and the occurrence of extreme weather events. The importance of the issues will stimulate student interest in potential careers in natural science research or policy.
2. *Enable students to apply scientific knowledge and reasoning to personal, professional and public decision-making.* By focusing on a series of provocative questions that depend on scientific information and have broad implications for regional, national and global society, the course will encourage students to question assumptions and critically examine public policy decisions about the preparations for and response to changes in weather and climate.

Course-Specific Learning Outcomes

1. *Understand the fundamental science of climate change:* Students will be able to explain the greenhouse effect, identify key greenhouse gases, and describe the basic mechanisms driving global climate change. They will also be able to interpret climate data and understand the difference between natural climate variability and human-induced climate change.
2. *Analyze the impacts of climate change on natural and human systems:* Students will be able to describe and evaluate the observed and projected effects of climate change on ecosystems, biodiversity, water resources, agriculture, human health, and economic systems at both global and regional scales.
3. *Evaluate climate change mitigation and adaptation strategies:* Students will be able to critically assess various approaches to reducing greenhouse gas emissions and adapting to inevitable climate change impacts. They will understand the roles of policy, technology, and individual action in addressing climate change, and be able to discuss the challenges and opportunities associated with implementing these strategies.

Mason Core Natural Sciences Learning Outcomes

1. Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding: a) evolves based on new evidence, and b) differs from personal and cultural beliefs.
2. Recognize the scope and limits of science.
3. Recognize and articulate the relationship between the natural sciences and society and the application of science to societal challenges.
4. Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information).
5. Participate in scientific inquiry and communicate the elements of the process, including: a) making careful and systematic observations, b) developing and testing a hypothesis, c) analyzing evidence, and d) interpreting results.

Technology Requirements:

Section DLI: This course is being offered online synchronously, which means that class sessions will take place at the scheduled time online using Blackboard Collaborate as the streaming service. Recordings of classes will be available - any audio, textual, or visual information from other students must be viewed privately and not shared with others in your household or shared outside the class.

Section 001: This course is being offered in person, which means that class sessions will take place in the designated location at the scheduled time. While in the classroom, students are expected to be respectful of their peers and the instructor and refrain from activities that are unrelated to the class, including cell phone and laptop use, unless specifically indicated by the instructor. Laptops or tablets may be used for taking notes, with permission of the instructor.

Both sections: Activities and assignments in this course will use Blackboard, (<https://mymason.gmu.edu>), where all lecture notes, assignments and reading materials will be posted. *All course materials posted to Blackboard or other course site are private; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.*

Textbooks, Recommended and Supplementary Reading Materials:

1. Required Reading:
 - 1.1. **(abbreviated AD in schedule below)** Introduction to Modern Climate Change (3rd edition; 2022) by Andrew Dessler
(available in the bookstore; Gateway Library¹; Amazon: <https://www.amazon.com/Introduction-Modern-Climate-Change-Dessler-dp-1108793878/dp/1108793878>)
2. Recommended Reading:
 - 2.1. Global Warming – The Complete Briefing (5th edition; 2015) by John Houghton
(available in the bookstore – online only; Gateway Library)
Note: This has been used as a textbook for CLIM 101 in past years.
 - 2.2. The Science and Politics of Global Climate Change (2nd edition; 2010) by A. Dessler and E. Parson
(<http://www.amazon.com/Science-Politics-Global-Climate-Change/dp/0521737400>)
 - 2.3. Merchants of Doubt (2011) by Naomi Oreskes and Erik Conway
(<http://www.amazon.com/Merchants-Doubt-Handful-Scientists-Obscured/dp/1608193942>)
 - 2.4. Drawdown by Paul Hawken (ed.) (2017)
(<https://www.amazon.com/Drawdown-Comprehensive-Proposed-Reverse-Warming/dp/0143130447/>)
 - 2.5. Dire Predictions by Michael Mann and Lee Kump (2008)
(<http://www.amazon.com/Dire-Predictions-2nd-Edition-Understanding/dp/1465433643>)
3. Supplementary Reading Materials: Students should refer to Course Blackboard page each week

¹ On reserve in the Gateway Library at the Johnson Center - may be charged out for 2-hour time periods and, if there is no one else awaiting use of the book, the book can be renewed.

Course Requirements:

1. *Reading*: The primary sources are selections from the textbooks and supplementary readings. Selected articles will be provided via Blackboard. **Students are expected to stay current on readings and lectures** as shown in the table below.
2. *Homework* (40% of grade): Ten sets of homework, each worth 4%, with true-false, multiple choice, multiple answer, and short-answer questions based on readings and lectures, will be assigned to cement concepts and provide students with an opportunity to evaluate their own acquisition and comprehension. Homework can be taken as many times as necessary before the due date. There is a 0.4% penalty on the final grade for each late homework. **The homework must be your own work, not done in collaboration with other students.**
3. *Attendance* (15% of grade): Presence in all classes is mandatory and will be recorded at each class session – students earn 1.5% for every 2 classes attended, i.e., attending 20 classes earns full attendance credit. Unannounced in-class quizzes will be given from time to time with questions based on the readings. Students may be excused from attendance for valid reasons such as illness by informing the instructor (Kinter) at least 2 hours prior to class time.
4. *Mid-term examination* (20% of grade): A test to evaluate students' acquisition and comprehension of material discussed in the **first 12 class sessions and textbook assignments.**
5. *Final examination* (25% of grade): A test to evaluate students' acquisition and comprehension of material discussed during the **entire semester.**
6. *Extra credit*: Up to 5% extra credit will be given for class participation (e.g., attending more than 20 classes, participating in a student debate, etc.). There will be other opportunities as well.
7. *Participation*: Students are expected to pay attention and participate during class sessions. While this is a large class, every effort will be made to provide opportunities for interaction. This may take the form of questions posed to randomly selected students in attendance.

Detailed Course Schedule (subject to minor adjustment)

<i>Date</i>	<i>Session</i>	<i>Topic</i>	<i>Reading(s)</i>	<i>Notes</i>
27 Aug	1	Introduction to CLIM101	Syllabus	In-class questionnaire
29 Aug	2	Our Place in the Universe	AD Chapter 1	
3 Sep	3	What is the Climate of the Earth?	AD Chapter 2	
5 Sep	4	Earth's Past Climate	AD Chapter 2	HW #1 DUE
10 Sep	5	Global Warming and Greenhouse Effect	AD Chapters 3 & 4	
12 Sep	6	Greenhouse Gases	AD Chapters 5 & 6	HW #2 DUE
17 Sep	7	Student Debate: Are humans heating Earth?	NA	
19 Sep	8	Earth Current Climate – What's Different Now?	AD Chapter 7	
24 Sep	9	Predicting Future Climate	AD Chapter 8	
26 Sep	10	<i>An Inconvenient Truth</i>	Film	HW #3 DUE
1 Oct	11	Global Impacts and Consequences	AD Chapter 9	
3 Oct	12	Building Public and Political Will for Climate Solutions (Guest Lecture – Prof. Ed Maibach)	Assigned reading on Blackboard	HW #4 & 5 DUE
8 Oct	13	<i>Review for Mid-term exam</i>	AD Chapters 1-9; lecture notes	
10 Oct	14	MID-TERM EXAMINATION	Covers all material in first 12 sessions	In-class/online exam
15 Oct	15	Regional Impacts and Consequences, including Virginia (sea level, heat, drought)	AD Chapter 9	
17 Oct	16	Event: Fall for the Book	NA	https://fallforthebook.org/
22 Oct	17	Detection and Attribution of Climate Change	AD Chapter 9.2.6	
24 Oct	18	Climate Change Adaptation and Mitigation	AD Chapters 11 & 12	
29 Oct	19	Debunking Climate Change Myths (Guest Lecture – Prof. Natalie Burls)	NA	
31 Oct	20	The (US) Politics of Climate Change	AD Chapter 11	HW #6 DUE
5 Nov	NA	<i>NO CLASS (Fall Break)</i>	NA	
7 Nov	21	Climate, Ecosystems and Human Society: The Ethics of Climate Change	AD Chapter 13	HW #7 DUE
12 Nov	22	Hopeful Signs in the USA	AD Chapter 14	
14 Nov	23	Hopeful Signs in the World	AD Chapter 14	HW 8 DUE
19 Nov	24	Climate Change Policy in Virginia and USA	AD Chapter 11	
21 Nov	25	Energy, Renewables and Decarbonization	AD Chapters 11 & 12	HW# 9 DUE
26 Nov	26	The Economics of Climate Change	AD Chapter 12	
28 Nov	NA	<i>NO CLASS (Thanksgiving)</i>	NA	NO CLASS
3 Dec	27	Student Debate: Should US government enact policy to reduce GHG emissions?	NA	HW #10 DUE
5 Dec	28	Review for Final Exam	AD Chapters 1-14; lecture notes	In-class questionnaire; Student Evaluations
17 Dec	29	FINAL EXAMINATION	NA	In-class/online exam

FERPA and Use of GMU Email Addresses for Course Communication:

The [Family Educational Rights and Privacy Act \(FERPA\)](#) governs the disclosure of [education records for eligible students](#) and is an essential aspect of any course. **Students must use their GMU email account** to receive important University information, including communications related to this class. Instructors will not respond to messages sent from or send messages regarding course content to a non-GMU email address.

Student responsibility: Students are responsible for checking their GMU email regularly for course-related information, and/or ensuring that GMU email messages are forwarded to an account they do check.

Online Tools:

Any student use of Generative Artificial Intelligence (AI) tools should follow the fundamental principles of Mason's Academic Standards policies (see below). Some kinds of participation in online study sites violate the Academic Standards: these include accessing exam or quiz questions for this class; accessing exam, quiz, or assignment answers for this class; uploading of any of the instructor's materials or exams; and uploading any of your own answers or finished work.

Academic Standards:

Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community which values integrity and produces graduates who carry this commitment forward into professional practice.

As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. The practices for implementing these standards adapt to modern practices, disciplinary contexts, and technological advancements. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:

- **Honesty:** Providing accurate information in all academic endeavors, including communications, assignments, and examinations.
- **Acknowledgement:** Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, co-authored pieces, and project reports.
- **Uniqueness of Work:** Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.

Violations of these standards—including but not limited to plagiarism, fabrication, and cheating—are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and adjudicating violations is [outlined in the university's procedures](#). Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

The principles outlined in these academic standards reflect our collective commitment to upholding the highest standards of honesty, acknowledgement, and uniqueness of work. By adhering to these principles, we ensure the continued excellence and integrity of George Mason University's academic community.

Student responsibility: Students are responsible for understanding how these general expectations regarding academic standards apply to each course, assignment, or exam they participate in; students should ask their instructor for clarification on any aspect that is not clear to them.

*Please note: The homework for this course must be **your own work**, not done in collaboration with other students. If you have questions about the homework, please ask the instructor (ikinter@gmu.edu).*

Title IX Resources and Required Reporting:

As a part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environment for all members of the University community, the University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities. Accordingly, **all non-confidential employees, including your faculty member, have a legal requirement to report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct** (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). Upon notifying the Title IX Coordinator of possible Prohibited Conduct, the Title IX Coordinator will assess the report and determine if outreach is required. If outreach is required, the individual the report is about (the "Complainant") will receive a communication, likely in the form of an email, offering that person the option to meet with a representative of the Title IX office.

For more information about non-confidential employees, resources, and Prohibited Conduct, please see [University Policy 1202: Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence](#). Questions regarding Title IX can be directed to the Title IX Coordinator via email to TitleIX@gmu.edu, by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

Student opportunity: If you prefer to speak to someone *confidentially*, please contact one of Mason's confidential employees in Student Support and Advocacy ([SSAC](#)), Counseling and Psychological Services ([CAPS](#)), Student Health Services ([SHS](#)), and/or the [Office of the University Ombudsperson](#).

This course will be conducted in a manner that is consistent with the George Mason University policies on non-discrimination (<https://universitypolicy.gmu.edu/policies/non-discrimination-policy/>), and diversity (<https://stearnscenter.gmu.edu/knowledge-center/general-teaching-resources/mason-diversity-statement/>) and the policy prohibiting sexual and gender-based harassment and inter-personal violence (<https://universitypolicy.gmu.edu/policies/sexual-harassment-policy/>). The instructors in this course are committed to recognizing and celebrating diversity, one of Mason's core values. The University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

Gender identity and pronoun use: If you wish, please share your name and gender pronouns with me (ikinter@gmu.edu) and indicate how best to address you in class and via email. I use he/him/his for myself, and you may address me as Dr. Kinter or Prof. Kinter in email and verbally.

Accommodations for Students with Disabilities

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit <https://ds.gmu.edu/> for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu. Phone: (703) 993-2474.

Student responsibility: Students are responsible for registering with Disability Services and communicating about their approved accommodations with their instructor *in advance* of any relevant class meeting, assignment, or exam.

Other Useful Campus Resources:

Mason has several support services for students. Please go to <https://stearnscenter.gmu.edu/knowledge-center/knowing-mason-students/student-support-resources-on-campus/> for a directory of services.

Other University Policies:

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.