CLIM 101: GLOBAL WARMING: WEATHER, CLIMATE AND SOCIETY

Fall 2024 – Syllabus
(updated 29 July 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 (Innovation Hall #103)

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 DL1: 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:
       (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 (2017) by Paul Hawken (ed.)
   2.5. Dire Predictions by Michael Mann and Lee Kump (2008)
3. Supplementary Reading Materials: Students should refer to Course Blackboard page each week

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.

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.
## Detailed Course Schedule (subject to minor adjustment)

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
<th>Topic</th>
<th>Reading(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 Aug</td>
<td>1</td>
<td>Introduction to CLIM101</td>
<td>Syllabus</td>
<td>In-class questionnaire</td>
</tr>
<tr>
<td>29 Aug</td>
<td>2</td>
<td>Our Place in the Universe</td>
<td>AD Chapter 1</td>
<td></td>
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<tr>
<td>3 Sep</td>
<td>3</td>
<td>What is the Climate of the Earth?</td>
<td>AD Chapter 2</td>
<td></td>
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<tr>
<td>5 Sep</td>
<td>4</td>
<td>Earth’s Past Climate</td>
<td>AD Chapter 2</td>
<td>HW #1 DUE</td>
</tr>
<tr>
<td>10 Sep</td>
<td>5</td>
<td>Global Warming and Greenhouse Effect</td>
<td>AD Chapters 3 &amp; 4</td>
<td></td>
</tr>
<tr>
<td>12 Sep</td>
<td>6</td>
<td>Greenhouse Gases</td>
<td>AD Chapters 5 &amp; 6</td>
<td>HW #2 DUE</td>
</tr>
<tr>
<td>17 Sep</td>
<td>7</td>
<td>Student Debate: Are humans heating Earth?</td>
<td>NA</td>
<td></td>
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<tr>
<td>19 Sep</td>
<td>8</td>
<td>Earth Current Climate – What’s Different Now?</td>
<td>AD Chapter 7</td>
<td>HW #3 DUE</td>
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<tr>
<td>24 Sep</td>
<td>9</td>
<td>Predicting Future Climate</td>
<td>AD Chapter 8</td>
<td></td>
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<tr>
<td>26 Sep</td>
<td>10</td>
<td>An Inconvenient Truth</td>
<td>Film</td>
<td>HW #4 DUE</td>
</tr>
<tr>
<td>1 Oct</td>
<td>11</td>
<td>Global Impacts and Consequences</td>
<td>AD Chapter 9</td>
<td></td>
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<tr>
<td>3 Oct</td>
<td>12</td>
<td>Building Public and Political Will for Climate Solutions</td>
<td>Assigned reading on Blackboard</td>
<td>HW #5 DUE</td>
</tr>
<tr>
<td>8 Oct</td>
<td>13</td>
<td>Review for Mid-term exam</td>
<td>AD Chapters 1-9; lecture notes</td>
<td></td>
</tr>
<tr>
<td>10 Oct</td>
<td>14</td>
<td>MID-TERM EXAMINATION</td>
<td>Covers all material in first 12 sessions</td>
<td>In-class/online exam</td>
</tr>
<tr>
<td>15 Oct</td>
<td>15</td>
<td>Regional Impacts and Consequences, including Virginia (sea level, heat, drought)</td>
<td>AD Chapter 9</td>
<td></td>
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<tr>
<td>17 Oct</td>
<td>16</td>
<td>Event: Fall for the Book</td>
<td>NA</td>
<td></td>
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<tr>
<td>22 Oct</td>
<td>17</td>
<td>Detection and Attribution of Climate Change</td>
<td>AD Chapter 9.2.6</td>
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<tr>
<td>24 Oct</td>
<td>18</td>
<td>Climate Change Adaptation and Mitigation</td>
<td>AD Chapters 11 &amp; 12</td>
<td></td>
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<tr>
<td>29 Oct</td>
<td>19</td>
<td>Debunking Climate Change Myths</td>
<td>NA</td>
<td></td>
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<tr>
<td>31 Oct</td>
<td>20</td>
<td>The (US) Politics of Climate Change</td>
<td>AD Chapter 11</td>
<td>HW #6 DUE</td>
</tr>
<tr>
<td>5 Nov</td>
<td>NA</td>
<td>NO CLASS (Fall Break)</td>
<td>NA</td>
<td></td>
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<tr>
<td>7 Nov</td>
<td>21</td>
<td>Climate, Ecosystems and Human Society: The Ethics of Climate Change</td>
<td>AD Chapter 13</td>
<td>HW #7 DUE</td>
</tr>
<tr>
<td>12 Nov</td>
<td>22</td>
<td>Hopeful Signs in the USA</td>
<td>AD Chapter 14</td>
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<tr>
<td>14 Nov</td>
<td>23</td>
<td>Hopeful Signs in the World</td>
<td>AD Chapter 14</td>
<td>HW 8 DUE</td>
</tr>
<tr>
<td>19 Nov</td>
<td>24</td>
<td>Climate Change Policy in Virginia and USA</td>
<td>AD Chapter 11</td>
<td></td>
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<tr>
<td>21 Nov</td>
<td>25</td>
<td>Energy, Renewables and Decarbonization</td>
<td>AD Chapters 11 &amp; 12</td>
<td>HW# 9 DUE</td>
</tr>
<tr>
<td>26 Nov</td>
<td>26</td>
<td>The Economics of Climate Change</td>
<td>AD Chapter 12</td>
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<tr>
<td>28 Nov</td>
<td>NA</td>
<td>NO CLASS (Thanksgiving)</td>
<td>NA</td>
<td>NO CLASS</td>
</tr>
<tr>
<td>3 Dec</td>
<td>27</td>
<td>Student Debate: Should US government enact policy to reduce GHG emissions?</td>
<td>NA</td>
<td>HW #10 DUE</td>
</tr>
<tr>
<td>5 Dec</td>
<td>28</td>
<td>Review for Final Exam</td>
<td>AD Chapters 1-14; lecture notes</td>
<td>In-class questionnaire; Student Evaluations</td>
</tr>
<tr>
<td>17 Dec</td>
<td>29</td>
<td>FINAL EXAMINATION</td>
<td>NA</td>
<td>In-class/online exam</td>
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</tbody>
</table>
GMU Email Accounts:
Students must use their own Mason email and Blackboard accounts to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information.

Online Tools:
Any student use of Generative Artificial Intelligence (AI) tools should follow the fundamental principles of the Honor Code. Some kinds of participation in online study sites violate the Mason Honor code: 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 Integrity:
Mason is an Honor Code university; please see the Office for Academic Integrity (https://oai.gmu.edu/) for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else’s work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, cultures, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

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).

Diversity and Inclusion:
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.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, gender identity, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity helps promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason’s commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum and teaching.

Acknowledging that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University
promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.

As faculty members and designated “Responsible Employees,” the instructors for this course are required to report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per university policy 1412. If you wish to speak with someone confidentially, please contact the Student Support and Advocacy Center (703-993-3686) or Counseling and Psychological Services (703-993-2380). You may also seek assistance from Mason’s Title IX Coordinator (703-993-8730; titleix@gmu.edu).

*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.

**Disability Accommodations:**
Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474

**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.

**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.