

Course Change Request

New Course Proposal

Date Submitted: 04/14/23 2:41 pm

Viewing: **CLIM 103 : Global Warming: Weather, Climate, and Society Laboratory**

Last edit: 04/14/23 3:17 pm

Changes proposed by: lortizur

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2023

Subject Code: CLIM - Climate Dynamics

Course Number: 103

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Global Warming: Weather, Climate, and Society Laboratory

Banner Title: Global Warming: Wea,Clim&Soc

Will section titles vary by semester? No

Credits: 1

Schedule Type: Laboratory

Hours of Lab or Studio per week: 3

Repeatable: May be only taken once for credit, limited to 3 attempts (N3)

Max Allowable Credits: 3

In Workflow

1. AOES Chair
2. SC Curriculum Committee
3. SC Associate Dean
4. Assoc Provost- Undergraduate
5. Registrar-Courses
6. Banner

Approval Path

1. 04/14/23 3:09 pm
Mark Uhen
(muhen): Approved for AOES Chair

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

Recommended Corequisite(s):

CLIM 101

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(Course/Test Code	Min Grade/Score	Academic Level)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog

Description:

Laboratory course accompanying CLIM 101. This course uses hands-on exercises to teach students about the causes and impacts of climate change, as well as adaptation and mitigation. Students will learn how to find and interpret climate data, analyze data related to climate adaptation and mitigation, quantify inequities in incidence of climate hazards, and communicate the elements of the scientific inquiry process.

Justification:

What: Creating a new CLIM Course

Why: This laboratory course provides an entry-level hands-on education on quantifying climate change impacts, as well as mitigation and adaptation strategies. The course will train students to use basic tools like

spreadsheets to analyze local climate-related data at scales spanning local to global scales. The course will expand entry-level offering in climate science by focusing on the applications of climate science to explore impacts and solutions.

Laboratory work will complement lectures offered in CLIM 101, which survey the science of climate change, it's impacts and challenges across a range of disciplinary fields. In addition, this laboratory will complement the existing CLIM 102 course, which focuses on the physical basis of climate change science and covers topics related to physical processes of the ocean and atmosphere.

Finally, the laboratory will introduce students to the topic of climate and environmental justice, a first for the department, providing opportunities to study local and global inequities in the impacts of a changing climate.

Does this course cover material which crosses into another department? No

Learning Outcomes:

This course will:

1. Provide students with the tools to find and interpret climate-relevant data. By working with real-world datasets, students will learn how to find climate-relevant data from authoritative public sources like NOAA and NASA, as well as local data from county and municipal repositories. Students will learn how to access datasets, read documentation to interpret data, and import it into an analysis platform (e.g., spreadsheet software). By working with data from various sources, students will gain an appreciation for uncertainty and learn techniques for making decisions with incomplete or contradictory information.
2. Expose students to a range of responses to climate change. In this laboratory, students will be presented with data and simplified models of climate adaptation and mitigation. Examples include datasets of available renewable resources for a particular location and emissions inventories. Through this work, students will gain an appreciation for the data that is used in climate adaptation and mitigation studies. The laboratory will also provide a foundation for continued learning on how to interpret and synthesize adaptation- and mitigation-relevant data.
3. Introduce students to climate justice issues. The course will survey global and regional disparities of climate change impacts. Students will use sociodemographic and climate projections data to quantify inequities in incidence of climate hazards across and within countries using tools like the Climate and Economic Justice Screening Tool in the US and projections of global population change.

Attach Syllabus

[Clim103LabSyllabus.pdf](#)

Additional Attachments

Staffing:

Luis Ortiz

Relationship to Existing Programs:

This course will be a natural science elective offered to students across all departments, and is proposed as a Mason Core Natural Science "Exploration Requirement".

Relationship to Existing Courses:

Optional Laboratory to CLIM 101: Global Warming: Weather, Climate, and Society Laboratory

Additional Comments:

Reviewer Comments

Key: 18153

CLIM 103: Global Warming: Weather, Climate and Society Laboratory

Meeting times and Location

TBD

Requisite

This course will require students to be familiar with basic spreadsheet software functionality.

Required Texts

Required reading materials for this Laboratory Course will be posted on the Github Page for the course.

Course Information

1 Credit

Instructor: Dr. Luis Ortiz

Contact: lortizur@gmu.edu

Climate change is the leading issue of our time, causing rising temperatures and increasing risks to the environment, humans, and infrastructure. This Laboratory Course provides a quantitative survey of physical processes leading to climate change, as well as mitigation and adaptation strategies. Through each lecture, students will learn to use real data from observations, climate models, and sociodemographic data to quantify trends, magnitudes, and impacts of climate change. Students will work with data ranging from global scales to local (e.g., Northern Virginia) to answer a broad range of questions related to climate change and its impacts and solution strategies.

This Laboratory Course will work in parallel with *CLIM 101: Global Warming: Weather, Climate and Society*, a separate 3-credit Lecture Course. Although CLIM 103 will share broad topics with CLIM 101, there will be several topics introduced only in this course, such as climate justice. This Laboratory Course (CLIM 103) generates a separate letter grade from CLIM 101. Scores in this course do not contribute to the CLIM 101 letter grade. It is recommended that CLIM 101 and CLIM 103 be taken concurrently, but they are standalone courses and may be taken during different semesters. It is the student's responsibility to verify the requirements for their major and their enrollment status in this Laboratory Course and its associated Lecture Course as necessary to meet those requirements.

The coursework for this class consists of 11 laboratory exercise sessions and a final presentation (see the schedule table below). Each lab session is scheduled for 2 hours and 45 minutes. Expect to spend that amount of time in lab each session. Each class will be divided into two parts. First, a brief introductory lecture on the topic to be covered that day will be shared with students. This lecture will survey the day's topic and introduce students to both a series of questions and the data that will be used to answer them. The second part of each class will consist of hands-on work. Students will use data discussed in the lecture to answer the questions posed in the lecture. Data will be either provided directly by instructors. In several laboratory exercises, searching and downloading data from public sources will be one of the assigned tasks. This in-person work will provide students with an opportunity to work directly with data with direct input and clarifications from the instructor.

Course Goals and Learning Outcomes

This course will:

1. *Provide students with the tools to find and interpret climate-relevant data.* By working with real-world datasets, students will learn how to find climate-relevant data from authoritative public sources like NOAA and NASA, as well as local data from county and municipal repositories. Students will learn how to access datasets, read documentation to interpret data, and import it into an analysis platform (e.g., spreadsheet software). By working with data from various sources, students will gain an appreciation for uncertainty and learn techniques for making decisions with incomplete or contradictory information.
2. *Expose students to a range of responses to climate change.* In this laboratory, students will be presented with data and simplified models of climate adaptation and mitigation. Examples include datasets of available renewable resources for a particular location and emissions inventories. Through this work, students will gain an appreciation for the data that is used in climate adaptation and mitigation studies. The laboratory will also provide a foundation for continued learning on how to interpret and synthesize adaptation- and mitigation-relevant data.
3. *Introduce students to climate justice issues.* The course will survey global and regional disparities of climate change impacts. Students will use sociodemographic and climate projections data to quantify inequities in incidence of climate hazards across and within countries using tools like the Climate and Economic Justice Screening Tool in the US and projections of global population change.

As a Mason Core Natural Science course, successful completion of this course will also require students to:

1. Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding:
 - evolves based on new evidence
 - 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 (e.g., health, conservation, sustainability, energy, natural disasters, etc.).
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:
 - Making careful and systematic observations
 - Developing and testing a hypothesis
 - Analyzing evidence
 - Interpreting results

Class schedule

Week	Topic	Unit
1	Introduction	Introduction, Spreadsheets, Finding climate data
2	Observations and models of global climate	Greenhouse effect and atmospheric temperature
3		Historical climate data
4		Climate models, model ensembles, and future scenarios, Part 1
5		Climate models, model ensembles, and future scenarios, Part 2 Presentation topic selection
6	Mitigation and adaptation to climate change	Counting carbon: Carbon Inventories by sector (Guest lecture)
7		Climate adaptation: Reducing impacts of climate change Part 1
8		Climate adaptation: Reducing impacts of climate change Part 2
9		Climate solutions: Costs and benefits of renewable energy
10	Climate change impacts	Climate justice: Global disparities of climate change impacts
11		Climate justice: Regional disparities of climate change impacts
12		Final Presentations Part 1
13		Final Presentations Part 2

Course Structure and Grading Criteria

Grading is based on laboratory exercises given during class. There are 11 laboratory sessions where students will work with real data from observations and models to answer questions about climate change, its impacts, and solutions. During each laboratory session, students will be given a short lecture on that day's topic to frame a technical work session. Work sessions will involve accessing prepared datasets and manipulating data to answer specific questions. The data in question will include observation records of weather variables like temperature and rainfall, technical data of available renewable energy resources, and information about human populations. For each laboratory session, students will prepare a report due at the start of the next class. The final grade will be made up from laboratory reports (70%) and the student presentation (30%). To accommodate emergencies and extenuating circumstances, the lowest grade laboratory report will be dropped.

Grading Scale

<u>A+ = 97 – 100%</u>	<u>B+ = 87 – 89%</u>	<u>C+ = 77 – 79%</u>	<u>D = 60 – 69%</u>
<u>A = 93 – 96%</u>	<u>B = 83 – 86%</u>	<u>C = 73 – 76%</u>	<u>F = 0 – 59%</u>
<u>A- = 90 – 92%</u>	<u>B- = 80 – 82%</u>	<u>C- = 70 – 72%</u>	

Final Presentation

As part of their work, students in this course will prepare a presentation on one of the topics covered throughout the semester. The presentation will consist of an in-depth exploration on a specific issue or topic related to one of the laboratory units they worked on. As part of the presentation, students should showcase skills learned in laboratory work.

Students will choose a topic on the first half the semester and share with their instructor during Week 5 unit. Instructors will provide feedback on their topic selection. Students are encouraged to look at upcoming topics. Final presentations will take up the last two weeks of class. Presentations will consist of a 12-15min presentation followed by a Question & Answer session (5min).

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.

Academic Integrity

The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using the appropriate format for this class. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

Disability Accommodations

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 <http://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

Privacy

Students must use their Mason email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information

Cell Phones & Laptop Computers

Laptop or tablet computers are required for participation in the labs. Cell phones must be turned off or set to silent.

Gender identity and pronoun use

If you wish, please share your name and gender pronouns with me (lortizur@gmu.edu) and how best to address you in class and via email.

Mason Diversity Statement

George Mason 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, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help 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 individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

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.

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

Notice of mandatory reporting of sexual or interpersonal misconduct: As a faculty member, I am designated as a "Non-Confidential Employee," and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, stalking, sexual exploitation, complicity, and retaliation to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

Useful Campus Resources

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