

# SCI 100: Climate Change

West Chester University  
Fall 2022

## Syllabus

**Updated:** August 25, 2022

### Instructor

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### Office hours

- Monday 12:30–1:50 pm ET
- Monday 3:00–4:00 pm ET
- Wednesday 12:30–1:50 pm ET
- Friday 12:30–1:50 pm ET

## Contents

<b>I Course information</b>	<b>2</b>
1. Course section details .....	2
2. Course description .....	2
3. Time commitment.....	2
4. Course schedule .....	2
5. Course materials .....	3
6. Methods of delivery .....	3
7. Student learning outcomes .....	3
8. Assessment scheme .....	5
9. Office hours .....	7
<b>II Policies</b>	<b>8</b>
10. Electronic devices .....	8
11. Attendance .....	8
12. Excused absences .....	8
13. Late or missed work .....	8
14. Accommodation.....	9
15. If you get sick .....	9
16. Tutoring .....	10
17. Technology .....	10
18. Academic integrity .....	10
19. Intellectual property .....	11
20. Statements common to all WCU undergraduate syllabi .....	13

## **Course information**

### **Course section details**

Section	Days	Time	Location
01	Mon., Wed., Fri.	10:00–10:50 am ET	Schmucker Science North 190
02	Mon., Wed., Fri.	11:00–11:50 am ET	Schmucker Science North 190

For Zoom class meetings (not office hours), use the following Zoom links:

- [Section 01 \(10:00–10:50 am ET\) Zoom link](#)
- [Section 02 \(11:00–11:50 am ET\) Zoom link](#)

and the password **sci100**. You must use your WCUPA Zoom account (i.e., the one linked to your University email address).

### **Course description**

This course provides an introduction to the science of climate change. Core topics include albedo, the greenhouse effect, the carbon cycle, and feedback mechanisms between these phenomena. We will study past climates, climate models, and the impacts of modern climate change. Near the end of the semester we will discuss efforts to mitigate climate change. We conclude by briefly discussing the most widely adopted climate change policies. No previous experience with these subjects is assumed.

**SCI 100 is approved as a WCU General Education Science Distributive course.**

### **Time commitment**

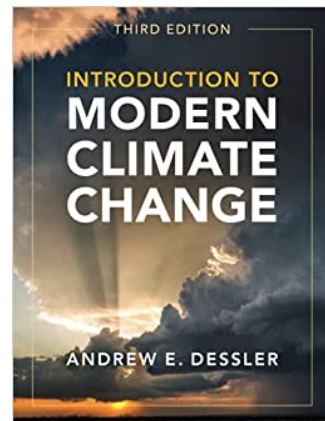
This is a three credit-hour course. In addition to three 50-minute classes, this course requires (on average) 1-4 hours of reading, assignments, and studying outside of class time each week.

### **Course schedule**

The **Course Schedule** is on our course D2L homepage. The schedule lists the dates of exams and assignment deadlines. It also provides hyperlinks to lectures slides, asynchronous lessons, and assignments, as well as list recommended reading from the textbook. The schedule will be updated regularly as the course progresses.

## Course materials

- **Textbook:** The course textbook is *Introduction to Modern Climate Change*, Third Edition, by Andrew Dessler (ISBN: 9781108793872). The textbook is for sale at the [WCU campus store](#); you will find less expensive options elsewhere. I recommend the [e-textbook](#), which is cheap and saves paper.
- **Scientific calculator:** You will need a calculator that can compute powers, exponentials, and operate in scientific notation. When completing homework you are welcome to use a web-based app, such as the [Desmos scientific calculator](#).



## Methods of delivery

The modality of this course is face-to-face (i.e., in-person). The course has three 50-minute in-person meetings scheduled each week – see page 2 for details.

This course will have a few asynchronous, D2L-based lessons in lieu of an in-person class meeting. (Consistent with WCU policy, no more than 15% of course content will be presented this way.) The dates of asynchronous lessons are listed in **bold red font** on the **Course Schedule**. On these dates class will not meet in person. The dates of asynchronous lessons are subject to change. You should plan to be able to attend every class meeting in person.

To complete an asynchronous lesson, click on the hyperlink provided on the **Course Schedule**. (The lesson may not be available until class time.) Complete all activities on the lesson webpage prior to the next scheduled class meeting. Note that, like in-person lessons, asynchronous lessons have an associated homework due the next class day.

## Student learning outcomes

**SCI 100 is approved as a WCU General Education Science Distributive course**, and as such meets the following General Education Goals.

### Gen Ed Goal #1 Communicate effectively:

#### a) Express oneself effectively in common college-level written forms.

In particular, after successfully completing this course a student will be able to explain, in plain language and to someone who is not familiar with these topics:

- The role energy balance and radiative forcing play in determining the average surface temperature of the earth.

- How greenhouse gases and the greenhouse effect work.
- The carbon cycle and its role in our climate.
- The challenges that “feedbacks” contribute to modeling and predicting climate.

In class, think-pair-share exercises and group discussions give students practice communicating physical concepts in plain language. Homework assignments include short-answer questions which provide practice for written communication.

Effective written communication is assessed through essay questions on in-class exams and the final project.

### **Gen Ed Goal #3 Employ quantitative concepts and mathematical methods:**

- a) Employ quantitative methods to examine a problem in the natural or physical world.**
- b) Apply the basic methods and thought processes of the scientific method for natural/physical science in a particular discipline.**

After successfully completing this course a student will be able to:

- Solve problems involving the physics of matter, light, and energy.
- Use simple models of the atmosphere to determine how features such as albedo, greenhouse gasses, and solar energy effect surface temperature.
- Compare the timescales of phenomena which contribute to the earth’s climate.
- Estimate a person’s carbon footprint.

Essentially every element of this course involves quantitative methods. We use tools such as arithmetic, algebra, and interpreting graphs are employed in every aspect of the course. Lectures devote time to reviewing these important skills *in situ*. In-class examples train students in problem-solving skills such as organizing information, visualizing and diagramming, recognizing concepts, strategizing solutions, using mathematical relations, and assessing results. Homework assignments include quantitative problems which provide practice with analyzing graphs and problem-solving within the context of climate science.

Quantitative methods are primarily assessed through in-class exams. The final project also involves a computation.

### **Gen Ed Goal #2 Think critically and analytically:**

- b) Construct and/or analyze arguments in terms of their premises, assumptions, contexts, conclusions, and anticipated counter-arguments.**

**c) Reach sound conclusions based on a logical analysis of evidence.**

After successfully completing this course a student will be able to:

- Critically assess the evidence that recent global warming is largely due to human activity.
- Weigh the merits of approaches to addressing climate change, including adaption, mitigation, and geoengineering.

At several points in this semester we will treat a conclusion of the science community as a case study in the synthesis of evidence and of logical analysis. We will analyze both the consensus view as well as the counter-arguments of skeptics. Group discussions and short-answer homework questions provide students with the opportunity to practice critically assessing scientific arguments.

Effective critical thinking is assessed through essay questions on in-class exams and through the final project.

**In addition to these goals, an elementary but essential goal of this course is for every student to be able to find trustworthy information about climate science and climate change policy.** Reliable, consensus-based, scientific sources of information will be emphasized throughout the course.

## Assessment scheme

This course follows the official WCU scale for grades:

Grade	Quality Points	Percentage	Interpretation
A	4.00	93-100	Excellent
A–	3.67	90-92	
B+	3.33	87-89	Superior
B	3.00	83-86	
B–	2.67	80-82	
C+	2.33	77-79	Average
C	2.00	73-76	
C–	1.67	70-72	
D+	1.33	67-69	Below Average
D	1.00	63-66	
D–	0.67	60-62	
F	0.00	<60	Failure

Refer to the [WCU Undergraduate Catalog](#) for description of NG (No Grade), W, Z, and other grades. Elements of the course will contribute to the course grade as follows:

Percent	Category
10%	Participation
35%	Homework
40%	Exams (16%+16%+8%)
15%	Carbon footprint project

10% **Participation:** You are expected to be an active participant in class. Attending class, paying attention, and participating in learning activities is sufficient to earn full credit for participation. In contrast, missing class or being disengaged while in class will result in a low participation grade. As one measure of participation, I will record attendance. I do not expect perfect attendance.

35% **Homework:** There is a homework assignment associated with each lesson. The homework for each lesson is due at **11:59 pm ET** on the *next class day*. So, most weeks there is a homework due on Monday, Wednesday, and Friday evenings. Homework assignments are completed as “quizzes” on D2L. The **Course Schedule** lists assignment deadlines and includes a hyperlink to each assignment.

**When calculating your course grade, I will “drop” your 4 lowest homework scores.** This policy serves to accommodate various situations which might cause you to miss an assignment deadline, but which are not considered excused absences under the WCU [Excused Absences Policy](#).

Most homework assignments are composed of questions that are graded by computer. For these assignments, you are allowed **unlimited attempts** to submit answers for full credit. After the deadline for the assignment has passed, the assignment will close and you will receive a score equal to your highest attempt.

Some homework assignments require written responses. These assignments are graded by the instructor. For these assignments, you may revise your answer as many times as you like prior to the deadline, and only your final submission will be graded. Written work is assessed for completeness as well as accuracy.

Answers to homework questions and instructor feedback on written work become available on D2L shortly after the assignment deadline. To view answers and feedback, click on the “Quizzes” tab, then click on the “View feedback” hyperlink to the right of the assignment.

40% **Exams:** There will be three in-class exams offered during the semester. Your two highest exam scores each contribute 16% to your course grade; your lowest exam score contributes 8% to your course grade. Exam dates are listed on the **Course Schedule**.

Exams are 50-minute assessments offered in class. Exams are “closed book”: the only aids allowed are the course Cheat Sheet and a stand-alone calculator

with no communication abilities. You may not use any other materials or access the internet.

Exams will include multiple choice questions. There is no partial credit available for these questions; I will not examine your scratch work. Exams may also contain short written response questions for which partial credit is available.

Exam scores may be scaled ("curved") to conform to a standard distribution of grades. Failure to take an exam results in a 0 score.

15% **Final project:** In this project you will estimate your carbon footprint and reflect upon your result. In the first part of the project, you will use an online calculator to make a detailed estimate of the carbon footprint of your current lifestyle. In the second part, you will respond to questions about your footprint and how various climate change policies might effect your footprint. A detailed description of the project will be available on D2L later in the semester.

The final project is submitted via D2L and is due **Wednesday, 14 December at 11:59 pm ET**.

Although unlikely, I reserve the right to alter the assessment scheme in order to accommodate for unforeseen circumstances or to better serve the learning objectives of the course. The deadlines of assignments and the dates of exams may change.

## Office hours

Office hours are an opportunity for us to meet to review homework or exams, seek advice about problem-solving, or discuss concepts developed in the course. I take office hours seriously and I very much enjoy the opportunity to work with you one-on-one.

The times of my office hours are listed on page [1](#). By default, office hours are offered in-person on a first-come, first-serve basis. Please note that I may occasionally need to reschedule office hours, offer office hours via Zoom, or require an appointment. I will announce any change to office hours format in class as well as via the D2L announcement tool and/or email.

Please understand that office hours are a limited resource. Please come prepared with your materials at hand and specific items to review or discuss. I have over 180 students enrolled my courses; I also have academic advisees and student organization leaders who occasionally need to meet with me. For this reason, it is not realistic to expect that I can meet with you frequently or meet for long periods of time.

# Policies

## Electronic devices

**No electronic devices may be used in class.** I've found that devices such as mobile phones, smart watches, ipods, tablets, and laptop computers are more distracting (for both the user and students around them) than useful.

## Attendance

**You are expected to attend and actively participate in class.** Participation is a graded item in this course – see [Participation](#) above.

If you miss a class then it is your responsibility to make up the missed learning opportunity by reviewing course materials on your own. Missing class does not excuse you from completing other aspects of the course on time.

## Excused absences

This course adheres to the WCU [Excused Absences Policy](#). If you are unable to perform an aspect of the course due to a conflict recognized by this policy (which includes University-Sanctioned Events) you must notify me in advance so that we can make arrangements.

## Late or missed work

If you suspect that you will not be able to meet a course deadline you must notify me in advance so that we can discuss possible resolutions. The default policies on late and missed work are as follows:

- **Participation:** Your participation is excused if a class activity conflicts with an event recognized by the WCU [Excused Absences Policy](#) – see [Excused absences](#). Beyond this, it is not possible to make up missed participation. Note that while participation is a graded item, I do not expect perfect attendance.
- **Homework:** In most cases, I am happy to provide a brief extension for a homework deadline if you make your request via email ([imorrison@wcupa.edu](mailto:imorrison@wcupa.edu)) at least several hours prior to the deadline (so that I have time to make the change on D2L). I am also willing, *on one occasion*, to re-open the most recent assignment so that you can complete the assignment for full credit. In addition, please note that the assessment scheme allows for several missed assignments without penalty: when calculating course grades I drop the four lowest homework scores – see [Assessment](#).
- **Exams:** Exams are not offered at alternate times, unless an exam conflicts with an event which is recognized by the WCU [Excused Absences Policy](#) – see [Excused absences](#). Failure to take an exam results in a 0 score.

- **Final project:** Late work may receive a reduced score or may not be considered.

## Accommodation

If you require additional accommodation for any aspect of the course you must notify me in advance so that we can make arrangements. Depending on the circumstances, you may need to provide documentation.

- **OSSD:** If you have an ongoing medical condition which effects your ability to meet the course expectations then you should register with the [Office of Services for Students with Disabilities](#) (OSSD). **To receive accommodation please send your OSSD Letter of Accommodation to me via email ([imorrison@wcupa.edu](mailto:imorrison@wcupa.edu)).**
- **Proctoring Center:** I cannot provide extra time in the classroom, nor can I guarantee a low-distraction environment, so if your OSSD Letter of Accommodation allows for these accommodations then you will need to use the [OSSD Proctoring Center](#) to complete exams. Please [book your reservation](#) for all three exams ASAP, as the center can run out of availability. Schedule each reservation for the date the assessment is offered in class at the time of your choice.
- **Health/wellness conditions:** If you seek accommodation for a medical condition which causes you to miss at least three consecutive school days, then contact [Student Assistance](#). I can offer accommodation based upon the advice of this office.
- **Personal emergencies:** Rarely, a personal emergency can arise which prevents a student from meeting course expectations. In such a rare circumstance I am happy to work with you in order to make appropriate arrangements. I may require documentation which verifies the emergency. [Student Assistance](#) can serve as a confidential liaison to verify the emergency.

## If you get sick

If you get sick then several of the policies above are relevant. Briefly:

- Obviously, if you are sick with a contagious disease then do not attend class or office hours.
- You are expected to make up for missed class by reviewing course material on your own. Once you are healthy you are welcome to attend office hours; however, I cannot summarize an entire class during an office hours visit.
- You are welcome to request an extension on homework assignments in advance of the deadline.
- **If an illness will cause you to miss an exam you must notify me in advance so that we can arrange accommodation.**

## Tutoring

Tutoring is available through the [Learning Assistance & Resource Center](#). This service is free, but availability is limited. Contact this center for details. In the past, WCU physics majors have offered free tutoring through the Society of Physics Students (SPS). If this occurs this semester, details will be announced on D2L.

## Technology

- **D2L:** Course materials are maintained on the course D2L site. You are responsible for regularly checking the course D2L site. I may not announce in class changes to course content on D2L. As with all technology, D2L can have glitches and service outages. For this reason, check D2L frequently and do not leave tasks to the last minute.
- **Communication:** I use the D2L announcement tool to make class-wide announcements. I use email for individual correspondence and for time-sensitive class-wide communications. Except in the event of a technical failure or an emergency, I will only use university email (mine and yours) to correspond.
- **Email:** Emails should be written with appropriate language and etiquette. Please consult the guide [here](#).
- **Zoom:** This course may use Zoom for virtual class meetings or office hours. You are expected have basic competence using Zoom. You may wish to consult the [IST Zoom documentation](#). You are welcome to blur your background, or use a virtual background, so long as the image is not inappropriate or distracting. Here are [instructions for setting up a virtual background](#), as well as [WCU-themed virtual background images](#).
- **Recording:** Students do not have permission to record class meetings, whether held in person or virtually. Such recording is restricted by privacy laws, including Pennsylvania Wiretap Law and FERPA. See [Accommodation](#) above and [Intellectual property](#) below.

## Academic integrity

Students are expected to follow the [Student Code of Conduct](#) as well as follow the rules and guidelines on academic integrity described in the [WCU Undergraduate Catalog](#). Here are a few relevant issues for this class:

- **Online platforms:** Email, D2L and Zoom are extensions of the classroom and as such all WCU rules regarding student behavior apply on these platforms. Do not violate the copyrights of materials on these platforms. Do not misrepresent your identity on these platforms, either by impersonating someone else or by allowing another person to impersonate you.

- **Collaboration:** Students are encouraged to study together and collaborate on assignments. However, you should go through the process of answering each homework question yourself. Any written work must be your own language and thought. Submitting work which you have not yourself created is fraud.
- **Learning resources:** Students are welcome to use additional learning resources beyond those provided by the instructor to help them master course material. Examples of learning resources include textbooks, instructional videos, informational websites, and private tutors. “Learning resources” does not include any source of solutions to assigned problems, whether found online or elsewhere. “Learning resources” also does not include so-called tutoring websites which offer solutions to problems upon request. These websites include (but are not limited to) Course Hero, Chegg, and Clutch Prep. Using these sites could lead to a violation of WCU rules on academic integrity. If you are unsure about whether the use of a website or product is legitimate, ask me before using.
- **Text recognition software:** Students agree that by taking this course all written assignments may be submitted for textual similarity review to Turnitin (directly or via D2L) for the detection of plagiarism. All assignments submitted to Turnitin will be included as source documents in the Turnitin reference database solely for the purpose of detecting plagiarism of such papers. If you do not wish for personal identifiers (student name, ID#, etc.) to be included in the Turnitin reference database then do not include them in your document. Use of Turnitin page service is subject to the Usage Policy and Privacy Pledge posted on the Turnitin site.
- **Copyright violations:** Course content contains intellectual property which may be protected by state and federal copyright law. **Students do not have permission to share course content with any person, website, or company.** Sharing includes posting content on a website or in a public place, or storing content on a computer that is used by others. See [Intellectual property](#) below.
- **Online activity logs:** Be aware that the course platforms D2L and Zoom provide records of user activity to the instructor and the University. In the event of a suspected academic integrity violation, this data will be examined and may serve as evidence of misconduct.

Students who violate WCU rules of academic integrity will receive an [Academic Integrity Violation Report](#), and may receive a failing grade (F) in the course.

## Intellectual property

The instructor utilizes copyrighted materials under the “Fair Use” exception to the Copyright Act of 1976 (Fair Use)

Act). Apart from such copyrighted materials, all other intellectual property associated with this course is owned and copyrighted by the instructor, including, but not limited to, lectures, course discussions, course notes, slides, assessment instruments such as exams, and supplementary materials posted or provided to students authored by the instructor. No recording, copying, storage in a retrieval system, or dissemination in any form by any means of the intellectual property of the instructor, in whole or in part, is permitted without prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of the semester in which this course is held.

# Statements Common to All WCU Undergraduate Syllabi



## ACADEMIC & PERSONAL INTEGRITY

It is the responsibility of each student to adhere to the university's standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another's work and/or using ideas of another and presenting them as one's own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Undergraduate Handbook, the Undergraduate Catalog, the Ram's Eye View, and the University website at [www.wcupa.edu](http://www.wcupa.edu).

## STUDENTS WITH DISABILITIES

If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University's Services for Students with Disabilities (OSSD), please visit them at 223 Lawrence Center. Their phone number is 610-436-2564, their fax number is 610-436-2600, their email address is [ossd@wcupa.edu](mailto:ossd@wcupa.edu), and their website is at <https://www.wcupa.edu/universityCollege/ossd/>. In an effort to assist students who either receive or may believe they are entitled to receive accommodations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, the University has appointed a student advocate to be a contact for students who have questions regarding the provision of their accommodations or their right to accommodations. The advocate will assist any student who may have questions regarding these rights. The Director for Equity and Compliance/Title IX Coordinator has been designated in this role. Students who need assistance with their rights to accommodations should contact them at 610-436-2433.

## EXCUSED ABSENCES POLICY

Students are advised to carefully read and comply with the excused absences policy, including absences for university-sanctioned events, contained in the WCU Undergraduate Catalog. In particular, please note that the "responsibility for meeting academic requirements rests with the student," that this policy does not excuse students from completing required academic work, and that professors can require a "fair alternative" to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

## REPORTING INCIDENTS OF SEXUAL VIOLENCE

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University's commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. **Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University Protection of Minors Policy.** Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: <https://www.wcupa.edu/admin/diversityEquityInclusion/sexualMisconduct/default.aspx>

## INCLUSIVE LEARNING ENVIRONMENT AND ANTI-RACIST STATEMENT

Diversity, equity, and inclusion are central to West Chester University's mission as reflected in our [Mission Statement](#), [Values Statement](#), [Vision Statement](#) and [Strategic Plan: Pathways to Student Success](#). We disavow racism and all actions that silence, threaten, or degrade historically marginalized groups in the U.S. We acknowledge that all members of this learning community may experience harm stemming from forms of oppression including but not limited to classism, ableism, heterosexism, sexism, Islamophobia, anti-Semitism, and xenophobia, and recognize that these forms of oppression are compounded by racism. Our core commitment as an institution of higher education shapes our expectation for behavior within this learning community, which represents diverse individual beliefs, backgrounds, and experiences. Courteous and respectful behavior, interactions, and responses are expected from all members of the University. We must work together to make this a safe and productive learning environment for everyone. Part of this work is recognizing how race and other aspects of who we are shape our beliefs and our

experiences as individuals. It is not enough to condemn acts of racism. For real, sustainable change, we must stand together as a diverse coalition against racism and oppression of any form, anywhere, at any time.

Resources for education and action are available through WCU's [Office for Diversity, Equity, and Inclusion](#) (ODEI), DEI committees within departments or colleges, the student [ombudsperson](#), and centers on campus committed to doing this work (e.g., [Dowdy Multicultural Center](#), [Center for Women and Gender Equity](#), and the [Center for Trans and Queer Advocacy](#)). Guidance on how to report incidents of discrimination and harassment is available at the University's [Office of Diversity, Equity and Inclusion](#).

#### **EMERGENCY PREPAREDNESS**

All students are encouraged to sign up for the University's free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information, visit [www.wcupa.edu/wcualert](http://www.wcupa.edu/wcualert). To report an emergency, call the Department of Public Safety at 610-436-3311.

#### **ELECTRONIC MAIL POLICY**

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.