

GEOGRAPHY 3205/5205

Climate Change Foundations

GEOG 3205/5205- 001
3 credit hours

FALL SEMESTER 2023 SYLLABUS

Class Meetings: Tuesday and Thursday, 10:45 AM-12:05 PM

- Instructor: Larry Coats
- Office telephone number: 587-9325
- Office location: Gardner Commons (GC) 4627
- E-mail: larry.coats@geog.utah.edu

Office hours: 9:00 – 10:30 AM Tuesday, 12:30- 1:30 PM Thursday or by appointment

Required Text: *Climatology: An Atmospheric Science 3rd Edition*, by John J. Hidore, John E. Oliver, Mary Snow, and Rich Snow, Prentice Hall Copyright: 2010. ISBN: 978-0-321-60205-3 (Available through Inclusive Access)

Catalog Description of Course

Climate Change Foundations (3) In this course we explore the distribution of climates around the world. We will investigate energy and moisture in the atmosphere, atmospheric circulation, controls of regional and microclimates, applied climatology, climatic variations, and consider past and future climates. This course is elemental for understanding the impacts of climate change on life on our planet.

Introduction

This course provides an introductory examination of the major components of the climate system including: the impact of mass energy on wind motion, atmosphere/ocean interactions, synoptic weather systems, local and urban climates, air pollution episodes, ice cores and ice ages, global warming and climate extremes including drought, storms and floods. One emphasis will be on understanding how future weather and climates can be modeled. This course will investigate current climate and climate change within a regional framework and provide detailed examination of the climates of high, middle and low latitude regions. At the end of the course the student should be able to understand the physical processes that create climates and comprehend model outputs aimed at forecasting the direction and severity of human-induced climate change. The student will also explore critical issues such as the varying adaptive capacity, vulnerability and risk of regions and societies to extreme weather events. GEOG 5205 is a required class for the Department of Geography [Climate Change Certificate](#) and [Climate Change Emphasis](#) (requires registration for the certificate).

Course Suggestions and Objectives

This class is intended as an introduction to the Earth's climate system, intended to provide sufficient background for continuing study in global climate change, meteorology, or paleoclimatology. In addition to learning discipline-specific information, I hope you will practice all your well-developed academic skills including the following: 1) using critical thinking skills to assess the validity of information, 2) taking good quality notes, 3) getting the most out of what you read in the textbook and assigned readings, 4) preparing well for tests, 5) finding information on your own, and possibly most importantly 6) how to think about the world with a geographic understanding. For some of you, this class may be your first (or only) science course, and studying for science may emphasize different skills than those with which you are most familiar. Geography is, for the most part, an observable discipline - it is with us and around us all the time. Because of this, you can often picture the various concepts. I believe that if you can draw or map the various concepts, etc., you will automatically understand it too. If something is difficult to comprehend, remember, or convey, try drawing it. Draw it, label the various parts, and annotate it - this provides a picture of the subject that should be in your mind even during "exam blackout"!

Learning Outcomes

By the end of *GEOG 3205/5205 Climate Change Foundations* students will be able to identify and explain the primary forcing elements of the climate system, and summarize how those elements combine to create the unique climate zones of the planet. Students are expected to integrate data on anthropogenic impacts on the atmosphere and calculate how those impacts should play out into future climate change. To facilitate the learning process, a series of Climate Benchmarks will be provided for each unit, pinpointing the key elements to be mastered before moving on to new material. Students will demonstrate the accomplishment of these outcomes by correctly answering quiz and test questions that require definitions for key concepts (recalling information), explanations for important processes (restating in your own words), interpretations of climatic datasets (analysis of scientific data), and evaluation of multiple lines of evidence to synthesize unique viewpoints on climate solutions (problem solving). In addition, students will perform a data-collection exercise, analyze their own data, interpret their findings graphically and in text, and explain how their data fit into the historical climate patterns of their region of interest. The overarching goal of this class is to produce a cadre of citizens well educated on climate operation and climate change that can form their own opinions about the validity of climate information in the media, and make well informed decisions about future actions regarding human activities and climate change.

RECOMMENDATIONS FOR SUCCESS IN THIS CLASS:

1. Take notes, and review them afterwards!
2. Study figures carefully, annotate them, make your own.
3. Check in on CANVAS often for discussion and clarification

Grading- 3000 Level

Final grades are earned on the basis of the overall accumulated points. There will be quizzes and homework assignments, two equally weighted mid-term exams, and one cumulative final exam. The quizzes and exams will be in class, on paper, and cannot be made up.

Quizzes & Homework	100 points
Exam #1	88 points
Exam #2	88 points
<u>Final exam (cumulative)</u>	<u>100 points</u>
Total	376 points

Grading- 5000 Level

Students taking the course for 5000 level credit will be held to a higher standard on the exams. The higher standard includes a greater level of understanding as well as answering additional questions that give the exams a higher point value than those taking the class at 3000 level.

Quizzes & Homework	100 points
Exam #1	100 points
Exam #2	100 points
<u>Final exam (cumulative)</u>	<u>124 points</u>
Total	424 points

NO EXTRA CREDIT is offered in this course, with the possible exception of bonus questions on exams. I DO NOT accept late work, unless prior arrangements have been made.

If you ever have questions or problems relating to this course (or other classes for that matter!), please see me at your earliest convenience. **Most of these situations can be positively handled if discussed early!**

** The instructor reserves the right to make additions, deletions, and modifications to the following syllabus and course requirements with notification to the students enrolled in the class.

“Climate is an angry beast and we are poking at it with sticks”

Wallace Broecker, ocean circulation researcher, Lamont-Doherty Earth Observatory, Columbia University

TENTATIVE SEMESTER SCHEDULE

DAY	DATE	DISCUSSION TOPIC	READINGS
M	8/21	University classes begin	
T	8/22	Introduction	Ch. 1
Th	8/24	Mass components of the climate system	Ch. 1
T	8/29	Energy & the climate system	Ch. 2
Th	8/31	Atmospheric temperatures	Ch. 3
Fr	9/1	<i>Last day to drop/delete</i>	
M	9/4	LABOR DAY HOLIDAY	
T	9/5	Moisture in the atmosphere	Ch. 4
Th	9/7	Moisture & the atmosphere (cont.)	Ch. 4
T	9/12	Wind & circulation patterns	Ch. 5
Th	9/14	Wind & circulation patterns (cont.)	Ch. 5
T	9/19	Atmosphere-ocean interactions	Ch. 6
Th	9/21	Atmosphere-ocean interactions (cont.)	Ch. 6
T	9/26	*Exam #1*	
Th	9/28	Atmosphere-ocean interactions (cont.)	Ch. 6
Sun	10/1	*Homework exercise data collection begins	
T	10/3	Atmosphere-ocean interactions (cont.)	Ch. 6
Th	10/5	Air masses & synoptic climatology	Ch. 7
<i>10/9-10/15</i>		FALL BREAK	
T	10/17	Climatology of storms- hurricanes	Ch. 8
Th	10/19	Climatology of storms- hurricanes	Ch. 8
F	10/20	<i>Last day to withdraw</i>	
T	10/24	Climatology of storms- hurricanes (cont.)	Ch. 8
Th	10/26	Climatology of storms-tornadoes	Ch. 8
T	10/31	*Homework exercise data collection ends	
T	10/31	Climatology of storms- tornadoes (cont.)	Ch. 8
Th	11/2	Climatology of storms- tornadoes (cont.)	Ch. 8
T	11/7	Natural causes of climate change	Ch. 9
Th	11/9	Climate change- natural causes (cont.)	Ch. 9
T	11/14	Reconstructing past climates	Ch. 10
Th	11/16	*Exam #2*	
T	11/21	Reconstructing past climates (cont.)	Ch. 10
Th/Fr	11/23-11/26	THANKSGIVING BREAK	
T	11/28	Greenhouse gases & global warming	Ch. 11
		*Homework exercise DUE	
Th	11/30	Global warming & physical environment (cont.)	Ch. 12
T	12/5	Regional climates	Ch. 15
T	12/7	Tropical & polar climates	Ch. 16 & 17
F	12/8	UU READING DAY	

***FINAL EXAM TUESDAY, DECEMBER 12TH AT 10:30 AM IN THIS CLASSROOM.**

University of Utah Standards of Academic Conduct

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from and class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

University of Utah Center for Disability Services

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

Addressing Sexual Misconduct

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, SSB 328, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Campus Safety

The University of Utah values the safety of all campus community members. To report suspicious activity, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.

Student Names & Personal Pronouns

Class rosters are provided to the instructor with the student's legal name as well as "Preferred first name" (if previously entered by you in the Student Profile section of your CIS account, which managed can be managed at any time). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class or on assignments. Please advise me of any name or pronoun changes so I can help create a learning environment in which you, your name, and your pronoun are respected. If you need any assistance or support, please reach out to the LGBT Resource Center. https://lgbt.utah.edu/campus/faculty_resources.php

Diversity/Inclusivity

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you. (Source: University of Iowa College of Education)

Undocumented Student Support Statement

Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents

obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit dream.utah.edu.

Wellness Statement

Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776. Rates of burnout, anxiety, depression, isolation, and loneliness have noticeably increased during the pandemic. If you need help, reach out for [campus mental health resources](#), including counseling, trainings and other support.