



METR 454/854 - Regional Climatology

Instructor:

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Office Hours:

Tuesday: 10am-noon (east campus)
Thursday: 10am-noon (east campus)
Friday: 10am-noon (city campus)
Any other time by appointment

Lecture:

MW 10:30-11:45am
229 Bessey Hall (first lecture; 219 Bessey Hall thereafter)

Prerequisite:

METR 351 (Basic and Applied Climatology) or permission of instructor. Students are expected to have a good, basic understanding of atmospheric science and some prior exposure to principles of climatology.

Course Description:

Regional differentiation of the climates of the earth on both a descriptive and dynamic basis. Analysis of the chief systems of climatic classification.

Course Objectives:

This course is designed to provide upper-level undergraduate and graduate students with a solid understanding of the global climate system and its regional variability and dynamics. Specifically, the course objectives are designed to reinforce and develop students' understanding in the following areas:

1. Basic atmospheric principles (review)
2. Global circulation patterns and regional geographic controls on climate (review)
3. Köppen and Thornthwaite climate classification schemes
4. Regional climate pattern analysis using global atmospheric reanalysis datasets
5. Experience with climate plotting tools: Grid Analysis and Display System (GrADS)
6. Atmospheric teleconnection patterns such as the El Niño–Southern Oscillation (ENSO), North Atlantic Oscillation (NAO), etc.
7. Global and regional climate change (past and future; natural and anthropogenic)
8. Unique characteristics of the various regional climates (tropical, subtropical, midlatitude, and polar), including the role of extreme events
9. Detailed case studies of the climates of specific regions (e.g., the Arctic, South America, the Great Plains, monsoon and desert regions, the Great Lakes, etc.)

Integrative Studies (IS) :

As described in the UNL Undergraduate Bulletin, METR 454 is designated as an IS course. IS courses are "intended to engage students in actively developing their ability and desire to analyze, evaluate, and communicate complex materials and positions." As such, this course includes various analysis, speaking, and writing components to enhance students' critical thinking and communication skills.

Textbook:

The Global Climate System: Patterns, Processes, and Teleconnections, by Bridgman and Oliver

Supplemental Reading:

Few textbooks are able to cover a topic with enough depth, breadth, and contemporary relevance as to be an "all-in-one" source for course material. This is especially true in the field of regional climatology, which has had no standard

textbook for years. Although the textbook chosen for this course is brand new (2006), it is only meant to provide a foundation and future reference for students of regional climatology. Therefore, in addition to the textbook, students in this course will be required to read and discuss a variety of supplementary articles published in the scientific literature and/or popular press. These articles will be distributed online through Blackboard (or handed out in class).

Online Resources:

Blackboard (<http://my.unl.edu>) will be the primary access point for online aspects of this course. Its use will be relatively limited, but will include documents for download (e.g., reading assignments) and links to external websites.

Grade Weighting:

Undergraduates (METR 454)	Graduate students (METR 854)
<ol style="list-style-type: none"> 1. Research project (30%) 2. Quizzes (30%) 3. Class participation (20%) 4. Homework (10%) 5. Attendance (10%) 	<ol style="list-style-type: none"> 1. Research project / case study (30%) 2. Quizzes (30%) 3. Class participation (10%) 4. Homework (10%) 5. Attendance (10%) 6. Discussion leadership (10%)

Grading Scale:

90–100%:	A– / A / A+
80–90%:	B– / B / B+
70–80%:	C– / C / C+
60–70%:	D– / D / D+
< 60%:	F

Research Project:

One of the objectives of this course is to develop your critical thinking, analysis, and communication skills. This will be accomplished primarily through an independent research project (as well as assigned readings, discussion, and homework). The research project will be based on a topic of current interest in regional climatology (as discussed in the current scientific literature) and/or a case study of a particular regional climate. Students are encouraged to explore project ideas early in the semester (from the textbook, classroom discussions, literature searches, etc.). More information on the project format and timeline will become available as the semester progresses. The final project will include a 15-page paper (including figures and references), as well as a 20-minute presentation to the class (given during the last two class periods and the final exam period). Your presentation grade will be based 50% on the professor's evaluation and 50% on an evaluation by your fellow students.

Graduate students: If you are taking the course for graduate credit (METR 854), your research project will be similar to that described above, but will entail a detailed case study of a particular regional climate. The paper and presentation must include an original analysis of the regional climate using available climate data (e.g., the NCEP/NCAR reanalysis), and the presentation will occupy one full lecture period (see course calendar). Presentations will be filled on a first-come, first-served basis, so once you have chosen a region and/or presentation date, please let me know.

Quizzes:

A short quiz will be given during every class period to provide an ongoing evaluation of your mastery of the course material. The quizzes will be based on material from the previous lecture, chapter readings, and/or supplementary readings. The format of the quizzes will vary, but are likely to be true/false, multiple choice, fill-in-the-blank, or short essay. Make-up policy: If you miss a quiz because of an official, university-excused absence, you must give prior notice by e-mail that you will be absent and must schedule a make-up quiz at that same time. Make-up quizzes for any other type of absence will not be provided. However, your lowest three quiz scores will be removed prior to calculating your final grade, in order to allow for occasional unavoidable absences.

Class Participation:

Beginning with the third week of classes, most class periods will include a discussion of the previously-assigned textbook and/or supplemental reading. Most of these discussions will be led by a graduate student leader. However, participation is expected from every student in class, and a portion of your final grade will be based on your level of class participation and evidence of critically reading the material (A=excellent, B=good, C=average, D=poor, or F=no participation).

Homework:

Students are required to read various chapters from the textbook (see course calendar) and supplemental readings.

Occasionally an out-of-class homework problem will also be assigned to allow the students to devote time to topics that require more careful analysis and/or use of outside resources (e.g., graphical analysis of climate data). Such assignments will be relatively infrequent, but are designed to provide the student with additional skills and experience using regional climate data. Students are encouraged to work together on homework assignments, but be sure to submit your final work on your own. Directly copying another student's work is not permitted, and cheating will not be tolerated. Also, the instructor reserves the right to refuse or significantly mark down any homework turned in past the due date.

Attendance:

Given the significant emphasis of this course on classroom discussion, it is critical that students be in attendance to participate in and contribute to the discussions. It is also recognized that significant learning can take place if one is a careful and diligent observer, but does not actively participate in every discussion. Therefore, 10% of your final grade will be based solely on your level of attendance over the course of the semester (as measured by the presence or absence of quiz grades).

Discussion Leadership: Students taking the course for graduate credit (METR 854) will be expected to develop their critical reading, analysis, and leadership skills by leading the class in the discussion of various reading assignments (e.g., journal articles). Students are encouraged to propose particular articles for discussion, or one can be chosen for them. A grade will be assigned to each graduate student based on their level of preparation, their ability to effectively summarize the article being discussed, and their role in leading the class discussion.

Course calendar (subject to minor changes)

Month	Day	Topic	Textbook readings
January	8	First class: Introductions, syllabus, course layout	Preface
	10	Review of basic atmospheric principles	Chapter 1
	15	No class: Martin Luther King Day	
	17	No class: AMS meeting (out-of-class assignment)	
	22	Review of global climate dynamics	
	24	Geographic controls on regional climatology	
	29	Climate classification: Köppen method	
	31	Climate classification: Thornthwaite method	
February	5	Overview of GrADS and the NCEP/NCAR reanalysis	
	7	Climate variability: Oscillations and teleconnections	Chapter 2
	12	Global and regional climate change	Chapter 6
	14	Global and regional climate change	Chapter 8
	19	Tropical climatology	Chapter 3
	21	Tropical climatology	
	26	Case study #1: Tropical region	
	28	Case study #2: Tropical region	
March	5	Climatology of the subtropics and dry regions	
	7	Climatology of the subtropics and dry regions	
	12	No class: Spring break	
	14	No class: Spring break	
	19	Case study #3: Subtropical region	
	21	Case study #4: Subtropical region	
	26	Midlatitude/continental climatology	Chapter 4
	28	Midlatitude/continental climatology	
April	2	Case study #5: Midlatitude region	
	4	Case study #6: Midlatitude region	
	9	Polar climatology	Chapter 5
	11	Polar climatology	
	16	Case study #7: Polar region	
	18	Case study #8: Polar region	
	23	Research project presentations	
	25	Research project presentations	

May	4	Final exam (7:30am): Research project presentations	
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General Policies:

- Students are expected to come to class on time. If it is unavoidable that you arrive late, please take care to enter the classroom with the least amount of disruption.
- Please be respectful of your fellow students by refraining from talking during class (unless called on); Also, please raise your hand if you have a question.
- As the professor, I am here to facilitate your learning, not do it for you. That means that I expect each student to put in an appropriate amount of effort to understand the course material. (This is a 3-credit class, so expect to put in 6-9 hours/week of work outside of class time.) It also means that you are expected to learn the material from other sources than just myself (e.g., the textbook, library, online resources, etc.). You will learn the material much better if you first attempt it on your own, rather than just relying on the instructor to provide the answer for you. As you will find later in life, "learning how to learn" and "learning by doing" are much more valuable skills than just "asking someone else." Professors will not always be around to answer your questions after you graduate!
 - Cheating, plagiarism, or any other form of academic dishonesty will not be tolerated and will result in a failing grade (on the assignment, quiz, or even the entire course). Any cases of academic dishonesty will be dealt with according to guidelines laid out in the UNL Bulletin.
 - Please bring a calculator, textbook, and note-taking material to every class period.
 - Any material presented in class or assigned as outside reading is fair game on quizzes, so be sure to take excellent notes and do the assigned reading!
 - Students are encouraged to ask questions. The more the better – there's no such thing as a dumb question (except for those that go un-asked!).
 - Students are also encouraged to speak to me outside of class regarding class material, comments on how the class is going, or just questions about student life in general. I am here to help, so please take advantage of the opportunity to speak to me about any issues.
 - Please understand that you will occasionally be asked to do tasks or discuss topics that you know very little about. This is to be expected. In fact, it is one of the points of college – to learn new things and expand your horizons. I don't expect you to come into class knowing how to do everything. (How boring would that be? Leaving a course knowing nothing more than when you first started?!) I do, however, expect you to learn how to do something or at least put forth a strong effort to try and figure out how. As the instructor, I similarly commit myself to helping you learn and find the information you need.
 - If you have any disabilities or special learning needs that I should know about, please speak to me during the first week of class so that we can make appropriate arrangements.

Revised: January 2007

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