EVAT 5300: Introduction to Climatology (3 credits)
Fall 2018
Lecture: MWF 12:00 p.m. – 12:50 p.m. (Clark Hall Room G004)

Instructor
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Course Description
This class provides a graduate-level introduction to the physical laws governing Earth’s climate system. In this class, we'll cover foundational knowledge about atmospheric radiative transfer, the general circulation of the atmosphere and ocean, and climate variability and change. The class will also introduce you to a number of climate data sets, which can be used for a variety of research purposes.

At the end of this course, you will be able to:
- Describe in detail how Earth’s greenhouse effect works
- Explain climatological patterns of winds, weather systems, and ocean currents
- Understand modes of climate variability, such as the El Niño-Southern Oscillation
- Discuss what is certain and uncertain about 21st century climate change
- Apply climate data sets to research problems in environmental sciences

This course provides fundamental knowledge of atmospheric science and climate that is appropriate for graduate students specializing in all areas of environmental sciences.

Who Should Take This Class?
- All graduate students in environmental sciences!
- Upper-level undergraduate students who are considering graduate school or a career in an atmospheric science or climate related field

Prerequisites
- For graduate students, contrary to what SIS says, no prior knowledge of atmospheric science is required.
- For undergraduate students, EVSC 3300 (Atmosphere and Weather)
**Textbooks**
There is no required textbook for this class. A recommended textbook is:

- *Global Physical Climatology*, 2\textsuperscript{nd} Edition, by Dennis L. Hartmann, 2016

I will be following Hartmann’s textbook closely throughout the semester, but the book is not required, as the level of physics and math in the book is intended for atmospheric science graduate students and is therefore not appropriate for all students enrolled in this class.

**Other Useful References**
For students without any background in atmospheric science, a good reference is the book we use in our undergraduate 


For students wanting a deeper background in atmospheric science, consider also:


**Assessment and Evaluation**
Homework (25%)
Exams (40%)
Research Project (35%)

*Homework:* Homework assignments will be assigned throughout the semester. Assignments and due dates will be posted to the Collab website and announced in class. The homework assignments will provide practice for the types of quantitative and longer-answer questions that can be expected on exams, and will also introduce you to data analysis skills that will be helpful for your final project (and also in your future research!). Students are encouraged to work together on the homework assignments, but must turn in their own solutions. Copying of another student’s solutions is a violation of the Honor Code.

*Exams:* Two midterm exams will be given on Friday October 12 and Wednesday December 5. Each exam will be worth 20\% of the final course grade. No final exam will be given. The exams will primarily be quantitative problem solving and essay-type questions. Exams may also include some short answer questions. Students who miss exams without prior approval of the instructor will receive a zero on the exam.
Research Project: You will be required to complete a short research project that incorporates your knowledge of atmospheric science and climate from this semester. Ideally, this will be related to your personal research interests, and for graduate students, I would encourage you to discuss this project with your advisor. This project is not a paper that is a literature review of a specific topic, but you will be required to gather and analyze data on a research question of your choosing.

To get your project off to a fast start, I will be meeting with each of you individually early in the semester to help you select a topic. Then, you will prepare a short proposal and a complete literature review with a bibliography. This will be due on Friday October 26 and will count for 10% of your course grade.

The remaining part of your research project will be the preparation of a journal-style manuscript that summarizes your research findings. This is due on the scheduled date of the final exam (Friday December 14 at 5:00 p.m.) and is worth 25% of your course grade. You are not permitted to use a project that you may have already prepared for a previous course ... this must be largely be original work done for this course during this semester.

Detailed guidelines for both the proposal and the paper will be provided later in the semester.

Grading Scale
A+: 99-100  A: 93-98  A-: 90-92
B+: 87-89  B: 83-86  B-: 80-82
C+: 77-79  C: 73-76  C-: 70-72
D+: 67-69  D: 63-66  D-: 60-62
F: Less than 60

Preliminary Course Outline
- Introduction to Earth’s Climate System
- Atmospheric Radiative Transfer and Planetary Energy Balance
- Surface Energy Balance
- Atmosphere’s General Circulation
- Ocean’s General Circulation
- Modes of Climate Variability
- Climate Feedbacks and Climate Change

A detailed course outline is provided under the Activities tab on the course Collab website. Please check the outline regularly as it will be updated throughout the semester with readings, lecture notes, and assignments.

Questions??
Class participation and asking questions in class is strongly encouraged. Questions outside of class can be addressed to the instructor via email, or in person during office hours. Please schedule an appointment to meet with the instructor outside of office hours.