Geography Geology 308/508

CLIMATE: PAST, PRESENT AND FUTURE

Spring 2018

Instructor: Dr. Samantha Kaplan

Office: D-327 Science Building

Office Hours: Tuesdays & Thursday 11:00 am - 12:00 pm and by appointment

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Required Text: Ruddiman, William, 2014. *Earth's Climate, Past and Future* (third ed.). New York: W.H. Freeman and Company, 445 p.

Students with Disabilities: Students with learning and/or physical disabilities are encouraged to contact me to make any special arrangements for taking lecture notes or exams.

Course Description: 3 Credits. Earth's climate is always changing. Different factors, including geological, astronomical, atmospheric, oceanic, biological, and human, operate at different time scales to change the climate of our planet. This course focuses on evidence of climate change in the past, modern climate variability, and the range of theories and arguments regarding future climate scenarios. We will study the field and research methods used to investigate past climate, as well as how climate models are used to explore future climatic trends, including global warming.

Learning Outcomes: Upon completion of this course:

- Students will be able to explain the workings of earth's climate system and the processes affecting climate over timescales ranging from years to millennia.
- Students will be able to demonstrate how interactions among the atmosphere, oceans and land combine to influence climate.
- Participants will be able to recognize how humans have affected the climate and be able to identify how past climate changes can be used to understand possible future climate change.
- Students will acquire the necessary tools and background to decipher climate change fact from fiction and make informed decisions about future climate policy.

Student rights and responsibilities

- UWSP has specific guidelines regarding student rights and responsibilities in class and on campus explained at http://www.uwsp.edu/dos/Pages/Academic-Concerns%20for%20Students.aspx

Classroom Policies

- No talking, texting, emailing, web-surfing, or listening to music during class. This is disruptive and discourteous to your peers and to the professor. Phones and other electronic devices must be turned off. Laptops and tablets may be used for note-taking, but only with prior approval. Any student found violating these rules will be asked to leave the classroom.
- Attendance is required at all class sessions and counts towards your grade. If you have to miss class, it is your responsibility to inform the instructor ahead of time and get notes from a peer.
- I do not post lecture notes on-line and I do not share my lecture notes with students. Please do not ask. If you miss class, it is your responsibility to get the notes from a classmate. I will post Power Point lecture slides following class (not before).

Grades

- **Evaluation:**

	Undergraduate	Graduate
Exams (3 @ 14% ea)	42%	39%
Attendance	6%	6%
Exercises (7 @ 6% ea)	42%	35%
Other Assignments	10%	6%
Paper (graduate only)		12%
Total	**100%**	**100%**

- **Final Letter Grades:** Letter grades will be assigned as follows:

Percent	Letter Grade
≥93	A
90-92.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
67-69.9	D+
63-66.9	D
≤62.9	F

Geog/Geol 308 Schedule (subject to change)

Date		Class Topic	Reading Due	Assignment Due
T	23-Jan	Course overview, weather vs. climate		
R	25-Jan	Solar forcing	Chapter 1	
T	30-Jan	Exercise – Energy budget	Chapter 2 p. 19-32	
R	1-Feb	The atmosphere	Chapter 2 p. 32-39	
T	6-Feb	The atmosphere cont'd.	Chapter 2 p. 32-39	
R	8-Feb	*Exercise (SIAL) - the carbon cycle*	The Habitable Planet	Energy budget
T	13-Feb	The oceans	Chapter 2 p. 40-53	
R	15-Feb	Long-term climate, Earth's thermostat	Chapter 4	
T	20-Feb	Climate and plate tectonics	Chapter 5	Carbon Cycle
R	22-Feb	No Class - Movie: Snowball Earth		
T	27-Feb	*Exercise (SIAL) – Time series analysis*		Snowball Earth
R	1-Mar	**EXAM 1**		
T	6-Mar	Cretaceous & Tertiary climate	Chapter 6, Chapter 7	
R	8-Mar	No class meeting		
T	13-Mar	*Exercise (SIAL) - Ice core data*	Chapter 11 p. 215-218	Time series
R	15-Mar	Earth's orbit and the ice ages	Chapter 8	
T	20-Mar	The Pleistocene and Last Glacial Maximum	Chapter 10	Ice cores
R	22-Mar	*Exercise (SIAL) - Neotoma part 1*	TBA	
T	27-Mar	SPRING BREAK		
R	29-Mar	SPRING BREAK		
T	3-Apr	Climate proxies and archives	Chapter 13, Chapter 3 p. 55-69	
R	5-Apr	Deglacial history, the Holocene	Chapter 14, Chapter 15	
T	10-Apr	**EXAM 2**		
R	12-Apr	*Exercise (SIAL) - Neotoma part 2*	TBA	Neotoma part 1
T	17-Apr	The last 2000 years	Chapter 17, Chapter 19	
R	19-Apr	Greenhouse gases	Chapter 20	
T	24-Apr	*Exercise (SIAL) - Climate Models*	Chapter 3 p. 69-74	Neotoma part 2
R	26-Apr	Greenhouse gases cont'd.	Chapter 20	

Date		Class Topic	Reading Due	Assignment Due
T	1-May	Modern climate - what is normal?	Chapter 20	
R	3-May	The IPCC and future scenarios	IPCC – Summary	Climate Models
T	8-May	Exercise - Wisconsin's Climate & WICCI	TBA	
R	10-May	Future Climate	Chapter 21	
R	17-May	**FINAL EXAM 8:00 - 10:00 AM**		WICCI