Course Title: UHON 351 – Climate Change and Human Civilizations Credit Hours: 3
Semester: Fall 2025
Course Modality: In-person
Classroom location: Morris Library, # 0601A
Meeting days and times: Tues/Thurs, 9:35-10:50 AM

Instructor and Contact Information:

Instructor name: Dr. Derek K. Gibson
E-mail address: derek.gibson@siu.edu
Office hours: Friday 9:00 AM – 11:00 AM
Office location: Parkinson Laboratory, # 303
Office phone: 618-453-6053

Course Description:

Human civilizations have existed and evolved within the context of a changing climate since the dawn of the Agricultural Revolution. This course will focus on climate change on Earth during the Holocene (i.e., the past ca. 12,000 years) and the societies that emerged, responded, and adapted (or did not adapt!) to changes in climate during that time. The rise and demise of the Indus River Valley civilizations, the Maya, the Mississippian Native Americans, the Chinese Ming Dynasty, and many other societies throughout the Holocene have been attributed – at least in part – to climatic changes. This course will address the following important questions: What were the key drivers of past global and regional climate change? How were specific past civilizations impacted by large-scale changes in climate? How do the drivers and societal responses to modern climate change compare to those of the preindustrial past? After taking this course, students will have a better understanding of the causes of climate change and how Earth's climate shaped history... and is shaping the future.

Prerequisites:

None. This course is designed to provide majors and non-majors alike with the necessary tools to critically examine climate change and its societal impacts. Scientific concepts will be discussed in a way that is accessible to curious and high-achieving undergraduate Honors students of all academic backgrounds.

Program Learning Objectives:

Upon successful completion of this course, students will be able to:

1. **Explain the causes of global and regional climatic shifts during the past 12,000 years** ○ Identify the major oceanic and atmospheric components of Earth's climate system, across a range of timescales.

- Explain the role of atmospheric chemistry in Earth's mean temperature (i.e., the impacts of atmospheric carbon, aerosols, water vapor, etc.) ○ Discuss natural and anthropogenic (human-caused) processes and events that have caused perturbations to Earth's climate during the past and present.

2. **Understand the role of Earth's climate in shaping the Agricultural Revolution and the subsequent rise and fall of civilizations around the globe** ○ Explain the relationship between mean-state climatic conditions, agriculture, and civilization.
    - Understand how long-term changes in temperature or precipitation patterns can lead to agricultural failure, political stability, population decline and/or migration, and warfare
3. **Articulate the nuanced ways past civilizations adapted or failed to adapt to climate change** ○ Discuss the unique climatic, cultural, political, and geographic factors that made specific past civilizations either resilient or susceptible to climate change. The Harappan, Maya, Mississippian, and Ming civilizations in particular will be examined.
    - Examine the specific strategies employed by past civilizations to mitigate the impacts of climate change.
4. **Apply their understanding of past climates and civilizations to address the societal challenges posed by modern climate change** ○ Compare the factors that contributed to climate resilience or vulnerability in past civilizations to modern society. What makes modern society more climate-resilient? What makes us more vulnerable?
5. **Participate in laboratory procedures and field trips** ○ Receive hands-on training in the laboratory and apply that training to real geologic samples. E.g., X-ray fluorescence, laser diffraction particle size analysis, stratigraphic interpretation
    - Participate in a field trip to Kincaid mounds – a Mississippian site abandoned during the Little Ice Age
6. **Critically review published literature** ○ Read and critique relevant articles from published literature, "pop science" publications, and other information sources.
    - Read relevant sections of the most recent Inter-governmental Panel on Climate Change (IPCC) report and discuss those data in the context of human civilization and history.

Unit Objectives

Unit I: **Introduction to Earth's climate system**

a) Earth's climate history
b) Oceanic and atmospheric climate drivers
c) The paleoclimatologist's toolkit (TPT): How we know what we know

Unit II: **Climatic impacts on past civilizations**

a) The Early Holocene and the Agricultural Revolution
b) Middle Holocene societies: Mesopotamia and the Indus River Valley

c) Late Holocene societies: The Maya, the Mississippians, and the Ming Dynasty

Unit III: **Modern climate change**

a) Causes of modern climate change
b) Near-future projections
c) Societal responses and possible solutions

COURSE MATERIALS

Required Texts

No textbook will be required for this course. Each week, a reading will be assigned from one of the following sources: Peer-reviewed literature, "pop science" articles (i.e., Scientific American, National Geographic, etc.), news articles, or government reports (i.e., the IPCC report, the National Climate Assessment, etc.). These materials will be printed and distributed to the class. They will also be made available online via D2L.

TENTATIVE COURSE SCHEDULE* – ASSIGNMENTS, READING, AND ACTIVITIES

*** THE EXACT ORDER AND TIMING OF LECTURES AND ASSIGNMENTS WILL LIKELY CHANGE BASED ON CLASS PROGRESS AND INTERESTS ***

Week	Topics	Reading and Activities	Assignments
Unit 1 Week 1	Welcome & course overview Earth's climate history	Mayewski et al., 2004. "Holocene climate variability."	
Week 2	Earth's climate history, cont. El Niño, La Niña, and other oceanatmosphere climate drivers	Iqbal, 2024. "How Climate Change Tears Societies Apart." Scientific American	
Week 3	TPT: Proxies Lab Activity	In lab: Sediment core processing and XRF geochemistry	Reflections on Iqbal, 2024.

Week 4	TPT: Relative and absolute dating methods Test 1		Analyze and interpret dataset from lab activity
Unit 2 Week 5	Early Holocene climate	Richerson and Bettinger, 2001. "Was agriculture impossible during the Pleistocene but mandatory during	

Week	Topics	Reading and Activities	Assignments
	The Agricultural Revolution	the Holocene? A climate change hypothesis"	
Week 6	Mesopotamia Indus River Valley	Staubwasser et al., 2004. "Climate change at the 4.2 ka BP termination of the Indus valley civilization and Holocene south Asian monsoon variability."	Prepare presentations
Week 7	Presentations University Museum	5 min presentations on aspects of Middle Holocene society	Short reflection on museum visit
Week 8	The Maya Droughts Kincaid, Cahokia, and the Mississippians	Gibson et al., 2024. Kennett et al., 2012	Reflections on Staubwasser et al., 2004.
Week 9	Spring Break Spring Break		

Week 10	The Little Ice Age 1: The Ming Dynasty The LIA 2: George Washington at Valley Forge		Reflections on Gibson and Kennett papers
Week 11	Test 2 Review Test 2		
Unit 3 Week 12	Lab activity: Sediment core particle size analysis Modern climate change		
Week 13	IPCC report in-class disc.		Report due: Analyze and interpret lab #2 data
Week	Topics	Reading and Activities	Assignments
	Field trip		
Week 14	Near-Future climate projections In-class discussion: What concerns you the most about the climate?	Mulvaney, 2021. "How climate models got so accurate they earned a Nobel Prize." National Geographic	
Week 15	Modern societal responses to climate change. Adaptation, mitigation, engineering, etc. Presentations		Reflections on Mulvaney, 2021.
Week 16	Presentations Final exam review		
Week 17	Final Exams		

ASSIGNMENTS AND UNIQUE LEARNING EXPERIENCES FOR HONORS STUDENTS

Throughout the course, students will be immersed in a variety of activities that will help them develop a nuanced perspective on how climatic shifts have shaped—and continue to shape—human development. The following learning experiences will be employed:

1. **Interactive Lectures and Case Studies**
   Our discussions will center on case studies from different regions and time periods, exploring how societies responded to climatic challenges and opportunities. These lectures are intended to be based on class participation and discussion. Students will be encouraged to join the conversation and debate topics with the instructor and each other.
2. **Primary Source Analysis**
   Students will engage directly with primary sources, including published studies, archaeological evidence, and paleoclimate data.
3. **Collaborative Discussions and Classroom Debates**
   In our discussion-based format, students will have the opportunity to engage in small group debates and whole-class discussions. These discussions are designed to challenge students to think critically about causality, human agency, vulnerability, and resilience in the face of climate change.
4. **Group Projects**
   Students will work in teams to investigate specific episodes of past climate change or a particular civilization's adaptive strategies and present their findings to the class. These projects will encourage students to integrate insights from archaeology, history, and climate science to create a holistic picture of human-environment interactions.
5. **Field-and-Lab-Based Learning**
   To connect historical climate change with the present day, students will participate in field trips to local museums and archaeological sites. This experience is intended to bridge the gap between the classroom and the "real world," encouraging students to consider the similarities between modern society and past cultures – particularly in terms of environmental stressors. Students will also generate new proxy data via laboratory analyses and interpret the results.

Through these experiences, students will gain a better understanding of the Earth's climate system, why the climate changes, and how those climate changes can impact human societies; past, present and future. This course is designed specifically to meet the interdisciplinary and critical thinking needs of an undergraduate Honors program. Specifically, this course provides a quantitative, STEM-based, analysis of the environmental and human history of Earth. Students will engage in the scientific process by generating their own climate data from laboratory analyses that they conduct under supervision, interpretating their own data, and discussing/debating their interpretations. Debates and

discussions about modern climate change will be encouraged throughout the course, to give students a chance to talk through the concerns they have about the future and what actions they can take to be a part of the solution.

Assignments and Grading

Discussions

A rubric will be provided.

Presentations

A rubric will be provided.

Homework

Your homework assignments will be based on topics from class lectures, laboratory exercises, and/or assigned readings. You may need to download datasets in Microsoft Excel. The sum total of the points from your homework during the semester will be equal to ~1.5 exams.

Exams

Exams will be worth 100 points each. Exam material may be from lectures, readings, peer presentations, and the field trip. The final exam will be cumulative and weighted the same as the previous two.

Grading Scale

Grades will automatically be rounded up if the decimal value is .5 or higher. Grades with decimal values between .0 and .4 will not be rounded up.

Letter Grade	Percentage of Points
A	90-100
B	80-89
C	70-79
D	60-69
F	Below 60

Note: Information about SIU Grading Scale: Grading System | Office of the Registrar | SIU

Assignment Category	Points
Exams	300
Homework and lab reports	150
Presentations	50
Discussions and reflections	50

COURSE POLICIES Inclusive Excellence and Disability Support Services

SIU contains people from all walks of life. Learning from and working with people who differ from you is an important part of your education in this class, as well as essential preparation for any career. SIU is committed to providing an inclusive and accessible experience for all students. Please inform me about specific accommodations you may have or need at the start of the course. You can also reach out to Disability Support Services if needed.

Religious Holidays

Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the student shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance.

Electronic Communication

If you need to communicate with me outside of class, please send me an email at derek.gibson@siu.edu, or stop by my office during office hours.

Incomplete as a Course Grade

An INC grade should be assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. INC is not included in grade-point computation. An INC must be changed to a completed grade within one year from the close of the term in which the course was taken or graduation, whichever comes first. Should the student fail to complete the course within the time period designated, that is, one year from the close of the term in which the course was taken or graduation, whichever comes first, the Incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. To complete the work from the original registration, a student should not register for the course again but should complete the work for the original registration if the original registration is within the normal time limits established for the degree. A contract for an INC grade must be established between the instructor and student at the time the INC grade is assigned. An extension may be granted if the request for the extension is made within the first year and approved by the Dean of the Graduate School and the Provost.

Attendance Policy

While your attendance will not be graded, students who attend class are more likely to be successful. Much of the material on exams and homework will come from course lectures, including information that is passed verbally or on the whiteboard/chalkboard (**i.e., it may be on the exam even if it was not in the posted lecture slides**).

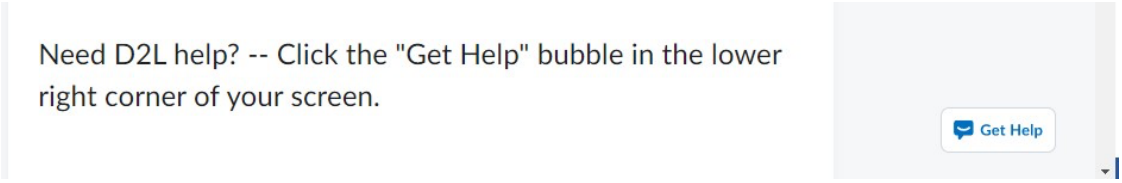
Policy for Missed or Late Work

Late work that is turned in during the week of its due date will not be penalized. Late work turned in after the end of the week when it was due will be graded with a flat 20% grade reduction.

Technical Support

If having D2L Issues- you can always access the help desk:

Phone: 618-453-5155
Email: salukitech@siu.edu
Alternatively, you can look for the **Self-Help** button at the bottom right of the D2L **My Home** menu.



You can also list outside links to tech support for any outside programs you may use in your course.

Academic Integrity Policy

Information on SIU's Academic Integrity Policy can be found in the *Morris Library Guide on Plagiarism* and the *SIU Student Conduct Code*.

Provost Syllabus Attachment

Information on important SIU dates and student services can be found on the Provost's website within the current semester's syllabus attachment. This is also located in a widget in MyCourses (D2L) and course page homes within D2L.