

**SIM-UB Undergraduate Program
GEO 101: Earth Systems Science
Spring 2023**

Course Outline

Instructor: Xin Tao
Class Day/Time: Tuesdays and Fridays; 8:30 – 10:00
Classroom: Please refer to electronic signboard
Office Hours: 10:00 – 11:30
Office Location: Please refer to electronic signboard
E-mail: xintao@buffalo.edu
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Textbook (recommended): Kump, L., Kasting J., & Crane R., The Earth System, 3rd edition, Prentice-Hall, ISBN: 978-0-321-59779-3.

Course Description and/or Objectives: Earth Systems Science examines modern environmental problems through quantitative methods, analysis, and modeling grounded in basic and applied science and research. The goal of the course is to introduce students to the fundamental processes that dominate the atmosphere, hydrosphere, lithosphere, and biosphere, their characteristics and complex interactions, and their impact on human life and society.

Course Requirements: There are three exams and three projects for the course. The exams consist of multiple-choice questions. Makeup exams may include short answer questions. The project instructions will be announced in class. The project due dates are shown in the syllabus.

Student Learning Outcomes: Successful completion of this course will provide students with knowledge about methods that scientists use to study Earth Systems Science as well as modern environmental problems. It will introduce how the Earth's systems are ever-changing due to interactions between geology, the atmosphere, ocean, and biosphere. It includes key examples of how and why the systems have changed at different times in Earth's history and how the scientific method helps scientists improve their knowledge of Earth's system. After this class, students will be able to recall the factors that contribute to modern environmental change, describe how the Earth system changed through Earth's history, demonstrate the rough steps to build Earth Systems model, and identify their impacts on human life and societies.

Assessment: There will be 3 exams and 3 projects. The lowest exam score will be dropped and the highest two is worth 60% of the final grade. The lowest project score will be dropped and the highest two is worth 30% of the final grade. 10% will be based on attendance and participation. Projects will be submitted on UBLearns platform. If the format is online, the in-class activities and exams will be administered on UBLearns platform as well.

Grading:

<u>UB Letter Grade</u>	<u>% Equivalent</u>	<u>Interpretation</u>
A	93.0 – 100.0	High Distinction
A-	90.0 – 92.9	High Distinction
B+	87.0 – 89.9	Superior
B	83.0 – 86.9	Superior
B-	80.0 – 82.9	Superior
C+	77.0 – 79.9	Average
C	73.0 – 76.9	Average

C-	70.0 – 72.9	Average
D+	67.0 – 69.9	Minimal Passing Grade
D	60.0 – 66.9	Minimal Passing Grade
F1	0.00 – 59.9	Failure*
F2		Failure**
F3		Failure, no participation

*participated after the 60% of the session

**started participating but stopped before the 60% point of the session

Incomplete Grades: Under certain circumstances (e.g. extended hospitalization), students may apply for a grade of Incomplete. See the UB catalog for details of the Incomplete grade policy and requirements at:

<https://catalog.buffalo.edu/policies/explanation.html>

Request for an Incomplete grade must be made prior to the end of the semester. Approval is not automatic, must be supported by robust relevant documentation, and is at the discretion of the instructor.

Class Policies

Missed exams: The student contacts the instructor either before, or on the day of, the scheduled exam, unless with a note that explains why the instructor could not be contacted.

Late policy: Assignments must be submitted in print or electronic version on the specific due date to the instructor. Late work will lose 10 percent per day.

Attendance: Students are expected to attend classes regularly. A student who incurs an excessive number of absences may be withdrawn from a class at the discretion of the professor. See the UB catalog for details of the class attendance policy at:

<https://catalog.buffalo.edu/policies/attendance.html>

General UB Program Policies

Attendance and active participation is expected by all students in every class. Students are expected to be present for the entire duration of each class. Tardiness to or absenting oneself during class will result in a deduction from the attendance and participation portion of the final grade.

Late assignments, if accepted, will be penalized.

Students who are absent from a **midterm exam** must request a makeup exam from the course instructor; a makeup will be given only if there is an appropriate, documented reason for absence from the exam (such as an MC); any disputes regarding the validity of the reason or the documentation may be referred to the student advisor.

Students who are absent from a **final exam** must formally request a makeup exam in writing to the SIM-UB Assistant Resident Director, within 24 hours of the original exam. The makeup exam request form can be found in SIMConnect. In all cases, supporting documents must be provided and a make-up exam will only be scheduled if there is a valid and appropriate reason for the absence. For example, prior commitments to external activities or events outside of SIM are not considered a valid reason for absence. For medical cases, students must submit a detailed letter from the doctor, highlighting the date of the medical consultation, the nature and the severity of the illness, and how the illness prevented them from taking the scheduled exam, in addition to a Medical Certificate (MC). **A Medical Certificate alone will not be accepted for make-up final exams.** Disputes may be referred to the Resident Director.

There will be no make ups for other course assessments, and students who are absent from such assessments will receive a zero.

UB Statement of Principle on Academic Integrity:

The University at Buffalo has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for appropriate citation of sources, and for respect for others' academic endeavors. By placing their name on academic work, students certify the originality of all work not otherwise identified by appropriate acknowledgements.

Additionally, students are expected to understand and abide completely by the following guidelines for academic integrity in all UB courses:

Plagiarism, cheating, and other incidents of academic dishonesty will result in an **automatic failing grade for the course**. Depending on the severity of the violation, your case may also be reported to UB for further investigation and may result in expulsion from the university.

Plagiarism consists of copying work from another source without giving proper citations. You must not copy information from printed materials, internet sources, or from the work of other students. If you are uncertain about how to submit your work correctly, consult the instructor immediately.

Any claim of ignorance of the rules of academic integrity by any student is unacceptable.

See the policy here: [Undergraduate Academic Integrity Policy](#)

Reasonable Accommodations and Accessibility Resources for Students with Disabilities

Reasonable Accommodation refers broadly to reasonable modifications of policies, practices, and procedures as necessary to ensure that persons with disabilities have the same opportunities as others in all programs, services, and benefits of the University at Buffalo. Anyone with a disability who needs reasonable accommodations in the SIM-UB Program should refer to the Student Handbook (available online via SIMConnect) for further information, or consult the Resident Director.

Syllabus

Week	Date	Topic	Readings	Assignments
1	1/31 2/3	An introduction to science An introduction to systems	Ch. 1 Ch. 2	
2	2/7 2/10	Global energy balance Earth's surface	Ch. 3 Ch. 3	Project 1 out
3	2/14 2/17	The Greenhouse Effect Atmospheric and oceanic circulation	Ch. 3 Ch. 4	
4	2/21 2/24	Review Exam 1		Project 1 due
5	2/28 3/3	Deep ocean circulation Modeling the ocean-atmosphere system	Ch. 5 UBLearns	
6	3/7 3/10	Deforestation Global Carbon Cycle 1	Ch. 8	Project 2 out
7	3/14 3/17	Global Carbon Cycle 2 Origin of Earth and life	Ch. 8 Ch. 10	
8	3/21 3/24	No class (term break) No class (term break)		
9	3/28 3/31	The rise of atmospheric oxygen and ozone Review	Ch. 10	Project 2 due
10	4/4 4/7	Exam 2 No class (holiday)		
11	4/11 4/14	The Eukarya domain of life Faint young Sun paradox	Ch. 11 Ch. 12	Project 3 out
12	4/18 4/21	Snowball Earth Pleistocene glaciations and glacial cycles	Ch. 12 Ch. 12	Project 3 due
13	4/25 4/28	Role of oceans in glacial cycles; the Holocene Recent warming	Ch. 14 Ch. 15	
14	5/2 5/5	Review Exam 3		
15	TBA	Makeup exams (if approved)		

Disclaimer: This syllabus is subject to change with advanced notice to the students. Unforeseen events will require adjustment to the syllabus.