

Geo101: Earth System Science I (Spring 2019)

Note: The only valid and continuously updated class syllabus is posted on UBlerns!

Instructor: Chris S. Renschler (renschr@buffalo.edu)

Audience: Undergraduate Students of all disciplines.

Time schedule (3 credits): MWF 1:00 PM - 1:50 PM (Fillmore 170)

Office Hours (Wilkeson 116): Mondays 10-11am and Wednesdays Noon-1pm

Objectives: The lecture introduces the main concepts and theories in Earth System Science and investigates the complexity and interaction of physical, chemical and biological processes in geosphere, atmosphere, hydrosphere, biosphere and ecosphere. The goal of this class is to gain the fundamental understanding of environmental processes and their local, regional and global impacts. The lecture creates an interdisciplinary learning environment that supports the communication among various disciplines about environmental systems issues and problems.

Required Textbook: Strahler and Strahler, 2005. Physical Geography: Science and Systems of the Human Environment, 3rd Edition, John Wiley & Sons, Inc. (ISBN 0-471-48053-3; you also may find the same book as ISBN 978-0-471-48053-2).

Course Format: The course consists of lecture presentations with computer-projected text, figures and tables mostly derived from the textbook. All slides shown in class are available on UBlerns in PDF format and students are encouraged to take additional notes. Students are encouraged to read their textbook chapter before and after to class. As the textbook, the lectures have five distinctive parts with interactive review sessions after each part: Part 1 – Introducing Physical Geography – Spheres, Scales, Systems, and Cycles, Part 2 – Weather and Climate Systems, Part 3 – Systems and Cycles of the Solid Earth, Part 4 – Systems of Landform Evolution, and Part 5 – Systems and Cycles of Soils and the Biosphere

Student Learning Outcomes:

Course Learning Outcome	Program Outcomes/Competencies	Instructional Methods	Assessment Methods
Provide breadth of knowledge of basic principles and concepts	Understand basic concepts of system science and Earth system sciences in particular	Lecture	Test Exam and 4 Exams on Parts 1 to 5
Provide depth within specialized areas	Understand investigates the complexity and interaction of physical, chemical and biological processes in geosphere, atmosphere, hydrosphere, biosphere and ecosphere	Lecture and feedback through participation	4 Exams on Parts 1 to 5; Participation
Provide an understanding of experimental design and methodology / Develop approaches for integration of information	Understand illustrated examples in lecture	Lecture	4 Exams on Parts Exam 1 to 5
Encourage critical thinking and hypothesis building / Provide skills in writing and communication / Provide contemporary information / Encourage appreciation of scientific values	Discuss current issues and applications through participation	Discussion through participation	Participation

Exams: There will be **four exams with 40 multiple-choice and 10 true false questions** (50 minutes time limit). There will be no final exam. **Make-up exams will be only given where a student contacts me before or at the day of the scheduled test and offers an acceptable excuse with written documentation. In case of an illness or accident a medical certificate from either a doctor or student health services is required.** Make-up exams will be given at Noon on Wednesdays in the week following the scheduled exam date (except where prolonged illness prevents this).

Grading: Your grade is based on the results of the four exams (25% each). **Extra credits (1% or more) can be gained in each class session by answering correctly (prepare especially for the exam review sessions).** The final letter grades: A (90-100%), A- (85-89%), B+ (80-84%), B (75-79 %), B- (70-74%), C+ (65-69%), C (60-64%), C- (56.6-60%), D+ (53.3-56.6%), D (50-53.3), F (0-50%). There is **only one test exam** that will allow students to get some practice (**only if test score is better than the average of the four exams and you are less than 1% shy of the next higher letter grade you will get the better grade**).

Class Schedule The instructor reserves the right to alter the course schedule and format of the exams as is deemed necessary. (if changes are made you receive an email and the revised schedule is posted on UBlerns):

Week	M/W/F	Lectures
Part 1 - Introducing Physical Geography – Spheres, Scales, Systems, and Cycles (Ch.1-4)		
1	Jan 28/ 30/Feb 1	Introduction (Ch.1) Spheres, Scales, Systems, and Cycles (Ch.2)
2	Feb 4/6/8	The Earth as a Rotating Planet (Ch.3) The Global Energy System (Ch.4)
Part 2 – Weather and Climate Systems (Ch. 5-9)		
3	Feb 11/13/15	Review Session - Part 1 WEDNESDAY: Test Exam - Part 1 (Ch.1-4) Air Temperature & Air Temperature Cycles (Ch.5)
4	Feb 18/20/22	Atmospheric Moisture and Precipitation (Ch.6) + Winds & Global Circulation (Ch.7)
5	Feb 25/27/Mar 1	Weather Systems (Ch.8) + WEDNESDAY: Movie (Water Part I; Part 2 online) + Global Scope of Climate (Ch.9)
Part 3 – Systems and Cycles of the Solid Earth (Ch.12-15)		
6	Mar 4/6/8	Review Session - Part 2 WEDNESDAY: 1st class Exam: Part 2 (Ch.5-9) + Part 1 (Ch.1 & 2)* Earth Materials and the Cycle of Rock Change (Ch.12)
7	Mar 11/13/15	The Lithosphere and the Tectonic System (Ch.13) + Volcanic and Tectonic Landforms (Ch.14) – Part I + FRIDAY: Movie (Fire)
	Mar 18/20/22	<i>No classes - Spring Break</i>
8	Mar 25/27/29	Volcanic and Tectonic Landforms (Ch.14) – Part II Weathering and Mass Wasting (Ch.15)
Part 4 – Systems of Landform Evolution (Ch.16-20)		
9	April 1/3/5 (AAG)	Review Session - Part 3 WEDNESDAY: 2nd class Exam: Part 3 (Ch.12-15) + Part 1 (Ch.1 & 2)* + FRIDAY: Movie (Sand, Part 1)
10	Apr 8/10/12	The Cycling of Water on the Continents (Ch.16) Fluvial Processes and Landforms (Ch.17)
11	Apr 15/17/19	Landforms and Rock Structure (Ch.18) + Waves and Wind (Ch.19) + Glacier Systems and the Ice Age (Ch.20) + potentially FRIDAY: Movie (Sand, Part 2)
12	Apr 22/24/26	Review Session - Part 4 WEDNESDAY: 3rd class Exam: Part 4 (Ch.16-20) + Part 1 (Ch.1 & 2)* Soil Systems (Ch.21)
Part 5 - Systems and Cycles of Soils and the Biosphere (Ch.21-24)		
13	Apr 29/May 1/3	Systems and Cycles of the Biosphere (Ch.22) + Biogeographical Processes (Ch.23)
14	May 6/8/10	Global Ecosystems (Ch.24) & Review Session - Part 5 WEDNESDAY: 4th class Exam: Part 5 (Ch.21-24) + Part 1 (Ch.1 & 2)* + if not already completed on April 19 then FRIDAY Movie (Sand Part 2)

*Note that, each exam includes the basics learned in Part 1 Ch.1&2 (Intro Physical Geography & Spheres, Scales, Systems, & Cycles).

UB Portfolio: If students are completing this course as part of your UB Curriculum requirements, please select an ‘artifact’ from this course that is representative of your learning and upload it to your UBPortfolio (powered by Digication) account. Templates have been created for this purpose. Artifacts for this course are self-drawn sketches of slides of course presentations (e.g. a sketch of a particular process with labels) and narratives of related movie sequences about these processes, their changes/dynamics and/or the management (e.g. water/matter and/or energy flow as well as their dynamics/variability/extremes). Your final UB Curriculum requirement, UBC 399: UB Curriculum Capstone, will require you to submit your ‘self-drawn artifacts’ as you process and reflect on your achievement and growth through the UB Curriculum.

Please note that you cannot simply copy or take a screenshot of the slide/movie scene since this might be a violation of copyrights. The instructor offers to give feedback to those students that visit the office hours with a final draft.

For more information, see the UB Curriculum Capstone website: <https://www.buffalo.edu/ubcurriculum/capstone.html>. Please know that the UB Curriculum office provides UBPortfolio support to students and instructors during the fall and spring semesters, Monday- Friday in 24H Capen Hall. For hours, visit https://buffalo.digication.com/ub_portfolio/ubportfolio-walk-in-lab-hours

Additional information about creating artifacts can also be identified by these supplemental presentations in class and/or online:

Part 1 “Blue Gold – World Water Wars” (2008) <https://www.youtube.com/watch?v=megBMpB33jE> (½ in class; ½ completed online)

Part 2 "Mega Disasters - The Next Pompeii" (2007) (completed in class; you may find it also in your local library)

Part 3 “Sand Wars” (2013) - Part 1 and Part 2 (½ in class before last exam; second ½ completed in class at last day of classes).