

Syllabus
Earth's History of Global Change

GEOL 1122 (CRN 13799) University of Georgia Fall Semester, 2019
11:00-12:15 Tu&Th Room 200A GG

Professor: Dr. L. Bruce Railsback, Professor, Department of Geology, University of Georgia
B.A. U. of Iowa 1980; B.S. U. of Iowa 1981; M.S. U. of Iowa 1983; Ph.D. U. of Illinois 1989.

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Office Hours: Railsback will meet with students at times convenient to them in Room 306 GG.
To set up such meetings, they should send him an email message at rlsbk@gly.uga.edu.

Like almost all professors at the University of Georgia, and at any major state university, Railsback's employment contract calls for him to devote part of his effort to research and part to instruction (in his case, 50% and 50%). Like almost all professors at the University of Georgia, he is evaluated each year on the basis of his acquisition of grant funding for the University, his generation of technologies and products that can be patented by the University, his publication of new research, his participation at scholarly meetings, his supervision of graduate students, and his teaching of undergraduates. Only his conviction that an educated citizenry is essential to a functioning democracy causes him to give top priority to the last of these.

Teaching assistant: Will Crumpacker (William.Crumpacker@uga.edu)

Recommended but not required textbook: Stanley, S.M., and Luczaj, J.A., 2015, *Earth System History* (4th edn.): New York, W.H. Freeman & Co., 587 pp.

Course web page: railsback.org/1122main.html. This syllabus, including the attached schedule, is subject to change as posted on the course web page.

Official UGA course description: Geologic record of global change, including measurement of geologic time, global geochemical cycles, sea-level and climate change, biodiversity, evolution, ecological changes and extinctions.

Course objectives: To acquaint students with the history of the Earth and its life, with emphasis on large-scale patterns of global change. We've inherited control of a planet and, to make intelligent decisions, we need an understanding of how that planet works and how it has gotten to its present condition.

Course promises/caveats: During this course, students will be presented with much information about how the Earth has changed and how we think about the history of the Earth. This material may induce students to think about why the world around them is the way it is, about whether the human milieu around them could be different than it is, and about why they believe the things that they believe.

<u>Course Requirements:</u>	Proportion of Final Grade
Participation/In-Class Responses/Summaries of creation stories	5%
Scientific Literature Exercise (available from course website)(Due 5:00 pm 27 August 2019)	5%
Midterm Exam 1 (Thursday, September 12, 2019 11:00-12:15 in 200A GG)	21%
Midterm Exam 2 (Thursday, October 10, 2019 11:00-12:15 in 200A GG)	33%
Final Exam (Thursday, December 12, 2019 12:00-3:00 pm in 200A GG)	<u>36%</u>
Students who have other prior commitments so that they cannot take exams on these days at these times should not take the class.	100%

This syllabus, including the attached schedule, is subject to change as posted on the course web page.

Attendance and Grades: Detailed records of attendance will not be maintained, and attendance will not be used in calculating final grades. However, it is very difficult to achieve an A, a B, or a C in this course without attending class regularly. Students who choose not to come to class are choosing to receive low grades. It is assumed that students, as adults of voting and soldiering age who have chosen to get a college education, are sufficiently mature to come to class, and sufficiently mature to recognize that their rewards (grades) will depend on their attendance and effort in studying.

Students who miss class for any reason are expected to get lecture notes for that class meeting from another student. Such students will not be given the professor's lecture notes or Powerpoint presentation(s).

Exams: The mid-term examinations will consist of matching, multiple choice, and short answer (1 to 3 sentences) questions. The first part of the final exam will have the same format as the mid-term exams. The second part of the final exam will consist of two essay questions available from the course web page. Copies of previous exams will be available on the course web page. Suggestions on how to prepare for exams are also included on the course web page. Exams must be written with non-red ink or sharp dark pencil. Use of computers, cell phones, and other communications or information-storage devices during an exam is prohibited.

The exams will require studying and preparation. Many students do not study for the first exam in this course, hoping to find that they don't need to study. Students in that subset of the class usually receive grades between 20 and 50 on the first exam, and their course grade is irreparably lowered. The way to avoid that fate is simply to attend class and study.

Study guides are not provided for exams because they would be the same as the lecture outlines. A good set of lecture notes is a student's study guide for the GEOL 1122 exams.

The general rule at most universities is that a student should expect to do at least two hours of work (reading or studying) outside class for every hour spent attending class. That level of preparation, in addition to studying for exams, should leave the student well-prepared.

Exams will be graded blindly, in that students will be asked to fold over the corner of the front page of their exam so that the instructor does not see the name. Exams will be graded one page at a time (i.e., the first page of everyone's exam will be graded, then the second page, and so on). The exams will be shuffled before the grading of each page. These procedures ensure that no bias can enter into the grading of exams.

Make-up exams are essay exams, because essay exams can be much more easily prepared on short notice. Exams can be made up in the documented event of illness, death in family, or jury duty. Car trouble, visits by friends or relatives, weddings, travel, and other exigencies beyond serious illness or death in family will not be treated as reasonable excuses for missing exams. The meeting to schedule a make-up exam typically takes place at the end of the next class meeting after the exam, and any student wishing to take the make-up exam must justify doing so at least three hours before that class meeting and must be present at that scheduling meeting unless absent for reasons that justify missing an exam.

Participation Grade: A student's participation grade largely involves recounting a creation story (see below) when called upon by means of random selection. A student who is called upon and who is not present, or who simply reads the original story, or who is otherwise clearly not prepared to tell the story in less than two minutes without recourse to the original text, will receive a reduced participation grade. A student never called upon will receive full credit for participation.

Reading and Discussion of *Creation Stories from around the World*: This course presents an explanation of the history of the Earth derived from scientific study over the past three centuries. Many other explanations of the origin of the Earth and its peoples were generated much longer ago by many cultures around the world. We will occasionally consider some of those explanations by reading creation stories from around the world that are linked from the course web page.

Stories will be discussed in class according to the attached schedule. Discussion will be initiated by a randomly chosen student who will briefly (in less than two minutes, without recourse to the original text) coherently summarize the story. Then we will discuss whether the story is appealing (1) as a literal account of the origin of the world and/or (2) as a metaphorical statement on the human relationship to nature. These discussions will develop ideas useful in answering an essay question on the final exam.

A grading rubric to guide determination of the GEOL 1122 participation grade arising from recounting of creation stories is available on the course web page.

Any student who has a print-related disability documented by the Disability Resource Center is exempted from in-class discussions and final exam questions that are related to the creation stories.

Final Grades: All exam and other grades are recorded as numbers, not letter grades. At the end of the course, final numerical averages are used to determine final letter grades. Percentages used to divide letter grades will be at or below the following values: A 92.00%, A- 90.00%, B+ 87.00%, B 83.0%, B- 80.0%, C+ 77.0%, C 73.0%, C- 70.0%, D+ 67%, D 63%, D- 60%. The actual dividing points vary from year to year because the dividing points are often lowered to allow a reasonable distribution of letter grades. Students are assured that there will always be at least one "A" (and usually several) as a "curve" is developed to fit the distribution of final grades.

Your instructor wants students to learn the material, to do well on the exams, and to receive good grades in the course. Low grades are not a necessity - there will be no problem with giving nothing but A's and B's if all the students do A and B work.

The geologic time scale will appear repeatedly on exams. See page 4 of this syllabus.

Lecture and Laboratory: GEOL 1122 is a lecture course, and GEOL 1122L is the corresponding laboratory course providing hands-on experience in a smaller class. GEOL 1122 and GEOL 1122L function independently. Students in GEOL 1122L will receive a separate grade for that course.

Students with learning disabilities certified by UGA must inform the professor of measures needed to account for those disabilities by the end of the third class meeting. Students for whom the University provides a note-taker are reminded that note-takers are required to not deliver notes for any lecture that the disabled student does not attend.

Student Athletes: Students wishing that their course grades be released to advisors in the UGA athletics program must give the professor a signed dated letter indicating that wish and indicating the name and campus address of the person to whom the grades should be sent. The course web page has a sample letter or template.

Students who are not native speakers of English can receive early drafts of Railsback's Powerpoint lecture files, so that they can become familiar with new words before attending the lecture. Students wishing to take advantage of this opportunity should send an email message to rlsbk@gly.uga.edu. On GEOL 1122 exams, any student who is not a native speaker of English will be allowed to use a bilingual (e.g., French-English / English-French) dictionary in hard copy (but not on an electronic device). All such dictionaries should be presented to be examined at the beginning of each exam.

Students whose religions hold sacred some days on which UGA holds classes: UGA policy states "Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the period of absence. . . . It is the obligation of students to provide faculty with reasonable notice of the dates of religious holidays on which they plan to be absent." In Fall 2019, "reasonable notice" means "no later than August 30".

Students bringing guns to class are reminded that the wall at the front of the room is not a brick wall, so that bullets fired at the professor may pass through that wall and strike students in Room 200B.

Time: Lectures will begin promptly at 11:00 and end no later than 12:15. This course provides 35 hours to cover 4,600,000,000 years of earth history, so there is no time to waste. If you must come in late or leave early, please sit at the sides of the room so as to not distract your colleagues by walking in front of them.

Classroom etiquette: Class meetings are intended for lecture on and discussion of the subject matter, and for students to ask questions about that material. Students are strongly encouraged to ask questions and to remember that there are no stupid questions.

To allow the students to hear all the lectures and participate in all the discussions for which they are paying, no private personal conversations can take place during class. Failure to adhere to this basic maxim of civilized behavior may result in administrative withdrawal from the class. In this regard, seating may be assigned at the discretion of the instructor.

Closing notebooks, putting on coats, and talking while the lecture or discussion ends are rude behaviors. Many students will still be trying to follow the lecture or discussion that they have paid to attend.

Communication devices and seating

Cellular telephones should be deactivated during class time to avoid disturbing students who are trying to listen to class activities.

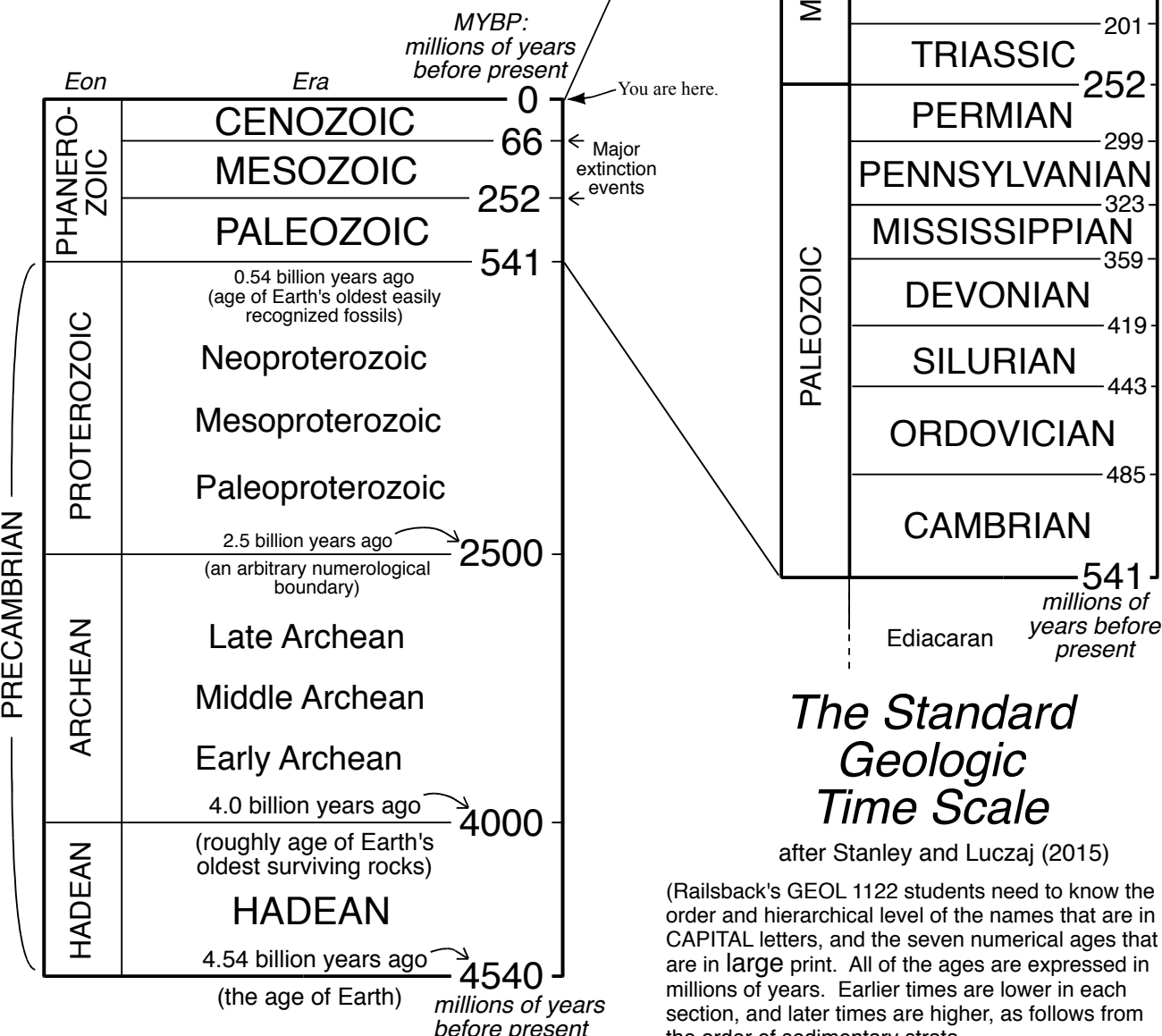
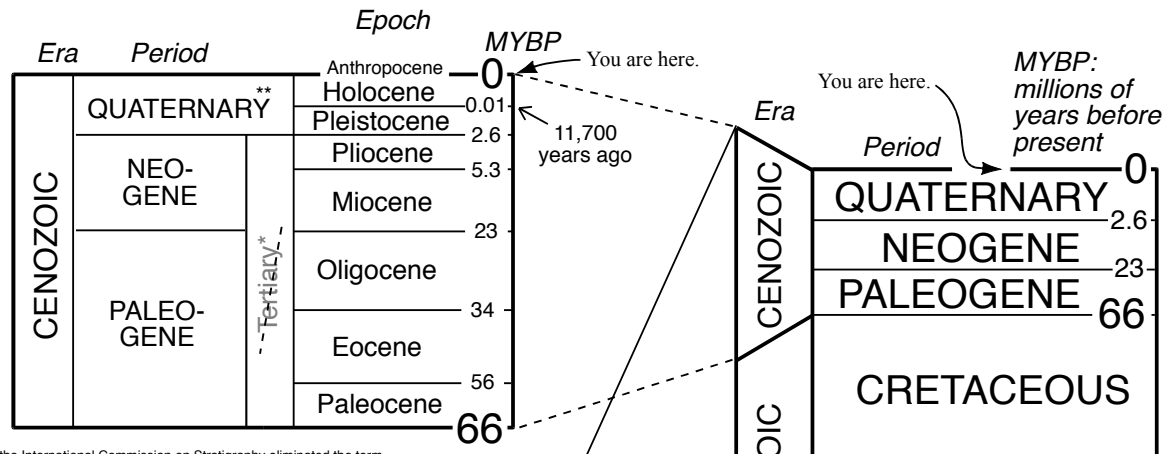
Students using texting devices, reading newspapers, reading books, doing crossword puzzles, or otherwise demonstrably ignoring class business are required to sit in the seats on the aisles nearest the side walls of Room 200A. Failure to do so will result in lowering of the course grade by one letter grade (e.g., from B+ to C+) per occurrence. A diagram on a following page illustrates the seats in question.

The Administration of the University of Georgia requires that the following statements appear on all syllabi:

Students are expected to observe the University Honor Code and Academic Honesty Policy. All academic work must meet the standards contained in *A Culture of Honesty*. Students are responsible for informing themselves about those standards before performing any academic work. The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

"In the first decade of the 21st Century, the International Commission on Stratigraphy divided the Cenozoic period previously known as the "Tertiary" into "Paleogene" and "Neogene". Much useful surviving literature still contains the word "Tertiary" and the letter "T" as its abbreviation. Many Earth scientists also continue to refer to the boundary at the end of the Cretaceous as the "K-T" boundary, even though it would be the "K-P" boundary in the new usage.

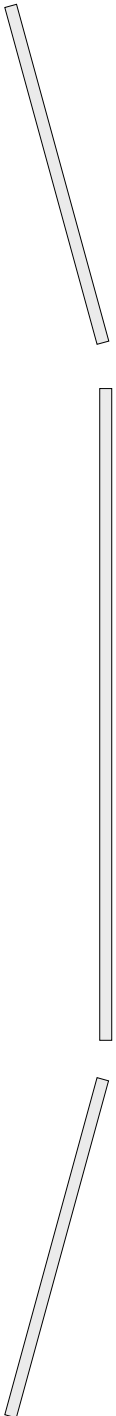
**The same action by the International Commission on Stratigraphy eliminated the term "Quaternary", folding the last 2.6 million years of Earth history into the Neogene. However, those last 2.6 million years of Earth history are so unique that, in response to scientific outrage, the Quaternary period was later restored to the system by the ICS. As a result, however, some documents generated in the early 2000s persist without the Quaternary in their time scales.



The Standard Geologic Time Scale

after Stanley and Luczaj (2015)

(Railsback's GEOL 1122 students need to know the order and hierarchical level of the names that are in CAPITAL letters, and the seven numerical ages that are in large print. All of the ages are expressed in millions of years. Earlier times are lower in each section, and later times are higher, as follows from the order of sedimentary strata.



Table

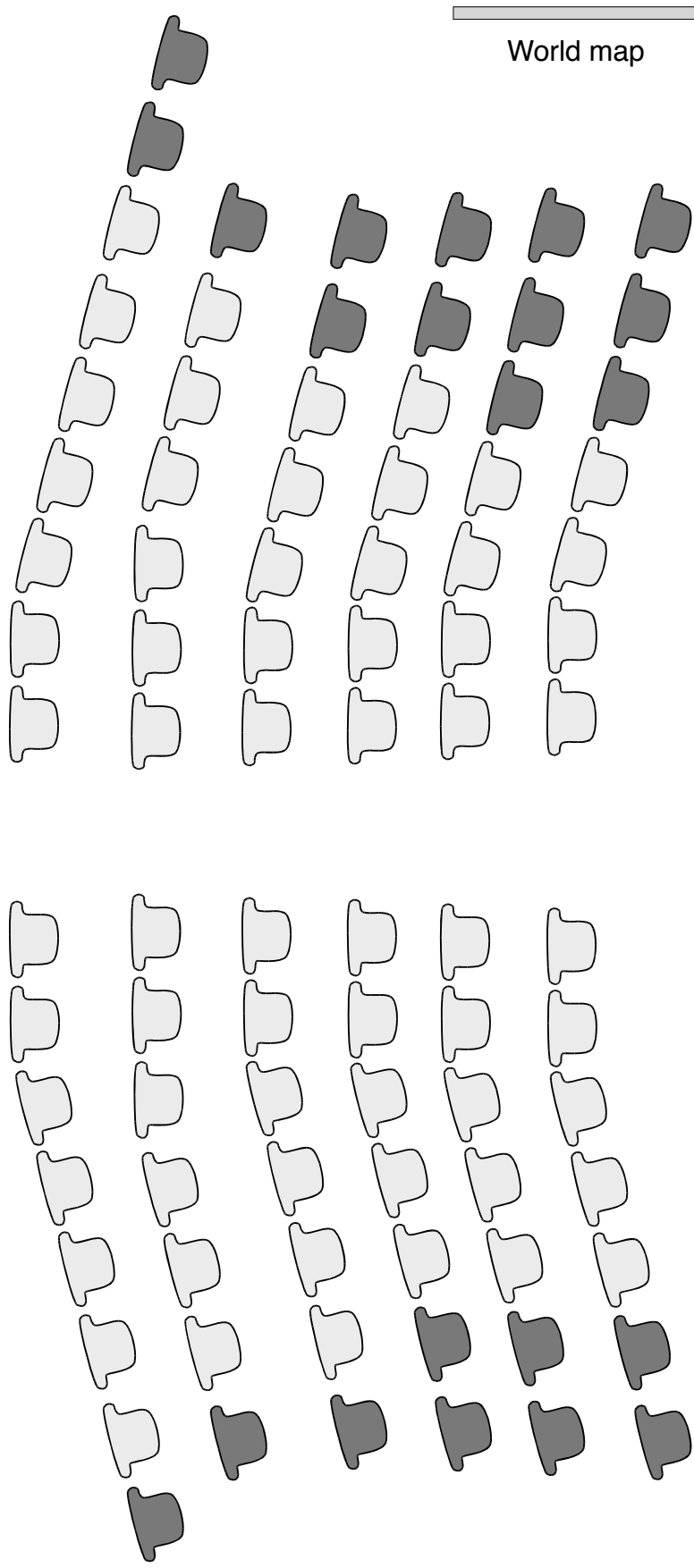
Lectern


This seat is a poor choice for anyone attending Railsback's lectures because he commonly blocks the view of the projection screen from this seat.



World map

Periodic table



Seats reserved for students who will use texting devices or will read newspapers, read books, do cross-word puzzles, or otherwise demonstrably ignore class business.

Seats reserved for students who will not demonstrably ignore class business.

GEOL 1122 students using texting devices, reading newspapers, reading books, doing crossword puzzles, or otherwise demonstrably ignoring class business are required to sit in the seats on the aisles nearest the side walls of Room 200A; failure to do so will result in lowering of the course grade by one letter grade (e.g., from B+ to C+) per occurrence.

Lxr	Date	Topic or Business	Reading* (see notes below)
<i>Part I. Basic Materials in Historical Geology</i>			
1	8/15/19	Introduction; Minerals	Syllabus (read it!); 31-35, website resources
2	8/20/19	Igneous & Metamorphic Rocks; Isotopes	35-38 45-47; 28-29 235-236; website resources; CS #1
3	8/22/19	Sedimentary Rocks, and Fossils	6-7; 38-45; 98-102 [103-126]; 52-55; website resources
4	8/27/19	Structural Geology & Plate Tectonics	186-201; 209-2011; website resources
<i>Part II. Basic Principles and Geologic Time</i>			
5	8/29/19	Goals and Theories	"What is Science?"(a website resource); CS #21
6	9/03/19	Correlative and Relative Dating	146-148; website resources; CS #7
7	9/05/19	Absolute Dating	141-144; [28-29 on isotopes]; website resources; CS #3
8	9/10/19	Age of the Earth & Geologic Time Scales	140-141; 10-13; 150-151; website resources
-	9/12/19	Exam I	--
<i>Part III. Biological Evolution of the Earth</i>			
9	9/17/19	Explanations of Biological Evolution	156-162; website resources
10	9/19/19	Mechanics of Biological Evolution	162-180; website resources; CS #10
11	9/24/19	Precambrian & Cambrian Life	268-272; 281-287; 304-311, website resources; CS #11
12	9/26/19	Evolution of Vertebrates I	73-77; 335-338; 341-345; 367-371; website resources
13	10/01/19	Evolution of Vertebrates II (Dinosaurs)	399-411 (incl. ESS 16-1); website resources; CS #13
14	10/03/19	Evolution of Vertebrates III	396-398; 429-433; 457-458; ESS 17-1
15	10/08/19	Evolution of Mammals & Hominids	454-457; 509-519; website resources
-	10/10/19	Exam II	(Withdrawal deadline = October 17, 2019)
<i>Part IV. Environmental Evolution of the Earth</i>			
16	10/15/19	Evolution of the Earth	257-266; [191]; 297-299; 345; 350-352; 379-381; maps in cover and on 277, 297-299, 303, 317, 319, 359, 372, 375, 391, 411, 423, 434, 451, 461; website resources; CS #16
17	10/17/19	Evolution of the Ocean & Atmosphere	259; 272; 287; 227-243; website res.; CS #14&15
18	10/22/19	Phanerozoic Sea Level; O isotopes	148-151; 231-235; website resources
19	10/24/19	Climate, Cretaceous, & PETM	435-457; 460-465;
20	10/29/19	The Cenozoic; glaciers	485-489; website resources; CS #12
21	10/31/19	Quaternary Glaciation	108-109; 489-494; website resources
22	11/05/19	The Last 120,000 years	ESS 19-1 on 490-491; website resources
23	Online	The Holocene I: Changing the World	Website
24	11/07/19	The Holocene II - 11,700 years	524-538; website resources
25	11/12/19	The Holocene III - 20th-21st Century Enviro Issues	website resources
26	Online	The Holocene IV: Resource Issues on a Finite Earth	
27	11/14/19	The Holocene VA - Greenhouse effect & global climate	540-546; website resources
28	11/19/19	The Holocene VB - Greenhouse effect & global climate	540-546; website resources
29	Online	The Holocene VI: Alternatives for the Late Holocene	Website
30	11/21/19	The Holocene VII - Changing ecologies	Website resources; CS #4
31	11/26/19	Summary and Review	Website resource: The Land Ethic Revisited
	12/03/19	Optional meeting for questions by students.	
-	12/12/19	Final Exam 12:00-3:00 pm Room 200A GG (there are no conflicting exams)	

*Notes regarding readings:

All readings are in Stanley and Luczaj's *Earth System History* (4th edn), except for web pages linked from the course website, and for numbers labeled "CS", which are numbers for stories in *Creation Stories from around the World*, a publication linked from the course website.

Pages in brackets are suggested reading that may make lecture material easier to understand.

Readings do not include "Earth System Shift" ("ESS") inserts unless specifically noted.

Undiscussed CS reading assignments roll over to the next class meeting.

This schedule is subject to change as posted on the course web page. In the event that the University of Georgia cancels a meeting of this class, all other class activities move to the subsequent meeting, so that the Summary and Review moves to December 4. The date and time of the final exam would not be changed by a cancellation during the semester.