GEOS 1304: History of Earth and Life

— Fall 2005, Time: MWF 11-11:50am, Room CB 1.120 —

Instructor: *Dr. Nathan R. Miller*, Office: FO 2.220, Office Hours: MW 1-2:30pm or by appointment, (972) 883-6852, miller@utdallas.edu.

Course Overview:
This lecture course provides an overview of major earth systems and the history of the earth through geologic time, fossils and evolution of life on earth, formation of the earth and evolution of earth's atmosphere and oceans, paleogeographic and plate-tectonic history of the earth, evolution of humans and impact of earth's future from a geological perspective. The accompanying lab course (GEOS 1104) provides additional practical experience in applying the concepts outlined in the lecture component

Overarching goal(s):
Based on application of skills introduced in lecture, small group interaction, and field excursions, successful students will be able to:

- Critique arguments/evidence regarding potential/actual environmental change (fossil fuel combustion, sea level change, volcanism, paleotemperature proxies, facies variations) in order to articulate a scientifically valid opinion.
- Predict potential consequences to Earth and life of perturbations to natural systems (present or past), given a set of critical environmental factors (plate spreading rates, ocean circulation, global distribution of continents, evolution of new predators)

Ancillary skill goals:

- Accessing, reading, and analyzing popular geologic literature; Reading comprehension & self-teaching; Peer teaching, working in groups, debate

Course Requirements

Texts:

1. Stanley, S.M., 1999, Earth Systems History, Freeman, 2nd Ed., http://www.whfreeman.com/ESH/
2. Walker, G., 2002, Snowball Earth: The Story of the Great Global Catastrophe That Spawned Life as We Know It, 269 p, Random House (Crown Publishing).
3. Bryson, B., 2004, A Short History of Nearly Everything, 687 p., Black Swan Publishing (recommended)
4. Any dictionary of geological terms. *(i.e.,* Dictionary of Geological Terms by R.L. Bates and J. A. Jackson, American Geological Institute (recommended)

Assessment:

- Participation (attendance, field trip, small group activities, WebCT assignments) 20%
- Theme project 20%
- Term tests 30%
- Final Exam 20%

Field trip leaves at 8am in the West Parking Lot:
You have a "ticket" to participate on the Saturday fieldtrip. In the event of bad weather, the fieldtrip will be rescheduled for the next possible weekend day (Sat or Sun) according to maximum class attendance.

Policy on Scholastic Dishonesty: Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from The University. Since such dishonesty harms the individual, all students and the integrity of The University, policies on scholastic dishonesty will be strictly enforced

Courteous behavior is expected in class – this includes arriving on time and remaining in class for the duration. Please turn cell phones off and refrain from text-messaging. I am happy to answer questions during class time, so feel free to raise your hand. Please refrain from talking with your neighbor – it's distracting to me and to other students.

Schedule of Topics/Readings

Date	Day	Wk	Class	Topic	ESH	SBE	ASH	Group Activities
Organization of Geologic Time & Time Travel								
19-Aug	F	1	1	Introduction/Syllabus/Course Framework	1			
22	M	1	2	Geologic Time - Timeline Exercise I	1			1. Timeline ex
24	W	1	3	Geologic Time - Timeline Exercise II	1			1. Timeline ex
I. Geologic toolkit for forensic Time Travel								
26	F	2	4	Intro to Earth Systems	1			
29	M	2	5	Rocks and Minerals	2			2. Think-pair-share - Rx-Min & Time Travel
31	W	2	6	Rocks and Minerals	2			
2-Sep	F	3	7	Sedimentary Rx, Envs, & Stratigraphy I	4, 5			3. Data in the Strata
5	M	3		**No Class - Labor Day**				
7	W	3	8	Sedimentary Rx, Envs, & Stratigraphy II	4, 5			
9	F	4	9	Sedimentary Rx, Envs, & Stratigraphy III	5			
12	M	4	10	Rock Record Correlation & Dating I	1, 6			
14	W	4	11	Rock Record Correlation & Dating II	6			
16	F	5	12	Life on Earth	3, 7			4. Geopoetry assignment (due by end of semester)
19	M	5	13	Bacteria	3, 7			
21	W	5	14	Protists	3, 7			
23	F	6	15	Animalia	3, 7			
26	M	6	16	Animalia	3, 7			
28	W	6	17	Plants	3, 7			
30	F	7	18	Evolution	7			
3-Oct	M	7	19	Review for Exam 1: Gallery Walk of Essay Questions				5. GW Essay Review
5	W	7	20	**Exam 1:** Classes 1-17; Text Ch. 1-7		1-3		
7	F	8	21	Plate Tectonics I	8, 9	1-3		
10	M	8	22	Plate Tectonics II	8, 9	1-3		6. Walker Discussion Topic 1 Questions Due
12	W	8	23	Major Chemical Cycles: Uniformitarianism and C-isotopes	10	4-6		7. CO2 Exercise in class
14	F	9	24	Major Chemical Cycles	10	4-6		7. CO2 Exercise due
II. Neoproterozoic Snowball Earth: a different world before advanced life						4-6		
17	M	9	25	Snowball Earth Hypothesis: Overview	12	4-6		8. Walker Discussion Topic 2 Questions Due
19	W	9	26	Glaciations - How Many? Really? How Extensive?	12	7-8		10. Neoproterozoic C-isotope stratigraphy Poster/Paper Assignment
21	F	10	27	Cap Carbonates & BIFs	12	7-8		9. Walker Discussion Topic 3 Questions Due
24	M	10	28	Snowball Earth Hypothesis and the Origin of Metazoa	12	9-10		10. Neoproterozoic C isotope stratigraphy poster & paper due
26	W	10	29	The Case for Snowball Earth in Ethiopia		9-10		
28	F	11	30	Review for Exam 2 (Gallery Walk of Essay Questions)	12	9-10		11. Walker Discussion Topic 4 Questions Due
31	M	11	31	**Exam 2: Classes 18-33; Text Ch. 7-12, 16-17**				
III. Cretaceous World								
2-Nov	W	11	32	Introduction to the Mesozoic	16			
4	F	12	33	Cretaceous Global Warming	17			12. Virt. fieldtrip Ex. due
5	Sat			**Saturday Fieldtrip - W parking lot - 7:45am (bus leaves at 8 sharp)**				13. Cretaceous fieldtrip
7	M	12	34	End of an Era: When Worlds Collide	17			
9	W	12	35	Cretaceous vs. Neoproterozoic Discussion Session				
IV. Cenozoic - Paleogene-Neogene-Quaternary World								
11	F	13	36	Cenozoic: The Mammals Take Over	18			
14	M	13	37	Cenozoic: Neogene Climate Change	19			Semester paper table review
16	W	13	38	Cenozoic: Neogene Evolution of Humans	20			
18	F	14	39	Cenozoic: Holocene Changes & the Future	20			
VI. Earth Evolution Essentials - Student Themes								
21	M	14	40	Formation of Earth, Moon	11		1-4	
23	W	14	41	Continents & Atmosphere Form, Bacteria Rule in the Archean	11			
24	F	15	42	Phanerozoic Diversification, Terminal Permian Extinction	13-15			4. Geopoetry due
28	M	15	43	**No Class - Thanksgiving Break**				
30	W	15	44	Review of course themes - final exam preparation (optional)				
2-Dec	F							Semester paper due
5	M	15	45	**Final Exam 11am**				