UPDATED: 3/25/20

GEL 107 — Earth History: Paleobiology

Spring 2020: Notes and lecture videos (saved to the Cloud) under Files on Canvas
~~**MWF 11:00 - 11:50 am; 1003 Giedt Hall**~~

Instructor: Sandy Carlson, ~~Rm. 2123 Earth & Physical Sciences Bldg; Telephone: 752-0350 or -2834~~
email: sjcarlson@ucdavis.edu **Office hours:** MWF 10:00-11:00 am, by Zoom, or by email.
Teaching Assistant: Tracy Thomson (email: tjthomson@ucdavis.edu)
Text (recommended): Introduction to Paleobiology and the Fossil Record
by Michael J. Benton & David A. T. Harper, 2009, Wiley-Blackwell. **(PDF: "Student textbook access…")**
Text is *recommended* for both GEL 107 and GEL 107L.
Requirements: Midterm I (25%); Midterm II (25%); Essay/research paper (15%); Final exam (35% of grade).

DATE	LECTURE	READING
March 30	A1. What is paleobiology? And why should we care?	Ch. 1
April 1	A2. What is the fossil record? How can data be biased?	Ch. 3
April 3	B1. Geology and geological time	Ch. 3
April 6	B2. Biomineralization and paleobiogeochemistry	Ch. 2
April 8	B3. Taphonomy and fossil preservation	Ch. 2, 3
April 10	C1. Individuals, ontogeny, and populations	Ch. 5, 20
April 13	C2. Species, speciation, and phylogeny reconstruction	Ch. 5, 20
April 15	C3. The tree of life, the fossil record of life, and classification	Ch. 5, 20
April 17	D1. Adaptation and functional morphology	Ch. 6
April 20	**MIDTERM EXAM I** (on lectures A-C)	— — —
April 22	D2. Biomechanics: the physics of biology	Ch. 6
April 24	D3. Evolutionary functional morphology	Ch. 6
April 27	E1. Ecology and paleoecology	Ch. 4, 19
April 29	E2. Inferring paleoecology	Ch. 4
May 1	E3. Evolutionary paleoecology. **QUESTION DUE**	Ch. 4
May 4	F1. Biogeography and plate tectonics	Ch. 2
May 6	F2. Evolutionary paleobiogeography	Ch. 2
May 8	G1. Biostratigraphy and the stratigraphic record	Ch. 2
May 11	G2. Evolutionary biostratigraphy	Ch. 2
May 13	H1. Macroevolution: what is it?	Ch. 5
May 15	**MIDTERM EXAM II** (mainly on lectures D-G)	— — —
May 18	H2. Rates of evolution and adaptive radiations	Ch. 20
May 20	H3. Origination and diversification	Ch. 8, 20
May 22	H4. Developmental biology and the fossil record	Ch. 6
May 25	Memorial Day – NO LECTURE	— — —
May 27	H5. Extinctions as perturbations. **ESSAY DUE**	Ch. 7
May 29	H6. Mass extinctions and recoveries	Ch. 7
June 1	H7. Macroevolutionary trends and patterns	Ch. 5, 20
June 3	H8. Big issues in paleobiology, and the future of the field	— — —
June 11	**FINAL EXAM**: ~~6:00 - 8:00 PM in 1003 Giedt Hall~~ **TBA**	

Logistics

Goals for the course: My primary goal is to further the development of your critical thinking skills in paleobiology, and how this can lead to a better appreciation for the world we live in today. What is the history and evolution of life as revealed by the fossil record through "deep time," and how is it relevant to life today?

Class format: The class is organized around a standard lecture format, but I strongly encourage you to send me questions or comments on any lecture material that is unclear. I plan to record and post my lectures (audio and slides) before each scheduled lecture time; they will be available via a link at the end of each lecture's notes that I post under Files on Canvas. You may download them if you wish or access them on the Cloud at all times. I plan to hold real-time office hours by Zoom on MWF 10-11 am; I will send a Zoom link to you all before 3/31.

Reading: The book is available at the UCD Bookstore (see the pdf posted under Files). The textbook for the class is recommended reading; I *do* recommend that you complete the reading assigned, but do not require it. My lectures will not cover exactly the same material as what is in the book; there are many topics in the book that I will not cover and will not expect you to know, while other topics that I cover in lecture are not in the book at all. I may include course material from other sources in lectures as appropriate, so viewing lectures regularly will ensure that you do not miss any relevant information. Check the course Canvas site often for brief lecture notes and videos of me delivering the full lectures, for announcements, and any other information that I would like you to know in a timely manner.

Grading: Your final grade will be based on your scores on the two midterms, one essay, and the final exam; I grade on a curve, relaxed from a straight scale. The exams will focus on material that I cover in lecture and will include multiple choice and essay questions; I am working on the logistics of exam administration now and will keep you fully informed as we approach April 20. The exams will be cumulative but will emphasize more the material covered since the previous exam. For the essay assignment, you will send me a question of your own interest, related to paleobiology, and will then write a short essay/research paper of no more than five double-spaced pages researching your question, citing three references. I will provide more information and guidance on the essay after the first midterm exam.

Study habits: I strongly recommend that you view the lectures, read the book, and take notes. I will post some brief notes and links to lecture videos in Files on Canvas for each lecture, but they can't take the place of your own notes. You can view these whenever it is convenient for you, as many times as you wish. PLEASE LET ME KNOW IF YOU HAVE DIFFICULTY ACCESSING THESE FILES. The material we cover in this class cannot be understood fully by rote memorization alone; it requires both analysis and synthesis of information. I plan to offer practice exams as worksheets and will schedule a Zoom review session before each exam. I will be happy to review your exam with you during my office hours. If you have questions, please Zoom in to my office hours or send me an e-mail message. I will make every effort to answer your emails as soon as I can.

GEL 107L: GEL 107L is a separate 2-unit laboratory course that can be taken concurrently with GEL 107. Hannah Kempf is the Teaching Assistant for GEL 107L. The lab is required only for Geology majors, but taking it, no matter what your major, will very likely improve your understanding of the course material in GEL 107 and enrich your knowledge of the fossil record. GEL 107L meets twice a week for 3 hours each and emphasizes the (remotely!) hands-on study of major clades with a fossil record, with exercises relating to concepts we cover in GEL 107 lecture. Hannah will be sending you more information on the revised lab format, if you are currently enrolled in GEL 107L.

"Nothing in biology makes sense except in the light of evolution." Theodosius Dobzhansky

"The most important scientific revolutions all include, as their only common feature, the dethronement of human arrogance from one pedestal after another of previous convictions about our centrality in the cosmos." Stephen Jay Gould

"Why has not anyone seen that fossils alone gave birth to a theory about the formation of the earth, that without them, no one would have ever dreamed that there were successive epochs in the formation of the globe." Georges Cuvier

"I want to find a voracious, small-minded [extinct] predator and name it after the IRS." Robert Bakker