

GEL 107 — Earth History: Paleobiology

Spring 2018

MWF 12:10 - 1:00 PM

1003 Giedt Hall

Instructor: Sandy Carlson, Rm. 2123 Earth & Physical Sciences Bldg; Telephone: 752-0350

e-mail: sjcarlson@ucdavis.edu **Office hours:** MWF 10:30 am - 11:30 pm, or by appointment.

Text (recommended): Introduction to Paleobiology and the Fossil Record

by Michael J. Benton and David A. T. Harper, 2009, Wiley-Blackwell. (Available at UCD Bookstore).

Text is *recommended* for GEL 107; *required* for GEL 107L.

Requirements: Midterm I (25%); Midterm II (25%); Essay (15%); Final exam (35% of grade).

<u>DATE</u>	<u>LECTURE</u>	<u>READING</u>
April 2	A1. What is paleobiology? And why should we care?	Ch. 1
April 4	A2. What is the fossil record? How can data be biased?	Ch. 3
April 6	B1. Geology and geological time	Ch. 3
April 9	B2. Biomineralization and paleobiogeochemistry	Ch. 2
April 11	B3. Taphonomy and fossil preservation	Ch. 2, 3
April 13	C1. Individuals, ontogeny, and populations	Ch. 5, 20
April 16	C2. Species, speciation, and phylogeny reconstruction	Ch. 5, 20
April 18	C3. The tree of life, the fossil record of life, and classification	Ch. 5, 20
April 20	D1. Adaptation and functional morphology	Ch. 6
April 23	MIDTERM EXAM I (on lectures A-C)	— — —
April 25	D2. Biomechanics: the physics of biology	Ch. 6
April 27	D3. Evolutionary functional morphology	Ch. 6
April 30	E1. Ecology and paleoecology	Ch. 4, 19
May 2	E2. Inferring paleoecology	Ch. 4
May 4	E3. Evolutionary paleoecology. QUESTION DUE	Ch. 4
May 7	F1. Biogeography and plate tectonics	Ch. 2
May 9	F2. Evolutionary paleobiogeography	Ch. 2
May 11	G1. Biostratigraphy and the stratigraphic record	Ch. 2
May 14	G2. Evolutionary biostratigraphy	Ch. 2
May 16	H1. Macroevolution: what is it?	Ch. 5
May 18	MIDTERM EXAM II (on lectures D-G)	— — —
May 21	H2. Rates of evolution and adaptive radiations	Ch. 20
May 23	H3. Origination and diversification	Ch. 8, 20
May 25	H4. Developmental biology and the fossil record	Ch. 6
May 28	Memorial Day – NO LECTURE	— — —
May 30	H5. Extinctions as perturbations. ESSAY DUE	Ch. 7
June 1	H6. Mass extinctions and recoveries	Ch. 7
June 4	H7. Macroevolutionary trends and patterns	Ch. 5, 20
June 6	H8. Big issues in paleobiology, and the future of the field	— — —
June 12	FINAL EXAM: 8:00 - 10:00 AM in 1003 Giedt Hall	

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 today?

Class format: The class is organized around a standard lecture format, but I strongly encourage you to interrupt me to ask questions in class, even though the class is pretty large. I show slides in lecture, so it is a very good idea to come to class regularly to see and hear just what the slides illustrate.

Expectations for class etiquette: When class begins, please stop your conversations. If you must arrive at class late or leave early, please do so as quietly and unobtrusively as possible. Cell phones must be turned off and put away during class. Please show respect for me and for fellow classmates and do not engage in disruptive behavior: whispering or talking to others, eating smelly food, or any other activity during lecture that would disturb others or interfere with the learning environment.

Reading: The book is available at the UCD Bookstore. Three copies of the book are on 2-hour reserve at Shields Library. 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 attending lecture regularly will ensure that you do not miss any relevant information. Check the course Canvas site often for brief lecture notes and slides, for announcements, and 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 true/false questions. The exams will be cumulative but will emphasize more the material covered since the previous exam. Under exceptional circumstances, I allow exams to be taken early (e.g., if three of your finals are scheduled for Tuesday, June 12). For the essay, you will send me a question of your own interest, related to paleobiology, and will then write a short essay of less than two double-spaced pages researching your question, citing three references. I will provide more information and guidance on the essay after the first midterm exam. I will have an option for a (very) small amount of extra credit as well.

Study habits: I strongly recommend that you attend lectures, read the book, and take notes during class. I will post some brief notes and slides on Canvas for each lecture, but they can't take the place of your own notes, taken during class. If you must miss a class, you should attempt to find out what you missed. 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 review session before each exam. I do not return exams but am happy to review your exam with you during my office hours. If you have questions, please come to my office hours or send me an e-mail message to schedule an appointment if you cannot come to office hours. I will make every effort to answer your questions within one day of their receipt.

GEL 107L: GEL 107L is a separate 2-unit laboratory course that can be taken concurrently with GEL 107. Mark DeBlois 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 hands-on study of major clades with a fossil record, with exercises relating to concepts we cover in GEL 107 lecture.

“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