

SW 291-History of Life on Earth

DePaul University
School for New Learning
Fall Quarter 2008

O'Hare
Campus

Tuesdays

9/16/08
-
11/18/08

6:30-9:30
PM

Faculty: Kevin F. Downing Ph.D.



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Note: E-mail is my primary means of communication with students. Phone messages will not be reviewed everyday.

Course Description: The study of fossils, the remains and traces of past living things, is essential for understanding and reconstructing the history of life on earth. Fossils provide us with critical information regarding the character and age of the most significant biological events in earth's history including the earliest forms of life, the pivotal development of multi-celled plants and animals, the rise, success, and demise of the dinosaurs, the diversification of the mammals, and the origins of our own species. In this course, you will explore how fossils and scientific reasoning are integrated to discern the complex history of life on earth. You will also evaluate the impact the discovery and recognition of earth's fossil record has had on society over the last several hundred years such as the position of humans among other species and the corresponding creation-evolution debate.

Learning Experience: The format for this course will be blended involving a mix of classroom, field and online learning experiences. Through field trips to fossil sites, museums, discussions, readings, lectures, labs, online resources, and original inquiry, you will be introduced to fossils and their critical role in deciphering the history of life. Subjects covered will include: fossil preservation, the importance of fossils for examining earth's age, the earth's ecological past; plant, invertebrate, and vertebrate fossils, dinosaurs; mass extinction, the origin of humans, and the evolution-creation controversy. Specific emphasis will be placed on relating ancient biodiversity patterns to current biodiversity concerns and the policy debate on intelligent design and evolution in schools.

Competencies offered:

Competence	Competence Statement
S-1-B	Can use public or private institutions as resources for learning science.
S-2-A	Can describe, differentiate, and explain form, function, and variation within biological systems.
S-2-C	Can describe, categorize and explain development or change within physical or biological systems.
S-3-D	Can use scientific knowledge to understand varying perspectives on a policy issue.
S-4	Can describe and explain connections among diverse aspects of nature.

Relationship of *Fossils and the History of Life* to the Competencies

The science of Paleobiology encompasses the study of the evolution of earth's biosphere over time as expressed in the fossil record. Topics and issues in Paleobiology provide a thorough foundation for accomplishing the competencies offered in this course and these relationships are summarized below.

S-1-B: Can use public or private institutions as resources for learning science. Museums and other institutions are the ultimate repositories of fossils unearthed by paleontologists. As such, these institutions can serve as special places to learn about science.

S-2-A: In order to understand the enormous variety and complex interactions of life on earth, paleobiologists collect, describe, and then differentiate fossils into groups. When this has been accomplished, the forms, function, and variation within the ancient biological world can be investigated. This course will examine how scientists determine the characteristics of past biodiversity and the corresponding evolutionary processes generating and extinguishing biodiversity on earth.

S-2-C: Core to understanding how earth's habitats have evolved their biotas is to discern the interactions and exchanges between organisms and their physical environments. This course will examine the dynamic character of earth's ancient ecology (paleoecology) including the paleoecology that promoted the human species.

S-3-D: The theory of evolution has been controversial for over a century and a half since Darwin and Wallace formulated it as an explanation of life's biodiversity. This course will look at the current context of the evolution-creation debate framed as "intelligent design".

S-4: The stability of life on planet earth depends on a great variety of interrelated factors such as climate, ecology, and natural resources. This course will examine the important interconnections of nature that have acted to promote diverse life forms and stable habitats for hundreds of millions of years on earth.

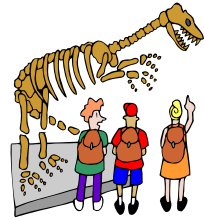
Course Goals:

General Outcomes: Upon successful completion of this course, all students are expected to have demonstrated:

- A basic working definition and knowledge of the science of paleobiology.
- An understanding of the historic connections between physical and biological factors governing earth's biodiversity.
- An understanding of the major trends and patterns of biodiversity through earth history.
- An understanding of humanity's evolution as expressed in the fossil record of primates.
- An ability to analyze information generated from scientific investigations in paleontology.
- An understanding of how institutions support the exploration and archiving of earth's biological history and serve as places of scientific learning.

Specific Learning Outcomes: Upon successful completion of the selected competence, a student will be able to:

S-1-B: Can use public or private institutions as resources for learning science. Students will visit a museum with paleobiological collections to learn about a fossil group.



S-2-A: Student will be able to describe, and differentiate the character of a fossil group of their choice (e.g., dinosaurs, plants, mammals.). When this has been accomplished the student will then assess the forms, function, and variation within this group.



S-2-C: Student will demonstrate an understanding of the basic principles of paleoecology as they provide a basis for understanding ancient biodiversity. Students will be able to apply paleoecological principles to explain the interactions and exchanges between living organisms and their physical environments through geological time.



S-3-D: Students undertaking this competency will examine both the scientific perspective of evolution as well as that advanced by supporters of intelligent design. This will be accomplished through the study of Darwin's theory as well as recent court cases involving the teaching of intelligent design in school systems



S-4: Student will be able to describe the interconnections of earth's past biodiversity to climate, extinction, evolution, and/or natural resources. For example, a student could address questions concerning the fossil record's support of the GAIA hypothesis.



Required Textbook:

Jean-Paul Tibbles (editor)	The Book of Life: An Illustrated History of the Evolution of Life on Earth, Second Edition (Paperback)	W. W. Norton & Company; 2nd edition (September 3, 2001)	Paperback: 256 pages	ISBN-10: 0393321568 ISBN-13: 978-0393321562
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Additional Useful Textbooks used by the Instructor:

Bringing Fossils To Life: An Introduction To Paleobiology

by [Donald R. Prothero](#)

- **Paperback:** 512 pages
- **Publisher:** McGraw-Hill Science/Engineering/Math; 2 edition (May 8, 2003)
- **ISBN:** 0073661708

History of Life

By [Richard Cowen](#)

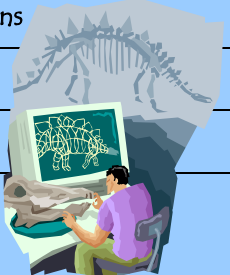
- Paperback, 324 pages
- Publication Date: September 2004
- Publisher: Blackwell Pub
- ISBN-10: 1405117567
ISBN-13: 9781405117562

(Additional Readings, Handouts, and/or Online Resources will be supplied in class)

Course Structure:

LEARNING STRATEGIES:

Each Session the instructor will introduce new concepts and examples through lecture and discussion. Students will be responsible for weekly readings and active participation in discussions. During most sessions, students will work in groups on laboratory exercises that apply the principles learned that session. Students will conduct independent research into a paleontology topic. Class will include:

Lectures/Blackboard Website and Discussions	Online Resources from institutions	
Discussions	Multimedia	
Readings (Text and Supplementary)	Original Inquiry	
Laboratory Exercises/Biological and Paleontological Specimens	Analysis of fossil sites. Paleontology Field Trips	
Institutions as Sources of Research and Learning: Outing to the Field Museum of Natural History or like institution.		

ASSESSMENT:

Biodiversity is a graded course. Your final grade in will be based on your progress towards completing the activities and deliverables listed below. You will be provided opportunities to improve your learning/scores through resubmission of work where a reasonable first attempt was made.

For all competencies, students need to demonstrate an understanding and application of concepts, theories and factual information concerning the science of Biodiversity, by successful completion of: 1) a practical examination (take-home), 2) a science-formatted Research Paper focusing on a paleontology issue in one or both of your competence areas, 3) a short (5-7 minutes) oral presentation of research findings, 4) participation in in-class lab exercises, 5) preparation for and participation in class discussions, and 6) participation in a field trip to a fossil site and natural history institution.

Evaluation Weighting:

1. Attendance/Participation		10%
2. 5 Lab Reports and 1 Virtual Field Trip Reports (2% each)		12%
3. Fossil Field Trip Participation and Report		12%
4. Museum Visit and Report		10%
5. Original research paper	a) written portion....	40%
	b) oral portion.....	5%
4. Take-home practical examination for respective competencies		16%

Anticipated Grading Scale

Grading Scale	Percentage	Verbal Descriptor
A	100-93%	Excellent
A-	92-90%	Very Good
B+ -> B-	89-80%	Good
C+ -> C-	79-70%	Average
D+ -> D-	69-60%	Weak (acceptable)
F	<60%	Unacceptable

ONLINE ACTIVITIES:

This course involves blended learning activities both onsite and offsite and will not meet every week. During those weeks, that the class does not meet on campus you will be responsible for contributing to the online discussion. Just as you are expected to attend a course scheduled to take place in a classroom, so you must attend to your online participation at least two times a week when class is not meeting. This is done by going to the Discussion Conference area on Blackboard to read what is written there and to contribute to the ongoing discussion. In some cases, you may be asked to post documents such as summary reports of fieldtrips.

For online and onsite discussions, the instructor uses the Rubric described by Pelz, 2004 summarized below. Take this into consideration as you participate online.

Discussion Rubric

Level	Interpretation	Character of the Contribution
4	Excellent	The comment is 1) accurate, 2) original, 3) relevant, 4) teaches us something, and 5) is well written. Four point comments add substantial teaching presence to a course and stimulate additional thought about the under discussion
3	Above Average	The comment lacks at least one of the above qualities, but is above average in quality. A level 3 comment makes a significant contribution to our understanding of the issue being discussed.
2	Average	The comment lacks two or three of the required qualities. Comments which are based on personal opinion or personal experience are often within this category.
1	Minimal	The comment presents little or no new information. However, level 1 comment may provide important social presence and contribute to a collegial atmosphere.
0	Unacceptable	The comment adds no value to the discussion.

Lab and Fieldtrip Report Rubric

Level	Interpretation	
4	Excellent	The report summarizes addresses and/or has the following qualities: 1) Your observations (what you observed and/or read about during your learning activity). 2) Specific examples of what you observed (e.g., species, habitats etc.) 3) How this learning helped you to gain a better understanding of the course topic. 4) The theories, principles and information reviewed. 5) and information is accurately communicated and report is well written.
3	Above Average	The report lacks at least one of the above qualities, but is above average in quality. A level 3 report demonstrates a strong understanding of the issue being discussed.
2	Average	The report lacks two or three of the required qualities. A level 2 report demonstrates a reasonable understanding of the issue being discussed.
1	Minimal	The report presents little evidence of the above qualities. A level 1 report demonstrates a nominal understanding of the issue being discussed.
0	Unacceptable	The report does not demonstrate understanding of the fieldtrip topics.

Research Paper Rubric

Level	Interpretation	
4	Excellent	Research question is original and relevant Paper adheres to the required scientific format Resources are scholarly and relevant Scholarly information is integrated and synthesized Citations were of proper format and used consistently Information is evaluated reasonably and critically Corresponding conclusions are consistent with preceding information and arguments Report is well written (grammar, flow and spelling)
3	Above Average	The paper lacks at least one of the above qualities, but is above average in quality. A level 3 report demonstrates a strong understanding of the issue being discussed.
2	Average	The paper lacks two or three of the required qualities. . A level 2 report demonstrates a reasonable understanding of the issue being discussed.
1	Minimal	The paper presents little evidence of the above qualities. A level 1 report demonstrates a nominal understanding of the issue being discussed.
0	Unacceptable	The paper does not demonstrate understanding of the topic.

ATTENDANCE POLICY

Attendance is mandatory and essential. Two or more sessions missed will result in a "fail" grade for this course, not an "incomplete". I should be notified of the circumstances for all absences prior to the class session or offsite activity. Each week's materials will be available at the course's website. It is ultimately your responsibility to obtain class materials for sessions missed and raise follow-up questions.. No graded work or handouts will be FAXed to students.

ACADEMIC INTEGRITY POLICY

I follow DePaul's policy on Academic Integrity on matters of student conduct including issues of plagiarism. (Please see the DePaul website and student handbook for details). Avoiding plagiarism is particularly important in this course because of the extensive use of other peoples research and ideas. The instructor may use the Turnitin® Website to evaluate whether your written work has characteristics of plagiarism.

ELECTRONIC SUBMISSIONS POLICY

It is acceptable to submit drafts of work as e-mail attachments. Submissions should be sent in the Word format and should not be sent as Zipped files. The final draft of your research paper must be turned in both as a hard copy and an electronic copy.

INCOMPLETE GRADE POLICY

Students are expected to finish the assignments of their courses in a timely manner. It is at the full discretion of the instructor whether a student shall be granted an incomplete grade with the possibility extended time for completion of class work. In order for a student to have an incomplete grade granted in this course, there must be a significant extenuating circumstance

evidenced by the student (typically medical). The student will need to initiate and file an SNL Incomplete grade contract before the end of the final session to receive an incomplete grade.



COURSE SCHEDULE

<i>Session</i>	<i>Topics</i>	<i>Reading Assignments</i>	<i>Written Assignments</i>
1 <i>Onsite</i>	<i>Scientific Reasoning</i> <i>Fossil Preservation</i> <i>Fossil Localities</i>		#1 LAB 1 Report: <i>What are Fossils? How do Fossils Form? = Taphonomy</i>
2 <i>Onsite</i>	<i>Biostratigraphy</i> <i>Geologic time</i>	<i>Life and Time</i> <i>p.1-36 in Tibbles</i> <i>Supplemental Material:</i> http://www.agiweb.org/news/evolution/index.html	#2 LAB 2 Report: <i>Stratigraphy and establishing the age and pattern of life's history</i>
3 <i>Offsite</i> <i>Field Trip</i> <i>Saturday</i> <i>9/27</i>	<i>Origin of life</i> <i>Species/Evolution</i> <i>Extinction</i>	<i>Life in Oceans</i> <i>p.37-65 in Tibbles</i> <i>Review Website:</i> http://evolution.berkeley.edu/evolibrary/article/evo_01	#3 Fieldtrip 1 Report: <i>Diversification and Extinction</i> #4 Turn in a Title & Brief Description for Original Research Paper. Send this by e-mail. #5 Contribute to Online Discussion Origin of Life
4 <i>Onsite</i>	<i>Relationships between Fossil Groups I</i> <i>Systematics</i>	<i>Rise of Vertebrates and Fish</i> <i>p.66-78 in Tibbles</i>	#6 LAB 3 Report: <i>Evolutionary Relationships</i>
5 <i>Online</i>	<i>Plants</i> <i>Functional Morphology: The relationship between changing environment and adaptation</i>	<i>Rise of Plants</i> <i>Review Website:</i> http://www.ucmp.berkeley.edu/plants/plantae.html <i>Intelligent Design I</i> <i>Slack p.1-108</i>	#7 Virtual Fieldtrip 1 Report: <i>Plants & Functional Morphology</i> #8 Contribute to Online Discussion of Functional Morphology

6 Onsite	<i>Paleoecology</i> <i>Biogeography</i>	<i>Four Feet: Amphibians & Reptiles</i> <i>p.79-126 in Tibbles</i>	#9 LAB 4: Paleoecology * Take-Home Practical handed-out.
7 Offsite Field Museum Fieldtrip	<i>Dinosaurs</i>	<i>Dinosaurs Rule</i> <i>p.127-168 in Tibbles 17</i> Intelligent Design II Slack p.109-208	#10 Museum Report: Dinosaur Paleobiology <i>Send this assignment by e-mail.</i>
8 Onsite	<i>Mammals</i>	Rise of Mammals <i>p.169-218 in Tibbles</i>	#11 LAB 5: Mammal Biodiversity and Adaptation
9 Online	<i>Human Origins</i>	<i>Primates</i> <i>p.218-251 in Tibbles</i> <i>Optional Supplementary Material:</i> <i>Judgment day videorecording: intelligent design on trial</i> <i>(On reserve at O'Hare)</i>	#12 Take-Home Practical due at beginning of class #13 Contribute to Online Discussion of Human Evolution & Intelligent Design
10 Onsite	<i>Course Summary and Research Presentations</i>		#14 *Student Presentations and Handouts*
			#15 Research Papers Due !