

Dinosaurs

GEOS 216

Fall 2019

Lecture

Tu & Th 12:30 – 1:45 PM

Harvill 150
([map](#))

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Why Dinosaurs Matter

Why study organisms that died out millions of years ago? Because it provides us perspective and understanding of our world today. By studying the fossil record, we begin to see ourselves as part of nature, connected across deep time to all other organisms past and present on Earth.

Dinosaurs were enormously successful animals and have much to teach us. They occupied a time



A *Tyrannosaurus rex* preying on a *Triceratops* at the National Museum of Natural History

span of more than 160 million years and inhabited all seven continents including polar regions. Dinosaurs were astoundingly adaptable and thriving before their sudden extinction. By asking and answering questions about dinosaurs help us better understand the evolution, and extinction of species through time. And it may even provide us clues about the future – how species adapt and evolve after catastrophic extinction events.

dinosaurs are related to other organisms in time and space. Second, we will examine the major groups of dinosaurs and the evolutionary relationships among them. Lastly, we will assess inferred dinosaurian behavior, physiology, functional morphology and extinction patterns from fossil evidence.

Course Description and Objectives

In this course, we explore dinosaurs and their evolution based on the fossil record

You will learn about what dinosaurs are and how to study them using scientific methods in three parts. First, we will discuss the history of dinosaur study, anatomy of dinosaurs, how to find and name dinosaurs and how

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Course Website: <https://d2l.arizona.edu/>

Required course Materials:

- **Dinosaurs: A concise Natural History. 3rd ed.** by D.E. Fastovsky and D. B. Weishampel, Cambridge University Press.
- **Turning Technologies clicker (supported devices: NXT, QT & QT2)** – available for purchase in the UA bookstore.

Expected Learning Outcomes

By the end of the semester, I would like each student in the course to be able to:

- Identify the major groups of dinosaurs and their primary attributes (anatomy, behavior, distribution, etc.).
- Interpret cladograms of evolutionary relationships among major groups of dinosaurs.
- Evaluate inferred dinosaurian behavior, biomechanics, physiology and extinction patterns from fossil evidence.

Clicker Registration

Clickers are interactive student response systems that allow you to participate and find out whether you understand a particular concept in class. Clickers also allow me to get a snapshot of whether most students in the class understand particular concepts. So the clickers are useful in helping you to learn and in helping me to teach more effectively. Thus, it is important that you remember to bring your clicker with you to class each day, and participate using your clicker throughout the class. **You will also use your clicker in exams.**

In order to receive credit for your clicker participation in quizzes and exams, you will need to **register your clicker device (no mobile app) on D2L prior to coming to the class on Tuesday, 8/27.** Please check D2L for detailed clicker registration instruction. The supported clicker devices in UA classrooms are NXT, QT and QT2 models - shown in the image below.

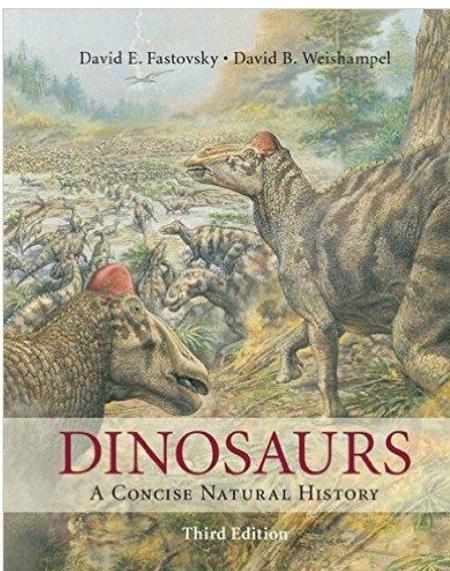


Suggestions and Tips on How to Succeed

Reading

There is one textbook for the course and I strongly recommend you to read the assigned chapter before coming to each class. Something hidden in the textbook will not appear in the exam without being mentioned during the class.

Dinosaurs: A concise Natural History. 3rd ed. by D.E. Fastovsky and D.B. Weishampel, Cambridge.



Lecture Slides

Each lecture starts with a list of questions that are answered during the lecture and in-class activities. These "lecture questions" occupy a high percentage of exam questions. The answers are not always simple, so it is essential to come to each class and write up your understanding of the answers. PDF files containing the lecture slides will be posted on D2L usually a day before the class is scheduled, but **they are not a substitute for coming to class or for taking your own notes.** My lecture slides are mostly images and key words to complement explanations that I will provide during the lectures. You can either print them off or download them on your laptop to annotate them with details from the lectures along the margins and study them for exams. If you miss classes or do not take your own notes, the lecture slides alone would not be helpful for you to understand what was covered in class. When you miss a class, come and see me during my office hours to ask questions about the missed class. **I do not have any written lecture notes.**

Expectation Agreement

As a student in GEOS216, you're expected to ...

- Bring yourself to every class and arrive to class on time prepared with reading, clicker, paper and pencil.
- Check D2L and email daily.
- Stay focused and ready to participate in class.
- Silence your cell phones and put them away before class begins.
- Use your laptop or tablet in class ONLY for taking notes or accessing relevant course material on D2L.

As your instructor, I will ...

- Come to class prepared and offer classes worth attending.
- Be available for my office hours and by appointment.
- Keep course website on D2L engaging and up-to-date.
- Assist you with finding additional support should you need it.
- Respond to your emails within 24 hours.

Pre-class Reading

It is well-established that pre-reading about upcoming topics improves students' performance in class and on exams. When you read ahead of time, you are more likely to understand the lecture and figure out what is important and what is not. Therefore, I strongly encourage you to read the assigned textbook chapter or posted reading on D2L and take the pre-class D2L quiz before coming to each class (**due by 11:30 AM on D2L**). The pre-class quizzes are designed to incentivize and guide the readings.

Clicker Quizzes

We will use clickers everyday to make the lectures more engaging and also to promote active learning environments. There will be several multiple choice clicker questions in every lecture. These questions can range from simple recall questions, conceptual understanding, and critical thinking questions. Students can use clicker questions as both formative and summative assessment to monitor their own learning. And I can use them to respond student learning needs. In order to earn **full credit**, you need to **answer at least 60% of the questions correctly**.

In-class Activities

We will do in-class activities in groups of up to four students every day. Most activities will include problem solving questions based on data – charts and graphs. Others will be based on reading a short article and/or watching a video clip followed by answering and discussing a few questions in groups. A few activities will be based on hands-on experiments. Please bring writing tool – pencil or pen to every class. There will be exam questions from activities. So keep them organized.

Grading Overview

Item	Percentage
Pre-class D2L Quizzes	20% (drop 5 lowest items)
Clicker Quizzes	10% (drop 5 lowest items)
In-class Activities	10% (drop 5 lowest items)
Mesozoic Madness Project	10%
Exams	50% (drop one lowest exam)
Total possible	100%

Grade Distribution: To earn an A in the class you must earn at least 90%. **No exceptions.** Your final grade for the course is based on the following total scores:

≥ 90% = A 89.99 - 80% = B 79.99 - 70% = C 69.99 - 60% = D below 60% = E

Class Policies & Conduct

You have chosen to participate in this class. I want you to be clear on why you are here and what you hope to get out of class. Please refrain from disruptive conversation with people sitting around you during lecture. **Students observed engaging in disruptive activity will be asked to leave the classroom** and will be reported to the Dean of Students. I will drop several grade items at the end of the semester – **you can miss up to five D2L quizzes, five clicker quizzes, five in-class activities, and one exam due to emergency or illness and not lose any points.**

Exams

Four exams will be given this semester (see schedule on page four). Three are midterms and one is a cumulative final exam. Your three highest exam score will count and we **drop one lowest scored exam**. Your final exam can be your dropped exam. There are **no make-ups (no exceptions!)** on exams as we drop one exam grade. Please plan ahead for all exams and plan your travel accordingly. Exams will be given in multiple-choice, true/false, match-up and short-answer format and draw heavily from lectures, in-class assignments, and quizzes.

Mesozoic Madness Project

Inspired by the NCAA College Basketball March Madness Championship Tournament, Mesozoic Madness is a game-based learning, a tournament of competition among dinosaurs and other magnificent Mesozoic species based on fossil evidence and scientific studies. Details of the project is posted on D2L and will be explain in class. The success of this project will depend on your participation. The learning goal of this project is to educate participants about dinosaur paleoecology - interspecies interactions and more.

Tentative Course Schedule

Date	Lecture Topic	Reading	D2L Quiz (due by 11:30 AM)
T 8/27	Introduction: what are dinosaurs?	Syllabus	#1 Due
Th 8/29	The Science of Uncovering the Past	Part I	#2 Due
T 9/3	Digging Up Dinosaurs: how are dinosaur fossils discovered and collected?	Ch. 1	#3 Due
Th 9/5	History of Dinosaur Study: dinosaur hunters Mesozoic Madness Project Part I Due (honors only)	Ch. 15	#4 Due
T 9/10	Dinosaurs and Deep Time: how old is that dinosaur?	Ch. 2	#5 Due
Th 9/12	Introduction to Dinosaur Skeletons	D2L	#6 Due
T 9/17	Taxonomy & Species: how do we name dinosaurs?	D2L	#7 Due
Th 9/19	Phylogeny: dinosaur relationships Mesozoic Madness Project Part II Due (honors only)	Ch. 3	#8 Due
T 9/24	Life on Land before the Dinosaurs	Ch. 4 & 5	#9 Due
Th 9/26	Exam 1	-----	-----
T 10/1	Thyreophorans: the armor-bearers	Ch. 10	#10 Due
Th 10/3	Marginocephalia: all about the head Mesozoic Madness Project Part III Due (honors only)	Ch. 11	#11 Due
T 10/8	Ornithopoda: mighty Mesozoic masticators Mesozoic Madness Bracket Opens	Ch. 12	#12 Due
Th 10/10	Sauropodomorpha: the big, bizarre, and the majestic	Ch. 9	#13 Due
T 10/15	Theropoda I: nature red in tooth and claw	Ch. 6	#14 Due
Th 10/17	Theropoda II: tyrant kings and feathered dinosaurs	Ch. 7	#15 Due
T 10/22	Theropoda III: the origin of birds	Ch. 8	#16 Due
Th 10/24	Exam 2	-----	-----
T 10/29	Dragons of the Sky: pterosaurs Mesozoic Madness Bracket Due	-----	-----
Th 10/31	Dragons of the Sea: marine reptiles	-----	-----
T 11/5	The Worlds of Dinosaurs: moving plates and changing worlds	Ch. 2 & 14	#17 Due
Th 11/7	Dinosaur Physiology: were dinosaurs warm-blooded?	Ch. 13	#18 Due
T 11/12	Dinosaur Families and Growth	Ch. 13	#19 Due
Th 11/14	Dinosaurs at the Olympics: dinosaur biomechanics	-----	-----
T 11/19	Through the Eyes of Dinosaurs: brains and senses	-----	-----
Th 11/21	The Extinction of Dinosaurs	Ch. 16	#20 Due (last quiz)
T 11/26	Thanksgiving recess (no class)	-----	-----
Th 11/28	Thanksgiving recess (no class)	-----	-----
T 12/3	Bringing Back Dinosaurs: molecular paleontology	-----	-----
Th 12/5	Conclusion and Review	-----	-----
T 12/10	Exam 3	-----	-----
W 12/18	Final Exam (1:00 – 3:00 PM)	-----	-----

NOTICE: The information contained in this course syllabus may be subject to change with reasonable advance notice, as deemed appropriate by the instructor. Check the syllabus and calendar regularly on D2L as changes will be updated.

The date and time of the final exam along with Final Exam Regulations can be found at:
<http://www.registrar.arizona.edu/schedules/finals.htm>

Absence and Class Participation Policy

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance in all lectures is strongly suggested and greatly benefit your learning. However, **if you do not plan on participating fully, please do not come** – you will be a distraction to those who are in class to learn. Please arrive on time and stay for the full class period.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at:

<http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.). Students are asked to refrain from disruptive conversations with people sitting around them during lecture. **Students observed engaging in disruptive activity will be asked to leave the classroom.**

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>.

UA Nondiscrimination and Anti-Harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Help & Resources

If you are feeling lost or overwhelmed ...

1. Come and see me
You are welcome to drop by during my office hours when you need help. You can also email me, or make an appointment to meet during my office hours or other times that work for both of us. Many questions and issues can be easily resolved this way.

2. Visit the Think Tank
Think Tank on UA campus offers free drop-in tutoring, review sessions, or private scheduled tutoring for a fee. They are located in Bear Down Gymnasium;

Email: sls-thinktank@email.arizona.edu,
Phone: (520) 626-0530

See the website for details:
<http://thinktank.arizona.edu/>

Copyright

Students are prohibited from selling course materials including lecture slides, assignments, quizzes, additional materials posted on D2L course website, and being paid to take lecture notes without the express written permission of the instructor. Violations of this prohibition will be treated as violations of the University Academic Integrity and will result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct violations for misuse of student email addresses. This conduct may also constitute copyright infringement.