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## Dinosaurs!

GEOL 4103W / 7584/ 7594, Spring 2008

T 5:30-8:00 PM

Calloway 205

**Instructor:** Dr. Phil Novack-Gottshall

**E-mail:** pnovackg@westga.edu

**Office:** Calloway G1

**Office hours:** M/W 3:15-5, Tu 11-2 & 4-5,  
or by appointment

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### Course description

This course is a multidisciplinary investigation into the morphology, classification and identification of the dinosaurs; the environmental, climatic, and geographic conditions on earth during the time of the dinosaurs; and the biological principles involved in understanding the origin, evolution, and extinction of the dinosaurs.

### Learning objectives

- 1) Explain what a dinosaur is, and identify the major lineages of dinosaurs through study of their anatomy and diversity.
- 2) Understand how scientists use dinosaur fossils to infer ecological, physiological, and behavioral characteristics.
- 3) Explain basic evolutionary mechanisms that have been important in the diversification of dinosaurs.
- 4) Evaluate the creative and destructive consequences of mass extinctions.
- 5) Critique current controversies in dinosaur paleontology, including body temperature, relationship with birds, and reproduction.
- 6) Describe the Mesozoic worlds in which dinosaurs lived, including climate, continental arrangement, and other biological inhabitants.
- 7) Describe several ways in which dinosaur fossils have been interpreted throughout human history.
- 8) Practice the skills of reading and writing scientific prose and developing original scientific hypotheses through researching a dinosaur genus.

### Textbooks

- 1) Fastovsky, D.E. and D.B. Weishampel. 2005. *The Evolution and Extinction of the Dinosaurs*. 2<sup>nd</sup> ed. Cambridge University Press, NYC.
- 2) *Dinosaurs Course Packet* (Required; available at bookstore).

### A note on my office hours

The best teachers of science are those who remain active in their scientific research. In order to succeed in both arenas, I reserve Fridays as my research day. Thus, I will not be available to meet with you on Fridays except for exceptional circumstances. You are still welcome to e-mail me with questions and concerns during this time, and I will make every effort to respond in a timely manner. However, an e-mail response cannot be guaranteed until the weekend. On other days, you are welcome to call me on campus, stop by when the door is open, or e-mail me. **I do not accept phone calls at my home.**

Grading policies	%	WAC component*
Exam #1 (Feb. 26)	25%	I.B
Exam #2 (Apr. 15)	25%	I.B
Understanding Science Writing (Mar. 11)	10%	I.C
Thinking Like A Paleontologist Paper	25%	
I. Ann. bibliography & summary (Feb. 12)	( 5%)	I.C
II. Preliminary research proposal (Apr. 1)	( 5%)	I.C
III. Final research paper (By April 30)	(15%)	II
In-class and take-home activities	10%	I.B
Participation	5%	

\* - See WAC key below.

### *Exams*

Exams (on Feb. 26 and Apr. 15) will consist of a mix of multiple choice, fill-in-the-blank, short answer, and a single essay question. They are not explicitly cumulative, although later material will build from earlier material. Exams will require much thinking and writing on your part. They will last one hour and we will have a regular class activity after each exam. Exams only cover material from lecture. There is no final exam in this course; the final paper will serve as your final exam.

### *Understanding Science Writing*

Science is communicated in the primary literature, primarily journals. These are technical presentations of original findings and ideas that most people outside the intended scientific audience find challenging to read. To help you learn to understand science writing, you will read one recent article that presents some notable but controversial idea concerning dinosaurs. I will provide this article during the semester. Your assignment, worth 10% of your grade, will be to (1) read the article and (2) write a journalistic news summary explaining the discovery and its wider implications to a lay audience. Besides helping you comprehend science writing, this assignment will help you understand the role of data in scientific knowledge and how scientific arguments are structured, and help you convey complex information in a succinct manner. This assignment is due **March 11**.

### *Thinking Like A Paleontologist Paper*

Although most people find dinosaurs eminently more exciting than when they normally think about science, paleontology is still science. This semester-long project will help you develop as both a dinosaur paleontologist and a scientist in general. You will become an expert on some genus of dinosaur, investigating how humans came to discover it, what fossil material is known today, and our current understanding of its anatomy, evolution, ecology, and behavior. To do this, you will need to turn to the primary literature. You will then use this information to develop a currently unanswered hypothesis related to your genus and develop a protocol for finding out such information. In other words, you will propose a way that paleontologists might answer some current question about your dinosaur genus. Possible questions might be: Was Genus A warm-blooded or cold-blooded? Why did Genus X have feathers? Did Genus C

hunt in packs? You will not have to answer this question for this paper; just explain how a paleontologist (possibly you in the future!) might go about answering this question. What information would you need to answer it? How might you go about collecting this data? How might you interpret possible outcomes?

Your grade for this project will be based on the following three components. The first part of this research project, due **Feb. 12** and worth 5%, consists of an annotated bibliography of relevant literature (at least five primary articles) and a one-page, typed summary of our knowledge of your dinosaur genus. By **Apr. 1** (and worth 5%), you will propose what currently unanswered question you could answer with this genus, give some background on why this is an important and appropriate question for this genus, and sketch out a preliminary method to answer it. This part should be at least one typed page in length and include a Works Cited section. The final paper, due by Wednesday, **April 30** (the last day of classes at UWG) and worth 15%, presents your final research proposal, including a succinct introduction of your research topic (including relevant background), a presentation of what methods and materials are needed to address the question, and a discussion of possible findings (and what these outcomes would lead you to conclude about your genus and about dinosaurs in general). This final paper should be 4-5 pages in length and cite at least five articles from the primary literature.

#### *In-class and take-home activities*

Throughout the term, you will be asked to do short assignments in class or at home. These assignments may take any of several forms, including short writing assignments, answering questions, class discussion/debate, participation in activities, etc. Some assignments will be turned in over WebCT; others will be due in class. You must be present in class in order to receive credit for in-class assignments. I will give you an evaluation of 2, 1, or 0 for each assignment based on my determination of your thoughtful participation. You must be in class to earn credit for the in-class activities; make-ups are not possible. You may miss one in-class and one take-home assignment without penalty; after that, you will receive a zero for any missed assignment.

#### *Attendance and participation*

Because this class is relatively small and thrives on discussion, it is critical that you come to every class. I will take attendance at random times throughout the semester. Regular attendance and participation will give you full credit (worth 5% of your overall grade); regular absences and indifference will not. Appropriate participation includes attentiveness, participation in class discussions, respectful behavior, and courteousness to your peers.

I maintain the right to add pop quizzes or other in-class activities if I feel it would help remind you of your responsibility to attend and participate in class.

### ***Lateness and missed exams***

Lateness is to be avoided. Exams will not be made up; they will receive 0%. I will deduct 10% per day (not class!) for all late papers (except weekends). For take-home assignments, I will deduct 1 point per class. You may not make-up in-class activities. If you expect a scheduling conflict, please see me in advance so we can make alternative arrangements.

### ***Extra credit fieldtrip***

We will have an optional Saturday field trip to Fernbank Museum in Atlanta. There will be a written assignment to fill out while you are there. You can earn up to 5% extra credit by doing this assignment. If you are unable to attend the field trip led by me, you can still go by yourself, give a self-guided tour, and do the written assignment.

### ***A note on Writing Across The Curriculum (WAC):***

This is a WAC course and can satisfy one of your two required 3000/4000 WAC courses. Because critical thinking, careful reading, and thoughtful writing are essential skills for educated people to possess, this syllabus and its coursework and policies apply equally whether or not you need WAC credit. If you have already fulfilled your WAC requirements, you might consider strongly taking two additional WAC courses to earn a WAC certificate on your transcript; contact the WAC program for details.

The following key explains how the various course activities above fulfill WAC requirements:

#### ***Group I (Writing to learn) activities:***

I.A – Journal/notebook writing

I.B – Informal writing activities

I.C – Discipline-specific tech. writing

#### ***Group II (Writing to communicate) activities:***

II – Formal writing assignment

### ***A note to graduate students***

This course is intended to fit the dual needs of an advanced undergraduate science elective and a graduate course, primarily for those interested in science education. Those wishing to receive graduate credit for this course will need to do additional work, appropriate to their own disciplinary interests. Please see me for details of what this entails.

### ***A final caveat***

Your professor is not capricious, but he reserves the right to alter this syllabus, class policies, or the class schedule to best accommodate the needs of the class. If such a change is needed, you will be given sufficient and timely notice, as well as the ability to contest or contribute to the alterations thereof.

## Lecture Schedule

<i>Date</i>	<i>Topics</i>	<i>Readings*</i>
Jan. 15	What is a dinosaur? A geological context for the dinosaurs: the Earth & rocks	Pp. 3-5
Jan. 22	Time, tectonics, & the Mesozoic world Vertebrate biodiversity	Ch. 2 & pp. 63-69
Jan. 29	Evolution: evidence, mechanisms, speciation, & extinction Vertebrate anatomy (or, why you resemble a dinosaur)	Pp. 69-78
Feb. 5	Portrait of a dinosaur ( <i>Iguanodon</i> ) Fossils: taphonomy, body fossils, & trace fossils	Pp. 5-20 & 211
Feb. 12	Phylogenetic relationships Archosaur origin and radiation: overview of Dinosauria <b>Annotated bibliography and summary due</b>	Ch. 3 & pp. 79-106, 222-226
Feb. 19	Theropoda I: early theropods, allosaurs, & tyrannosaurs Theropoda II: ornithomimids, dromaeosaurs, & oviraptors	Ch. 12
Feb. 26	<b>EXAM #1 (During first hour)</b> Dinosaur CSI: Bringing dinosaurs to life	
Mar. 4	Taking flight: feathered dinosaurs, <i>Archaeopteryx</i> , toothed birds, & avian origins	Ch. 13 & 14
Mar. 11	Sauropodomorpha: prosauropods & sauropods Dinosaur biomechanics: Coping with large body size <b>Understanding Science Writing paper due</b>	Ch. 11
Mar. 18	<b>No class (Spring Break)</b>	
Mar. 25	Thyreophora: stegosaurs & ankylosaurs & dino defense Dinosaur diets: carnivory & herbivory	Ch. 6 & 7 & pp. 111-113, 135-137, 150-151, 167-169, 192-197, 240-243, 270-282
Apr. 1	Ornithopoda: basal groups, iguanodonts, & hadrosaurs Dinosaur physiology & body temperature <b>Preliminary research proposal due</b>	Ch. 10 & 15
Apr. 8	Marginocephalia: pachycephalosaurs & ceratopsians Dino sex: mating displays, nesting, & rearing juveniles	Ch. 8 & 9 & pp. 117, 151-157, 170-177, 197-205 & 244-248, 282-284
Apr. 15	<b>EXAM #2 (During first hour)</b> Dinosaur hunters: a brief history of dinosaur paleontology	Pp. 123-130, 142-145, 160-162, 181-184, 211-218 & 233-234, 257-264, 290-298
Apr. 22	Dinosaur relatives: Pterosaurs & swimming reptiles of the Mesozoic	
Apr. 29	Dinosaur relatives: mammals & human origins The End-Cretaceous mass extinction: facts & theories	Ch. 18 & peruse ch. 17
May 6	<b>No class—Final research paper due by April 30</b>	

\* All readings are from Fastovsky and Weishampel (2005). There may also be additional readings throughout the semester.