

SYLLABUS
DINOSAURS AND THEIR RELATIVES
EAS-E114, SECTION 36863, 3 CREDIT HOURS
FALL SEMESTER 2022

GEOLOGICAL SCIENCES BUILDING ROOM GY 1045
11:30 AM – 12:45 PM TUESDAY AND THURSDAY
MODE OF INSTRUCTION: IN PERSON

INSTRUCTOR: Dr. Claudia C. Johnson

Office Phone: 855-0646; claudia@indiana.edu Please add E114 to email subject line.

OFFICE HOURS: Monday, 2:30-3:15 pm and by appointment.

OBJECTIVES OF THE COURSE: The objectives of the course are to increase your understanding of three major themes: a) origin and evolution of vertebrates, including dinosaurs and their distant relatives the fish, amphibians, amniotes, and birds; b) geography and climate of the Earth during the evolution of these groups but especially during the time of the dinosaurs and birds; and, c) dinosaur classification, phylogeny, evolution, paleobiology, paleoecology and extinction. Through lecture presentations, homework readings, and in-lecture exercises you will gain an increased awareness of successful evolutionary pathways, as well as mass extinction events that occurred through the dynamic history of our planet.

STUDENT LEARNING OUTCOMES:

I. *In this course you will acquire tools to model and understand the physical and natural world.*

After learning mechanisms of sea floor spreading, you will be able to interpret ancient greenhouse climates, and predict the distribution of plants and herbivorous dinosaurs across the globe.

II. *You will acquire skills in the collection and interpretation of data, in critical thinking, and in theoretically based inquiry.*

From data on dinosaur teeth, jaws, skeletal structure, and body size, you will be able to interpret dinosaur diet, and develop models for dinosaur endothermic or ectothermic metabolism.

III. *In this course you will learn to solve problems.*

Did you wonder how fast a dinosaur could move? You will learn to calculate dinosaur weight and stride length, and determine dinosaur speed for the large, herbivorous sauropods and the smaller, carnivorous theropods.

IV. *Through the semester you will acquire analytical and quantitative skills allowing you to become informed, active participants in society.*

You will practice making and interpreting line charts and histograms, you will be introduced to and practice your knowledge on the difference between fact and inference (e.g., dinosaur nests are factual; dinosaur behavior is inferential), and you will compare and contrast modern and extinct animal morphologies so you can look at skeletal structures of dinosaurs in museums with new insight.

V. *By the end of the semester, you will be confident in your use of the scientific method*

because you will be introduced to this method at the outset of the course and will use it throughout the semester in your dinosaur evaluations.

E114 CARRIES CREDIT FOR: IUB GenEd N&M, Nat. Science; & COLL (CASE) N&M Breadth of Inquiry

STUDENT PREPARATION: The objectives of the course will be achieved if you remember facts, understand the meaning of material presented, apply your knowledge to solving geologic problems, and analyze topics by breaking them down and understanding the relationship among the parts. You will have practice in each of these steps during the lectures.

Your ultimate goal is to gain skills necessary to synthesize and evaluate information pertaining to dinosaurs and their distant relatives long after the course has been completed.

MATERIALS: Assigned readings are from your required text and postings to Canvas.

Required Text: DINOSAURS, A Concise Natural History, **4th Edition**, 2021 Cambridge University Press. Authors: D. E. Fastovsky and D. B. Weishampel, with Illustrations by John Sibbick

NOTE: We will use the **4th Edition**, not the 3rd. The 4th has the figures we will use in lecture, and it has the information from which your exam questions will be taken.

CLASS HOURS:

Lectures are Tuesday and Thursday, 11:30am – 12:45pm.

You are required to attend 2 lectures per week.

GRADES:

Exam 1	20%
Exam 2	20%
Final Exam	30%
In-lecture exercises	30%

Each lecture exam is comprehensive and includes material presented from the beginning of the semester.

In cases of illness and a missed lecture, refer to Canvas for the lecture powerpoint.

If you are having trouble keeping up in the class, please speak with Dr. Johnson.

FINAL GRADE DISTRIBUTION: A=90-100; B=80-89; C=70-79; D=60-69; F=59 & lower.

Marks of + and - will be added to the letter grades as follows (- assigned to 0, 1, 2; + assigned to grades of 7, 8, or 9; e.g., 87%=B+, 61%=D-; 74%=C). **Class grades are not curved.**

LECTURE TOPICS

VERSION FOR 8/18/22

Aug. 23 Lecture 1: Overview of lecture topics; course requirements; intro of Associate Instructors. What is a dinosaur, and what isn't a dinosaur? BE SMART, Season 8, Ep 14, 8 min <https://www.pbs.org/video/what-is-a-dinosaur-and-what-isnt-a-dinosaur-xnqx5p/> Assignment: Preface; Chapters 1 and 16

25 Lecture 2: Course themes, semester threads, and the process of fossilization An illustrated history of dinosaurs. PSB EONS Episode 13 min <https://www.youtube.com/watch?v=JDnQmBFxIfE> Assignment: Textbook Chapter 2

30 Lecture 3: When Dinosaurs Roamed America (DVD)

Sept. 1 Lecture 4: Dinosaur groupings based on pelvic structure Dinosaurs 101 National Geographic, 4 minutes. <https://education.nationalgeographic.org/resource/dinosaurs-101> Assignment: Pages 95-97, 113-115, 211-214, 243-246

6 Lecture 5: Cladograms and hypothesis testing, and a reminder on evolution Assignment: Chapters 3 and 4

8 Lecture 6: Building animals, characteristics of vertebrates, and a bit on a predatory bite. Assignment: Chapters 3 and 4

13 Lecture 7: Evolution of fish - how did the earliest fish bite? Pre-exam questions. Assignment: review lecture notes

15 Lecture 8: Focus on fish forms and finish our foray into fossils of fish. Assignment: review lecture notes

*20 Lecture 9: Evolution of amphibians: oldest, modern, and structural changes in the history of the group. Your inner fish (DVD). Assignment: review lecture notes and Chapter 4

*22 Lecture 10: Amphibians to reptiles: - a major break from water for the amniotes. Assignment: review lecture notes

27 Lecture 11: Major amniote groups, including the group to which dinosaurs belong; Overview of exam materials including tetrapod and amniote cladograms

Sept. 29 Exam 1

Oct. 4 Lecture 12: Herbivorous and carnivorous dinosaurs - feeding habits of the big beasts Assignment: Chapters 6 and 9, and pages 243-252, 296-303, 322-329

6 Lecture 13: Herbivory and carnivory, continued. Assignment: Chapters 6 and 9, and pages 243-252, 296-303, 322-329

*11 Lecture 14: Dinosaur thermoregulation, from large babies to the biggest of beasts Assignment: Chapter 14

13 Lecture 15: Dinosaur social behavior – who made music and who rammed heads? Dinosaur eggs and nests and investment in parental care. Assignment: Relevant parts of Chapters 10, 11 and 12, and as guided by lecture information and slides

18 Lecture 16: The time the dinosaurs roamed the land - what did the land look like so long ago? Assignment: Chapter 2 revisited

20 Lecture 17: Biological evolution of dinosaur groups – putting it all together

25 Lecture 18: Dinosaur body and trace fossils: in-class exercise *How dinosaurs coupled up*. EONS Season 4, Episode 12; 8 min <https://www.pbs.org/video/how-dinosaurs-coupled-up-knepg5/>

27 Lecture 19: Earliest evolution of plants - when did food for the herbivorous dinosaurs evolve? Antarctic Dinosaurs (DVD) *Assignment: Chapter 15*

Nov. 1 Lecture 20: Evolution of more plant food for the HUGE dinosaurs, or, in scientific jargon: Evolutionary history of vascular land plants *Assignment: Chapter 15 and review notes*

3 Lecture 21: The age of the flowering plants: using plants as environmental indicators
Review of topics for Exam 2

Nov. 8 Exam 2 - comprehensive from the beginning of the semester

10 Lecture 22: Characteristics and success of birds/avian dinosaurs, and their relation to terrestrial dinosaurs *Assignment: Chapter 5, p. 105-109, Chapter 7*

15 Lecture 23: Dinosaur and bird cladograms, and mysteries of feathered reptiles unveiled *Assignment: Chapters 7 and 8*

17 Lecture 24: Feathers! Who had them, when did they originate, and what were they used for? *Assignment: Chapter 8*

Nov. 22 THANKSGIVING BREAK – no class meeting

24 THANKSGIVING BREAK – no class meeting

29 Lecture 25: What is a dinosaur? Reptiles that are not dinosaurs: are they still around today? *Where are all the medium sized dinosaurs? EONS Season 4, Ep 4, 11min.*
<https://www.pbs.org/video/where-are-all-the-medium-sized-dinosaurs-2fwjwj/>
Assignment: Chapter 5

Dec. 1 Lecture 26: Bizarre Dinosaurs: how did these crazy forms function?!? (DVD)

6 Lecture 27: The Cretaceous-Paleogene mass extinction: A giant meteorite impact, and more.... *Assignment: Chapter 17*

8 Lecture 28: Semester review of *Dinosaurs and Their Relatives* during this last class period

Dec. 15 FINAL EXAM: 12:40-2:40 p.m., Thurs., December 15

Final Exam is Comprehensive. Everyone must take final exam, worth 30% of total grade.

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Code of Student Rights, Responsibilities, and Conduct

<http://www.iu.edu/~code/>

Academic Integrity: As a student at IU, you are expected to adhere to the standards detailed in the [*Code of Student Rights, Responsibilities, and Conduct*](#) (Code). Academic misconduct is defined as any activity that tends to undermine the academic integrity of the institution. Violations include: cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic dishonesty. When you submit an assignment with your name on it, you are signifying that the work contained therein is yours, unless otherwise cited or referenced. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged. All suspected violations

of the Code will be reported to the Dean of Students and handled according to University policies. Sanctions for academic misconduct may include a failing grade on the assignment, reduction in your final course grade, and a failing grade in the course, among other possibilities. If you are unsure about the expectations for completing an assignment or taking a test or exam, be sure to seek clarification from your instructor in advance.

Each time you have an exam, please remember that you agreed to the conditions in the **Code of Student Rights, Responsibilities, and Conduct**.

Note Selling: Several commercial services have approached students regarding selling class notes/study guides to their classmates. Selling the instructor's notes/study guides in this course is not permitted. Violations of this policy will be reported to the Dean of Students as academic misconduct (violation of course rules). Sanctions for academic misconduct may include a failing grade on the assignment for which the notes/study guides are being sold, a reduction in your final course grade, or a failing grade in the course, among other possibilities. Additionally, you should know that selling a faculty member's notes/study guides individually or on behalf of one of these services using IU email, or via Canvas may also constitute a violation of IU information technology and IU intellectual property policies; additional consequences may result.

Reporting Bias Incidents: "As your instructor, one of my responsibilities is to create a positive learning environment for all students. Bias incidents (events or comments that target an individual or group based on age, color, religion, disability, race, ethnicity, national origin, sex, gender, gender identity, sexual orientation, marital status or veteran status) are not appropriate in our classroom or on campus. What should you do if you witness or experience a bias incident? See it? Hear it? Report it by submitting a report online biasincident.indiana.edu or calling the Dean of Students Office (812-855-8187)."

Counseling and Psychological Services: For information about services offered to students by CAPS: <http://healthcenter.indiana.edu/counseling/index.shtml>.

Disability Services for Students (DSS): "Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.) You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; Captions and alternate media for print materials may take three or more weeks to get produced. Please contact Disability Services for Students at <http://disabilityservices.indiana.edu> or 812-855-7578 as soon as possible if accommodations are needed. The office is located on the third floor, west tower, of the Wells Library, Room W302. Walk-ins are welcome 8 AM to 5 PM, Monday through Friday. You can also locate a variety of campus resources for students and visitors that need assistance at: <http://www.iu.edu/~ada/index.shtml> "

Sexual Misconduct and Title IX: *As your instructor, one of my responsibilities is to create a positive learning environment for all students. Title IX and IU's Sexual Misconduct Policy prohibit sexual misconduct in any form, including sexual harassment, sexual assault, stalking, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help.*

If you are seeking help and would like to speak to someone confidentially, you can make an appointment with:

The Sexual Assault Crisis Services (SACS) at (812) 855-8900 (counseling services)

Confidential Victim Advocates (CVA) at (812) 856-2469 (advocacy and advice services)

IU Health Center at (812) 855-4011 (health and medical services)

It is also important that you know that Title IX and University policy require me to share any information brought to my attention about potential sexual misconduct, with the campus Deputy

Title IX Coordinator or IU's Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist.

I encourage you to visit <http://stopsexualviolence.iu.edu> to learn more.