

SPRING 2023: VERTEBRATE PALEONTOLOGY: FOSSIL RECORD AND EVOLUTION OF VERTEBRATES
GLY 6932/4930 section 1446/1445; ZOO 6927/4926 section 7V45/7V44

Instructors:

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Credits: 3

Lecture: Tuesday/Thursday 9:35 am – 11:30 am (Periods 3-4), CRR 0221 (with virtual option)

Maximum enrollment: 10 students

Office hours: By Appointment

Synopsis of course content

This course is designed as a detailed overview of the fossil record of vertebrates, focusing on recent discoveries, current controversies, and relevance to Florida. Course will also provide the opportunity for direct experience with vertebrate paleontology fieldwork in Florida.

Students learning objectives, include to:

1. Advance understand the foundation content of the science of vertebrate paleontology (VP);
2. Gain appreciation of the contributions of UF to VP; and (3) Understand the practice of VP.

Course portal and communication

All course materials will be enabled using UF's CANVAS; hybrid format, with in person and videoconferencing done using Zoom.

Grades will be based on the following (out of 100 total % pts):

I. Lecture and Discussions: 50% of grade)

Midterm exam: Covers all course material covered in lectures (including assigned readings) up through **the mid-term** Both the midterm and final are "take-home," open-notes. (20%).

Final exam: This will cover all course material covered in Lectures (including assigned readings) from **the midterm** through end of course; take-home, open notes (20%)

Participation Based on attendance and participation in class and discussions (10%)

II. Research Project: (20% of grade): **Students will choose a topic (and turn in an abstract) for their oral or poster presentation on last day of class**

Oral Presentation: A 12-minute talk or poster designed to be given at a professional meeting (e.g., GSA or SVP). For graduate students, presentation of original research is strongly encouraged. An in-depth summary and analysis of the literature for a future research project may also be accepted (with instructor's approval). For

undergraduates it should be focused on a presentation on topic relevant to the course. (150 pts).

III. Labs (8, 20%)

IV. Field trips (3; 10%)

Hybrid learning environment, will include:

Classes with synchronous content delivered by instructors and guests and student-led discussions of readings, virtual labs, or other assignments (e.g., videos). Participants may elect to attend in-person, or via videoconferencing.

Both exams are take-home, open notes; meaning that you may consult your notes, but not other resources. The purpose of this is to encourage you to take complete notes.

Laboratories will be either in-person or self-directed learning, TBD.

Asynchronous (“homework”) will include readings, web-based learning, selected media, and self-directed laboratories.

Textbook: *Vertebrate Paleontology* (2014), By Michael J. Benton 4th edition (Wiley-Blackwell). **Other readings** (articles from primary literature and book chapters) will also be required and made available, as needed.

Field trips

Three potential “field “ trips are scheduled for the semester. These are planned to introduce the science of vertebrate paleontology and the specific resources and activities of our VP program at UF and the Florida Museum of Natural History.

#1. **Fossil exhibits at the FLMNH.** This will be a field trip to the FLMNH, located in the UF Cultural Plaza on the west edge of campus (Hull Road). We will lead this field trip in small groups.

Tentative date and time: September 12 (or 19), 9 to 10 am (and 10 to 11 am, if needed) meet at Powell Hall, Hull Road, UF campus. (BJM)

#2. **Tour behind the scenes of VP** research and collection facilities, Dickinson Hall, UF Campus.

Saturday, 17 October 2020, 9 to 10 am (JIB & BJM)

#3. **Montbrook fossil site**, see an active field collecting site in Levy County, on one Saturday during the semester, TBD (JIB). Either in place of, or in addition to the Montbrook site, another field trip may be scheduled to Thomas Farm (BJM).

Labs

Eight labs will be held during the semester, as indicated on the schedule below. These will typically be on Fridays and may be either in-person (4 times) and or at-home labs (4 times).

Extra credit

Students will receive 2% points each (1) for attending and writing a one-page synopsis of a seminar that they attended outside of the class schedule, but or relevance to this course; and/or (2) a day digging at the Montbrook fossil site. (4% points total possible)

Schedule (Please Note: lecture topics are *subject to change*; T = Tuesday; Th = Thursday):

- Jan**
- 10 (T) Lecture 1 (JIB & BJM) *Introduction, evolutionary relationships and phylogenetics, nature of vertebrate fossils, VP at UF* (Benton, Ch. 2; MacFadden 2018, Big Bone Lick video).
 - 12 (Th) Lecture 2 (BJM) *Origins of vertebrates, jawless fishes, origin of jaws, and gnathostomes* (Benton, Ch. 1; Ch. 3.1-3.6; York & McCauley 2020; Brazeau & Friedman 2015).
 - 17 (T) Lecture 3 (BJM) *Fish evolution and diversity* (Benton, (Ch. 3.7-3.11; Ch. 7; Lauder 2015; Martill 2008); **LAB 1 Fishes (due 1/19)**
 - 19 (Th) Lecture 4 (BJM) *Tetrapod origins, invasion of land* (Ch. 4) Shubin video; article TBD
 - 24 (T) Lecture 5 (BJM) *Amniotes, anapsids, synapsids, diapsids & others* (Ch. 5.1-5.6)
 - 26 (Th) Field trip (BJM) Tour of fossil exhibits at FLMNH (logistics TBD); **LAB 2 Tetrapods (due 1/31)**
 - 31 (T) Lecture 6 (BJM) *Permo-Triassic extinction* (Benton Ch. 5.7; other readings)
- Feb**
- 2 (Th) Lecture 7 (JIB) *Beginning the age of dinosaurs: Triassic vertebrates* (Benton, Ch. 6; other readings)
 - 7 (T) Lecture 8 (JIB) *Non-dinosaur Mesozoic reptiles* (Benton, Ch. 8.6-8.10; other readings)
 - 9 (Th) Lecture 9 (JIB) *Evolution of Dinosaurs* (Benton, Ch. 8.1-8.5) **LAB 3 Archosaurs (due 2/14)**
 - 14 (T) Tour (JIB) *behind-the-scenes in VP Collection, Dickinson;*
 - 16 (Th) Lecture 10 (JIB) *Origins and Evolution of Birds* (Benton, Ch. 9; other readings)
 - 21 (T) Lecture 11 (JIB) *Mesozoic Mammals* (Benton, Ch. 10.1-10.3, other reading)
 - 23 (Th) Lecture 12 (JIB) *Cretaceous-Paleogene Mass extinction* (Benton 8.11, other readings)
Take-home (open notes) ****Midterm Exam**** -- distributed Feb 23 , **due Monday, Feb 27**)
 - 28 (T) Lecture 13 (JIB) *Cenozoic mammal diversification and mammalian phylogeny* (Benton Ch. 10.4-10.8)
- Mar**
- 2 (Th) Lecture 14 (JIB) *PETM, Eocene mammals and the origin of modern orders* (Ch. 10.9-10.13, 11.1-11.2; other readings) **LAB 4 Introduction to Mammals (due 3/7)**
 - 7 (T) Lecture 15 (BJM) *Afrotheria* (Benton Ch. 10.7).
 - 9 (Th) Lecture 16 (BJM) *Artiodactyla & Cetacea* (Benton, Ch. 10.10). *Project abstracts due*
Mar 11 through 18th—UF Spring Break
 - 21 (T) Lecture 17 (BJM) *Perissodactyla* (Benton, Ch. 10.11.2-4)
 - 23 (Th) **Lab 5 Ungulates (due in class)**
 - 28 (T) Lecture 18 (JIB) *Insectivores and Bats* (Benton, Ch. 10.9; 10.11.1; other readings)
 - 30 (Th) Lecture 19 (JIB) *Carnivora* (Benton, Ch. 10.11.5-6; other readings); **Lab 6 Carnivora (due 4/4)**
- Apr**
- 4 (T) Lecture 20 (JIB) *Glires: Rodents & Lagomorphs* (Benton, Ch. 10.12; other readings)
 - 6 (Th) Lecture 21 (JIB) *Euarchonta: The Origin of Primates* (Benton, Ch. 10.13; Ch. 11); **Lab 7 Primates and their relatives (due 4/11)**
 - 11 (T) Lecture 22 (BJM) *Marsupials* (Benton, Ch. 10.5; 10.6.2; other readings)
 - 13 (Th) Lecture 23 (BJM) *South American mammals & GABI* (10.6, other reading);
 - 18 (T) Lecture 24 (BJM) *Pleistocene Extinctions* (10.14, other reading) **LAB 8 SA Mammals (due 4/20)**
 - 20 (Th) Class presentations
 - 25 (T) *Overview and synthesis of Vertebrate Paleontology*
Take-home ****Final Exam**** -- distributed 25 April, **due Monday, May 1st**)