# DINOSAURS - ERTH 2401 – Course Syllabus for Fall 2023

**INSTRUCTOR:** Dr. Michael Ryan (MichaelJ.Ryan@carleton.ca). You can learn more about your instructor at dinoresearch.wordpress.com. Note that Dr. Ryan does not have an on-campus office.

**TEACHING ASSISTANTS:** Your TAs are Caelan Libke, Léa Veine Tonizz, Trystan Warnock-Juteau, Bruna de Carvalho, and Dana Korneisel. You have been assigned a TA based on the first letter(s) of your last name (see below). Please contact your assigned TA first before you try to contact any of the other TAs. If you cannot reach a TA, please contact your instructor.

**A to Dh:** Caelan Libke (CAELANLIBKE@cmail.carleton.ca)
**Di to Ling:** Léa Veine Tonizzo (LEAVEINETONIZZO@cmail.carleton.ca)
**Linh to Rig:** Trystan Warnock-Juteau (TrystanWarnockJuteau@cmail.carleton.ca)
**Rih to Tha:** Bruna de Carvalho (brunaborbadecarvalho@cmail.carleton.ca)
**Thb to Z:** Dana Korneisel (DanaKorneisel@cmail.carleton.ca)

**OFFICE HOURS:** Your instructor's office hours are by appointment Tuesday and Thursday, 1:00 pm to 2:00 pm. Office Hours for the Teaching Assistants are also by appointment, time and dates to be determined; please consult Brightspace for this information. Please contact us by e-mail to set up an appointment and you will be sent a zoom link. Note that some TAs have offices on campus and may be available for in-person meetings.

**QUESTIONS ABOUT THE COURSE:** Questions about the course or the lecture material should be emailed to your course instructor or your assigned TA. E-mailed questions will be responded to within 24 hours. Note that e-mails will typically only be responded to between 9:00 am to 5:00 pm EST/EDT, Monday to Friday.

**BRIGHTSPACE:** The course will be delivered synchronously on-line through Brightspace. If you have difficulties connecting to Brightspace, please resolve these issues with the university (https://carleton.ca/its).

Please access the weekly lectures through the Zoom link in the Brightspace module 'Lecture and Office Hours Zoom Meetings Links'. If you try to open the link using your personal Zoom account, you will need the password: ERTH2401

**COURSE ACCOMADATIONS:** If you require an accomodation for the course these must be registered with the Paul Menton Centre (PMC) for Students with Disabilities (https://carleton.ca/pmc/) who will provide you with a letter of accomodation. If you have been granted a letter of accomodation please inform your instructor by email, as the PMC does automatically do this.

If you require a note taker for the course you are encouraged to try to locate one yourself as the PMC does not do this. If you inform me of your need for a notetaker, I will send a notification to the students in the course, but one cannot be guaranteed for you.

**LECTURES:** ERTH 2401 will have two 80 minute lectures each week, Tuesday and Thursday from 14:35 pm to 15:55 pm EDT/EST beginning on Thursday, Sept 7, 2023. The last lecture will be on Thursday, Dec. 7th, 2023. The lectures will be presented live unless otherwise indicated. The lectures will be recorded and posted to the course Brightspace site later the same day. Your instructor will also release any prerecorded content and the PowerPoint presentations for the week's lectures at the start of each week.

**LECTURE ZOOM LINKS:** A recurring Zoom link for the lectures will be embedded into the Brightspace course page before the start of the course.

**ADDITIONAL NON-LECTURE MATERIAL:** Please note that some lectures will have additional pre-recorded components or links to outside, on-line sources that will also be part of the course examination material. These materials will be listed at the start of each lecture and indicated with the Brightspace module for each lecture. Please use caution in opening outside links.

**WEEKLY CLASS ANOUNCEMENTS:** At the start of each week your instructor will send out an e-mail through the Brightspace class list outlying the content of that week's lectures and any changes from the course syllabus, as well as reminding you about upcoming quizzes and midterms. During classes when a guest lecture is presenting live, their lecture will typically start at the beginning of the class and instructor's lecture for that class (if any) will be prerecorded.

**REQUIRED TEXTBOOK:** The course textbook is: D.E. Fastovsky and D.B. Weishampel, 2021. *Dinosaurs, A Concise Natural History* (4th Edition). Cambridge University Press (ISBN 978-1-108-46929-6 (paperback); (ISBN 978-1-108-47594-5 (hardback). <u>This textbook is mandatory for the course.</u> Digital and hard copies of the textbook are available from the university bookstore.

Earlier editions of the textbook may still be available, but be aware that some information in those editions will be out of date.

## QUIZZES, MIDTERMS AND THE FINAL EXAM

## NOTE THAT ALL QUIZZES, MIDTERMS AND THE FINAL EXAM WILL BE OPEN BOOK.

Examination material for the course will be derived from the 4th edition textbook (see information on QUIZZES below) and the lectures (both your instructor and the guest lecturers), and any additional pre-recorded or on-line material posted to Brightspace that is designated as examination material.

**GRADING:** There will be five (5) quizzes and two (2) midterm exams during the term, and a final exam scheduled by the university after classes have finished.

The quizzes and midterms are *non-cumulative*. The quizzes, midterms and final exam will be taken on-line through Brightspace.

If you would like to review your quiz or midterm, please contact your TA.

**QUIZZES:** There will be a total of five (5) quizzes in the course; two before the first midterm, two before the second midterm and one before the final exam. Each quiz will be worth 3% (out of 100%) of the final course grade for a total of 15% of your final grade.

*Quiz Content and Format*: Each quiz will be based on a specific textbook chapter or chapters (see course schedule below). All quizzes will consist of five (5) true or false and five (5) multiple choice questions.

*Quiz Length:* You will have 60 minutes in which to write each quiz. Once you begin a quiz you cannot close the quiz and restart it. You will not be able to answer questions or modify questions after 60 minutes (or whatever timeframe your accommodation registered through the Paul Menton Centre for Students with Disabilities is set for, if you have one).

WHEN YOU HAVE FINISHED YOUR QUIZ BE SURE TO HIT THE SUBMIT BUTTON TO SUBMIT THE QUIZ. If you forget to do this, <u>don't panic</u>. Contact your TA and they will override the system and submit your quiz manually.

*Quiz Timeframe*: You will have five days in which to write each quiz. The examination window for each quiz will open on Monday at 12:01 am EST the week of the quiz and will close Friday at 11.59 pm EST at the end of that week. Please consult the schedule in this syllabus for the exact date for each quiz and the specific chapter(s) that will be covered on it.

<u>Missed quizzes cannot be rescheduled or made up, so plan you schedule accordingly.</u>

**MIDTERMS:**

Midterm 1: 25%, 80 minutes. Thursday, Oct 5, 2023, 14:30 – 16:00 EDT (covers lectures 1 to 7)
Midterm 2: 25%, 80 minutes. Thursday, Nov 9, 2023, 14:30 – 16:00 EST (covers lectures 8 to 15)

Midterms are scheduled for 80 minutes (the length of a regular class timeslot) and will replace a lecture on the date of the midterm. The midterm will typically consist of approximately 40 questions: 20 multiple choice and 20 true & false questions, and one short answer question (to be answered with short statements or bullet points).

Each midterm will be taken within the regular 80 minute timeslot for the course (2:35 pm to 3:55 pm).

If you have a time accomodation for the course, please contact your TA who will add this to Brightspace for you. Note that your time accommodation will result in your midterm running beyond the scheduled class time window, so you will need to make arrangements if this causes a conflict with something else in your schedule. Please note that your midterm cannot be rescheduled for a different date, or a different time on the date of the midterm.

Once you begin a midterm, you cannot close the midterm and restart it. You will not be able to answer questions or modify questions after the 80 minutes have elapsed (or whatever timeframe your accommodation registered through the Paul Menton Centre for Students with Disabilities is set for, if you have one).

WHEN YOU HAVE FINISHED YOUR EXAM BE SURE TO HIT THE SUBMIT BUTTON TO SUBMIT THE EXAM. If you forget to do this, don't panic. Contact your TA and they can override the system and submit your exam manually.

**MISSING A MIDTERM:** Valid excuses for missing a midterm and scheduling a make-up exam include, but are not limited to, a medical issue or a death in the family, and must be documented with the appropriate a medical certificate or self declaration form (https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf). You must contact your instructor within 24 hours of a missed midterm to inform them that you are requesting a make-up exam and will be providing the appropriate documentation; otherwise you will not be eligible for a make-up exam.

If you are informing your instructor of a medical issue as your reason for missing a midterm DO NOT e-mail me photos of the issue.

The make-up midterm must be taken within one week of the missed scheduled midterm.

**FINAL EXAM:** Final Exam: 35%, 2 hours TBA (covers lectures 15 to 23).

The final exam is scheduled for two (2) hours and will consist of 30 multiple choice and 30 true & false questions; there will be no short answer questions on the final exam. The Registrar's office will schedule the time and date of your final exam; your instructor has no say in the scheduling.

**MISSED OR DEFERRED FINAL EXAM:** If you miss the final exam or require a deferral of the final exam for any reason, be aware that you must contact the Registrar's Office. Your instructor cannot arrange for deferred exams; only the Registrar's Office can do this.

**EXTRA CREDIT:** Due to the size of the course there will NOT be optional extra assignments.

**BE AWARE THAT YOU HAVE ENROLLED IN ERTH 2401 KNOWING THE TIME AND DATE WHEN THE COURSE IS SCHEDULED AND ARE THEREFORE EXPECTED TO BE AVAILABLE DURING THAT SCHEDULED TIMESLOT.**

## COURSE OBJECTIVES

1. Identify the major events in the evolution of dinosaurs. (Remembering and Understanding)
2. Explain the importance of fossils for palaeoenvironmental interpretations. (Remembering)
3. Explain the position of dinosaurs in the evolutionary history of life and their development throughout the Mesozoic Era, including extinction theories. (Remembering, Analyzing and Understanding)
4. Distinguish dinosaurs according to the characters of fossil remains. (Remembering and Understanding)
5. Analyze dinosaur intraspecific and interspecific behaviour through time. (Remembering and Understanding)
6. Analyze dinosaur palaeobiology for each major group. (Remembering and Understanding)
7. Describe the non-dinosaur flora and fauna of the Mesozoic. (Remembering and Understanding).
8. Explain the importance of dinosaurs in culture and as a tool for educating about science. (Understanding)

## LEARNING OUTCOMES

By the end of this course, students will be able to:
1. Recall the anatomy of dinosaurs.
2. Describe and evaluate patterns of relationships between major dinosaur groups.
3. Describe key evolutionary events in the origin and radiation of dinosaurs.
4. Describe the inferred biology and behaviour of dinosaurs.

## LECTURE TOPICS AND DATES

The lectures are derived from, but diverge at times from, the textbook, and some lectures are not covered in the textbook. The relevant chapters for each lecture (where appropriate) will be stated at the start of each lecture, although only portions of some chapters may be covered in some lectures (chapter numbers follow the 2021 edition of the textbook). By the end of the course we will have covered almost the entire textbook, so reading ahead is encouraged and will help those of you without a strong background in biology and geology.

The lectures will be delivered synchronously during the scheduled course hours, Tuesday and Thursday, 14:35-15:55 Eastern Time Zone (EDT/EST). These lectures will be simultaneously recorded and posted on-line after the class. The instructor's PowerPoint slides for each lecture will also be posted to Brightspace.

In addition to the lectures, some classes will feature a guest speaker (occasionally supplanting the instructor's lecture) lecturing on the subject material for that class, but focusing on their

area of expertise. These guest speakers will be acknowledged experts in their research fields, and unless otherwise indicated, these lectures will also be covered in the exams. Whenever possible the PowerPoint presentation from the guest lecturer will be posted to Brightspace.

Whenever possible, these guest lecturers will present live to class, but due to time zone differences or other commitments, some of these presentations may be pre-recorded. Please note that some guest lecturers have yet to be determined at the time this syllabus is being written.

Before the first class of each week, I will send out an e-mail announcement informing students who the guest lecturer(s), if any, will be for the week along with a short bio or link for each person. Any changes from this syllabus for that week will also be noted in the e-mail announcement.

Please note that each lecture should be viewed and understood before proceeding to the next lecture. Each lecture will assume an understanding of the preceding lectures.

## LECTURE OUTLINES:

*Note that lecture topics are subject to change, with some sub-sections possibly being deleted or moved to another lecture slot for time considerations.*

**Lecture 1 (Sept. 7): Introduction & Objectives: A Brief History of Life**: Course Introduction and Overview; review of geological time & a brief review of the history of life; How to dig up a dinosaur. **From the textbook: Part 1; Chapter 1, p 13-25; Chapter 2, p 33-39; Chapter 15, p 400-412**

**Lecture 2: (Sept. 12): Fossils, Fossilization, Sedimentology & Stratigraphy:** What is a fossil? How do fossils form? The science of sedimentology and stratigraphy – how we determine the age of fossils? **From the textbook: Chapter 1, p 8-12; Chapter 2, p 28-33**

**Lecture 3 (Sept 14): The Life of A Dinosaur Hunter:** World famous dinosaur palaeontologist and *Jurassic Park* movie consultant, Dr. Jack Horner, will present a lecture on his career and research. **Non-textbook lecture.**

**Lecture 4 (Sept. 19): Evolution and Phylogenetics:** Review of evolution; What is a species? Phylogenetic systematics; Cladograms and how they are constructed. **From the textbook: Chapter 3**

**QUIZ #1 (CHAPTERS 1 &2) 3% [Sept 18-Sept 22]**

**Lecture 5 (Sept. 21: Chordate Evolution & Skeletal Anatomy:** Vertebrate anatomy; overview of chordate evolution leading up to the clade Dinosauromorpha and the key features of each major group. **From the textbook: Chapter 4, p. 66-79**

**QUIZ # 2 (Chapter 3) 3% [Sept 25 – Sept 29]**

**Lecture 6 (Sept 26): Archosauromorpha to the Earliest Dinosaurs:** Picking up from lecture 5, we expand on some of the important steps in tetrapod evolution and introduce the earliest dinosaurs. **From the textbook: Chapter 4, p. 79-85; Chapter 5**

**Lecture 7 (Sept 28): Theropoda 1:** Tetanurae. **From the textbook: Part II; Chapter 6; Chapter 7, p. 152-158**

**OCT 3 (Tuesday), 14:35 – 15:55 PM EDT, MIDTERM #1 (COVERING LECTURES 1 - 7 ONLY); 80 MINUTES; 25%**

**Lecture 8 (Oct 5): Theropoda 2:** Introduction to Coelosauria. Tyrannosauridae and *T.rex;* Ornithomimids. **From the textbook: Chapter 7, p. 158-167**

**Lecture 9 (Oct. 10): Maniraptora & the Origin of Birds:** Maniraptora; oviraptors; feathers, wings and the origin of flight. Spotlight on the bat-wing dinosaur, *Yi qi* from China. **From the textbook: Chapter 7, p. 167-178; Chapter 8**

**Lecture 10 (Oct. 12): Sauropodomorpha:** Origin and biology of sauropods. **From the textbook: Chapter 9**

**QUIZ #3 (CHAPTERS 8 & 9) 3% [Oct 16-Oct 20]**

**Lecture 11 (Oct. 17): Basal Ornithischia & Thyreophora:** Thyreophora origins; ankylosaurs and stegosaurs. **From the textbook: Part III; Chapter 10**

**Lecture 12 (Oct. 19): Marginocephalia:** Pachycephalosauria and Ceratopsia. **From the textbook: Chapter 11; Chapter 6, p. 140-141**

**FALL BREAK OCT. 23 – 27, NO LECTURES.** Your instructor typically hosts an on-line movie night during Reading Week where we watch an old dinosaur movie – date, time and film to be determined. This movie night is non-mandatory and offered as way for the class to interact in an informal setting. Guest commentators will include Hollywood special effects artist, Andreas Feix (Jurassic World, The Mandalorian), and a writer/artist/film historian, Stephen Bissette. Note that this event will only occur if a minimum number of students commit to attending.

**Lecture 13 (Oct. 31): Ornithopoda:** Basal ornithopods; Hadrosauridae. **From the textbook: Chapter 12**

**QUIZ # 4 (Part III, Chapter 10) 3% [Oct 30-Nov 3]**

**Lecture 14 (Nov 2): Palaeohistology & Dinosaur Biology:** Guest lecture on dinosaur palaeohistology by Dr. Mateus Wosik; **From the textbook: Part IV, Chapters 13.**

**Lecture 15 (Nov. 7): Dinosaur Metabolism & Behaviour:** Endothermy vs. ectothermy; How do we infer dinosaur behaviour? **From the textbook: Chapter 14.**

**NOV. 9 (Thursday, 14:35 – 15:55 PM EST, MIDTERM #2 (COVERING LECTURES 8 - 14 ONLY), 80 MINUTES; 25%**

**Lecture 16 (Nov. 14): Exploration and Discovery:** Early history of palaeontology. **From the textbook: Chapter 16**

**Lecture 17 (Nov. 16): Taphonomy:** The study of how dinosaurs died and became incorporated into the fossil record. Guest lecture by Dr. Ray Rogers. **Non-textbook Lecture**

**QUIZ #5 (Chapter 16) 3% [Nov 20-Nov 24]**

**Lecture 18 (Nov. 21): Palaeoecology:** Cretaceous palaeoecology. Guest lecture by Dr. Jordan Mallon. **Chapter 15 from the textbook.**

**Lecture 19 (Nov. 23): Dinosaur Palaeobiogeography** - who was where when. **From the textbook: Chapter 15, p. 394-400.**

**Lecture 20 (Nov. 28): Dinosaurs Around The World:** Dr. Matt Lamanna on the dinosaurs from South America. **Non-Textbook Lecture.**

**Lecture 21 (Nov. 30): The End of the Dinosaurs?** Dinosaurs at the end of the Cretaceous. **From the textbook: Chapter 17**

**Lecture 22 (Dec. 5): Dinosaurs, Science & Culture:** Industrial Light & Magic SFX artist Andreas Feix joins Dr. Ryan to discuss how science has influenced the public's understanding of dinosaurs through popular culture. How much science is actually in those *Jurassic Park* movies? **Non-textbook lecture**

**Lecture 23 (Dec. 7): The Palaeontology of Star Wars.** Guest lecture by archaeologist Dr. David West Reynolds (former George Lucas colleague & NY Times bestselling author of the *Star Wars Visual Dictionaries*) on finding the 'Krayt Dragon' in Tunisia with Dr. Ryan. **Non-textbook lecture**

**FINAL EXAM: TBA, (covering lectures 15 -23 only), 2 hours; 35%**

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## REQUESTS FOR ACADEMIC ACCOMMODATION

Carleton is committed to providing academic accessibility for all individuals.
Please review this link for the processes the processes for academic accommodation requests: https://students.carleton.ca/course-outline. This link includes information regarding addressing Human Rights Concerns and accommodations for pregnancy obligations, religious obligations, academic accommodations for students with disabilities, survivors of sexual violence, and accommodations for student activities.

For more information on academic accommodation, please contact the Earth Sciences departmental administrator.

## EXAM ACCOMMODATIONS FOR PAUL MENTON CENTRE FOR STUDENTS WITH DISABILITIES (PMC) VIA VENTUS

Carleton University now uses Ventus as its academic accommodation management system, Ventus. Ventus provides students with more control over their accommodations on a per-course and per-test basis, and creates an improved user experience for students and faculty with real-time data in one shared web location. Students can request and manage their academic accommodations via the Ventus Student Portal: https://ventus.carleton.ca/student. More information on using Ventus, can be found on VentusHelp: https://carleton.ca/ventushelp.

## ACADEMIC INTEGRITY

The University demands, unequivocally, academic integrity from all of its members, including students. Misconduct in scholarly activity will not be tolerated. The integrity of a student's academic work is critical to enabling student success. Students who violate the principles of academic integrity undermine the quality of their education and the value of a Carleton University degree.

Plagiarism and other forms of misconduct will not be tolerated. It is the student's responsibility to read and understand the university's Academic Integrity Policy which is available here: https://students.carleton.ca/services/academic-integrity