

Course Syllabus: Earth Science 2266G- Dinosaur and Other Vertebrate Evolution

Lecture: Mondays, Wednesdays, Fridays → 9:30-10:30am, AHB-1B06
0.5 Course, 3 lecture hours per week

Instructor: Stephanie Mabee, PhD Candidate
E-mail: smabee2@uwo.ca
Office Hours: TBA

Teaching Assistant: Jordan Siewnarine, E-mail: jsiewnar@uwo.ca

Course Website: PowerPoint slides and other course materials available online through <http://owl.uwo.ca>

Prerequisites: Completion of first-year requirements and registration in an Earth Sciences, Biology, Kinesiology, Anthropology module or written special permission from your Dean.

Course Description: Introduction to the fossil record that documents the major steps in vertebrate evolution, including the origin, radiation, and mass extinction of fishes, basal tetrapods (amphibians), basal amniotes (reptiles, mammal-like reptiles, and dinosaurs), birds, and mammals.

Learning Outcomes: Upon successful completion of this course, students will be able to:

- describe the basic morphological characteristics of major vertebrate groups in terms of evolution, including the addition or modification of characters that would mark the transition from an ancestral to a descendant group
- explain the hypotheses and controversies concerning the origin of some major vertebrate groups, such as the origin of chordates, vertebrates, tetrapods, birds, and mammals
- use fossil data to explain the patterns, processes, and controlling factors of biological evolution at the species level (e.g. Darwinian evolution) and at the faunal level (e.g. mass extinctions and recoveries)

Lecture Schedule:

Week 1 **Introduction to biodiversity, bones and the origin of chordates.**
Geological time scale, phylogenetics and ancient environments. Fossil evidence of the oldest chordates. The vertebrate bauplan and vertebrate diversity in the context of overall biodiversity. Evolutionary significance of jaws, teeth, vertebrae, bony fins and lungs

- Week 2 **Fishes: Jawless and early jawed fishes**
Evolution and radiation of agnatha and gnathostomes, jaw formation hypotheses
- Week 3 **SHARK WEEK**
Evolutionary path of Chondrichthyes with a focus on subclass Neoselaches
- Week 4 **Bony fish and basal tetrapods**
Examining walking limbs and lungs, leading to the invasion of land by vertebrates
- Weeks 5-6 **Archosaurs**
Internal fertilization, amniotic egg, and body scales enabled reptiles to conquer land on a grand scale. Dinosaurs' rule of land and conquering of air, and giant marine reptiles of sea. Rise and fall of mammal-like reptiles (proto-mammals). Vertebrate paleobiogeography and plate tectonics
***Note: Midterm exam held Week 6- Wednesday February 13th in class**
- Week 7 **Reading Week (no class)**
- Week 8 **Feathered dinosaurs and origin of birds**
Feathered dinosaurs, pre-adaptation, and the origin and radiation of birds.
- Week 9 **Rise of mammals**
Early diversification of monotreme, marsupial, and placental mammals. Examples of plate tectonics and parallel evolution.
- Weeks 10-11 **Diversification of mammals**
Examples of adaptive radiation and environmental change: rodents and rabbits, carnivores, marine mammals, horses, and elephants
- Week 12 **Primate and hominid evolution**
Stereovision and opposable thumb in arboreal mode of life; global cooling and shrinking forest; origin of hominids.

Marks Distribution

Mid-term Exam	30%
Final Exam	40%
Quizzes	10%
Essay	20%

Exams

The midterm examination will occur on **Wednesday February 13th, 2019** at 9:30am and include course material up until the Monday of Week 6. The exam will be 50 minutes

and be held during lecture time. If the midterm exam is missed for a valid reason, please contact myself, Stephanie, directly and submit appropriate documentation. A make-up exam will be provided and expected to be written within two weeks of the midterm exam.

The final three-hour exam will be written, short answer and cumulative but mostly focusing the second half of the course. This will take place during the end of semester exam period, with date and location to be announced once available. If you miss the final exam, you must contact the Registrar's Office to write a make-up exam.

Quizzes

Short quizzes (e.g. a few short answer or multiple choice questions) will be given at random throughout lectures to help you to assess your understanding of course material and encourage you to attend class.

Day Trip

A day trip will be held in mid-March to the Royal Ontario Museum, Toronto to study vertebrate fossils on display. Students will complete an assignment (counts towards participation mark) at the museum and submit it one week after the day trip.

Essay

An essay on various aspects of vertebrate evolution (a list of suggested topics and other details TBA in class) **due in class on Friday March 22, 2019.**

Note: All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Recommended Text:

Benton, M. J. 2005. Vertebrate Palaeontology (3rd Edition or newer). Blackwell Publishing, Oxford, UK.

Accommodation and Accessibility:

Note that if documentation (medical or otherwise) is required, it can only be collected by the student's Dean's Office/Academic Counselling unit.

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be

obtained from the Dean's Office immediately. For further information please see:
<http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here:
https://studentservices.uwo.ca/secure/medical_document.pdf.

For further information, please consult the university's medical illness policy at
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

If you miss the Final Exam, please contact the Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

Academic Policies:

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf. This includes, but is not limited to, plagiarism and/or cheating.

It is required by Western University to include the following statement on plagiarism on all course outlines: "Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar)."

Support Services:

Please contact myself, Stephanie Mabee, if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations.

The policy on Accommodation for Students with Disabilities can be found here:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.