

EARTH SCIENCES 2266G
DINOSAUR AND OTHER VERTEBRATE EVOLUTION

Instructor: Jisuo Jin, Professor (BGS Rm 0180; Phone: 519-661-4061; e-mail: jjin@uwo.ca).

Course Description: Introduction to the fossil record that documents the major steps in vertebrate evolution, such as 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).

Prerequisites: Completion of first-year requirements and registration in an Earth Sciences, Biology, Kinesiology, or Anthropology module.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

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

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Academic Offences: 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/handbook/appeals/scholoff.pdf>.

Lectures (Mon. Wed. Fri. 9:30-10:30AM, P&AB-34)

- Week 1 **Introduction to biodiversity and the origin of chordates.**
Geological time scale, fossilization, and ancient environments. Fossil evidence of the oldest chordates. The vertebrate bauplan and vertebrate diversity in the context of overall biodiversity.
- Week 2-3 **Fishes: armours, jaws, and internal skeletal structures**
Evolutionary significance of jaws, teeth, vertebrae, bony fins, and lungs.
- Week 4 **Amphibians: walking limbs and lungs**
Walking limbs and lungs set the stage for invasion of land by vertebrates.
- Week 5-7 **Dinosaurs and other reptiles: conquerors of land, water, and air**
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.
- Week 8 **Feathered dinosaurs and the origin of birds**
Feathered dinosaurs, pre-adaptation, and the origin and radiation of birds.
- Week 9 **Rise of the mammals**
Early diversification of monotreme, marsupial, and placental mammals. Examples of plate tectonics and parallel evolution.
- Week 10-11 **The great diversification of mammals**
Examples of adaptive radiation and environmental change: rodents and rabbits, carnivores, marine mammals, horses, and elephants.
- Week 12-13 **Primates and hominid evolution**
Stereovision and opposable thumb in arboreal mode of life; global cooling and shrinking forest; origin of hominids.

Essay

An essay (approximately 3000 words) on various aspects of vertebrate evolution (a list of suggested topics and other details will be available from the course instructor and TAs).

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>).

Day Trip

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

Marks Distribution

Mid-term test (February 17, 9:30-10:30AM)	30%
Final Exam (refer to University schedule)	45%
Classroom pop quizzes (randomly scheduled)	10%
Essay (due last day of lectures)	15%

Recommended Text

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