

EEB466H1 Approaches to the Study of Biodiversity
Department of Ecology & Evolutionary Biology, University of Toronto

Course Syllabus 2014

Course Description:

This course uses the collections, research, and public gallery areas of the Royal Ontario Museum to expose students to the ways in which biodiversity is discovered, analyzed, and interpreted in a museum setting. Topics include morphological and molecular approaches, taxonomy, classification, bioinformatics and e-taxonomy, and the interpretation of biodiversity for the public. Labs include ROM collections tours, guest lectures, and student databasing projects.

Prerequisites:

EEB362H1/365H1 and one or more organismal courses from EEB 266H1, 267H1, 268H1, 330H1, 331H1, 337H1, 356H1, 360H1, 382H1, 384H1, 386H1, 388H1, 389H1
Exclusion: None

Time and Location:

Lectures:

Monday 1:00 – 2:00 Earth Sciences Centre, ES 3087
Wednesday 1:00 – 2:00 Royal Ontario Museum, ROM 2B-05E

Labs:

Wednesday 2:00 – 4:00 Royal Ontario Museum (various collections rooms)

Course Staff:

Prof. David Evans (Course Coordinator)
Department of Ecology & Evolutionary Biology
Royal Ontario Museum
Phone: 416 586-5753
e-mail: d.evans@utoronto.ca

Prof. Allan Baker
Department of Ecology & Evolutionary Biology
Royal Ontario Museum
Phone: 416 586-5520
e-mail: allanb@rom.on.ca

Prof. Hernan Lopez-Fernandez
Department of Ecology & Evolutionary Biology
Royal Ontario Museum
Phone: (416)-586-7948
e-mail: hernanl@rom.on.ca

Office Hours:

Prof Evans: Wednesdays, 4-5 pm, Royal Ontario Museum (Rm 307C)

Other Profs: By appointment, arranged via email.

Evaluation:

The grade for this course is derived mainly from quizzes (3 worth a total of 45%) and four written assignments. The written work includes three 5-page essay assignments — one for each of the three sections (3 worth a total of 30%). There is 25% for class participation: 15% for participation in class discussions of assigned readings, and a 10% is derived from participating in the two lab exercises (5% for fish cataloging and 5% for microvertebrate fossil sorting and cataloguing). Course assignments will be handed to the professor in class. **Note: There is no final exam for this course during the Final Exam Period.**

Itemized marking Scheme:

Quizzes (3): 45%

Essays (3): 30%

Lab Exercises (2): 10%

Participation: 15%

Blackboard Information:

This course uses the BlackBoard system to distribute lecture note hand-outs and assigned readings. Students are expected to check the course BlackBoard site before each upcoming class. The instructors will attempt to upload lecture notes for the upcoming class the night before class. Other course materials (assigned readings) will be uploaded 5 days prior to the in-class discussion

Prof. Evans' Lectures and Labs

Sept 08: General introduction

Sept 10: Introduction to Paleontology: Biodiversity through Geologic Time
Lab: Vertebrate Paleontology Lab Tour

Sept 15: Making paleontological collections

Sept 17: Invertebrate Paleobiodiveristy (J-B Caron, to be confirmed)
Lab: Tour of Invertebrate Paleontology Collections

- Sept 22: Fossil Collections Management
- Sept 24: Untangling Paleoecology: A case study using microfossils
Lab: Vertebrate microfossil exercise (5%)
- Sept 29: Measuring Paleobiodiversity and Mass Extinctions
- Oct 01: Untangling Paleobiodiversity: A case study using dinosaurs
Lab: Vertebrate Microfossil exercise, con't.
- Oct 06: **Quiz 1 (15%); Essay 1 Due (10%)**

Prof. Baker's Lectures and Labs

- Oct 08: DNA barcoding as a tool for discovering biodiversity
Lab: Tour of the Mammalogy collections
- Oct 13: Thanksgiving Holiday (no class)
- Oct 15: The role of museum collections in genomics: European crows and palaeognathous birds
Lab: Tour of DNH Molecular lab
- Oct 20: Conservation genetics of kiwis and snipes
- Oct 22: Species declines – the red knot story
Lab: Tour of Ornithology collections
- Oct 27: Biodiversity conservation: the role of environmental advocacy at natural history museums (Dave Ireland)
- Oct 29: **Quiz 2 (15%); Essay 2 Due (10%)**

Prof. Lopez-Fernandez's Lectures and Labs

- Nov 3: Biodiversity Exploration in modern museums
- Nov 5: Telling the story to the public: communicating science in a museum
Lab: Tour of Schad Gallery of Biodiversity and Ichthyology Gallery
- Nov 10: Biodiversity discovery after fieldwork – systematics and taxonomy in modern museums

- Nov 12: A day in the life: managing modern collections from the ROM database to the Global Biodiversity Information Facility.
Lab: 1) Tour of ichthyology collections and ROM tissue collection room,
Lab exercise: sorting and cataloging field samples (5%)
- Nov 17: U of T Fall Break- no classes
- Nov 19: Current uses for old collections – How historical collections teach us about climate change, extinct lineages and human impacts on ecology.
Lab: - 1) Tour of Entomology Collection/Digital Imaging Centre. Guest lecturer Prof. Chris Darling. 2) Lab exercise in R: using the comparative method to understand cichlid evolution.
- Nov 24: Evolutionary biology from a museum, Part 1: morphology, fossils, DNA and phylogenomics reconstruct the cichlid fishes tree of life.
- Nov 26: Evolutionary biology from a museum, Part 2: Phylogenies, phenotypes and ecology reconstruct the evolutionary history of adaptive radiations
Lab: 1) Tour of ROM Herbarium (Deborah Metsger), Tour of Invertebrate Zoology collection (Maureen Zubowski), 2) Lab exercise in R: discussion of comparative methods results.
- Dec 1: **Quiz 3 (15%), Essay 3 Due (10%)**