uOttawa

Department of Biology

Introduction to Organismal Biology
BIO1130 -2019

Prof. François Chapleau

Course Outline (lectures)

"Nothing in Biology Makes Sense except in the Light of Evolution."
Theodosius Dobzhansky (1973)

Class Schedule

BIO1130A (Marion auditorium = MRN 150)
Monday 8:30 am to 10:00 am
Thursday 10:00 am to 11:30 am

BIO1130B (Marion auditorium)
Wednesday 1:00 pm to 14:30 pm
Friday 11:30 am to 1:00 pm

BIO1130C(Marion auditorium)
Monday 5:30 pm to 7:00 pm
Wednesday 5:30 pm to 7:00 pm

Availability:

Office hours (Gendron 376): Monday: 10 am - 12 pm
Wednesday: 10 am - 11:15 am

Other time of availability:

- by email appointment: send me an email (chapleau@uottawa.ca) indicating three periods of 20 minutes of your availability and I will choose one for an appointment.
- If my office door is open and I am alone, do not hesitate to come in. You are always welcome.

Questions by email: I am usually rapid at answering questions by email. However, your question needs to be clear and precise. If the answer requires more than 10 lines, I might ask you to stop by my office to provide you a verbatim answer. **Always put BIO1130A, B or C in the title of your email and always put your name and student number as a signature to your question**.

Lab coordinator: Dr Fabien Avaron Fabien.Avaron@uottawa.ca
Large class coordinator: Marc Charette marc.charette@uottawa,ca

Book (compulsory):

Reece et al. (2017). Campbell Biology. (2nd Canadian edition). Pearson. Several format available starting at 122$.

It is an excellent book. It covers basics of all subjects although I will not use it much for the first three chapters of BIO1130. The illustrations are excellent. In addition, I will often use my own photos and images + videos from the public domain to illustrate some concepts. Complementary material (museum specimens) will be used to exemplify some subjects.

Although we will be giving you **instructions to access "Mastering Biology," the web component of the textbook, this is a facultative resource for BIO1130**. It might help you in your preparation for the exam. I will not refer to it during the course or my lectures.

My lectures are in the form of PowerPoint slides. The presentations will be made available at least 24 hours in advance of class on the Virtual Campus (Brightspace). They will also be available as PDF files. It is always preferable to print or download the files before class. **Exams are based on what I teach in class** and this goes way beyond the PowerPoint slide content. Consequently **you need to take notes while I speak**. Not doing so will have an impact on your success in this course.

Audio podcasts (i.e., only sound, no slides) of each lecture will be made available. They are tools to help you study. **Important: students that miss class because podcasts are available, do not do well in exams.** Attend lectures to ensure your success in this course! This is why you are at university!

There will be active discussion groups (topic discussions + Q&A) on the Virtual Campus during the term. Read them and participate. Some elements of the discussions will be material to study for exams. More on this during the term.

Course Overview:

The course contains many notions and concepts. My main objective is to ignite in you a curiosity for scientific questions and for the evolutionary reality of life on our planet.

We will discuss the scientific method, the theory of evolution, ecological and conservation biology and the history of life on Earth. These themes will be addressed from multiple angles. Thus, we will discuss the perception of science in society. We will examine the scientific contribution of Charles Darwin and other scientists. We will examine the pattern and process of evolution. We will study how species are formed, how they adapt to their environment and how they go extinct. We will also look at the evolution of our own species. Finally, we will examine the history of life on Earth by describing the main evolutionary events of this wonderful saga. All these concepts will be illustrated with numerous examples.

Outcomes:

At the end of this course, my hope is that you will have learned and understood the following concepts:

1) The scientific method and concepts such as: induction, deduction, hypothesis, prediction and testing.
2) The distinction between science and non-science and the concept of realism, methodological materialism, rationality, etc.
3) Notions of the history of evolutionary thinking, from the early Greeks (Anaximander, etc.) to more recent times; Lamarck, Darwin, etc.
4) Perception of evolution and evolutionary processes: Buffon, Cuvier, Lamarck and Darwin and the Modern Synthesis, including the important contribution of 18th and 19th century geologists.
5) Knowledge of premendelian and Mendelian genetics, laws of heredity and modern additions to these theories: incomplete dominance, epistasis, polygenism, norms of reaction, etc.
6) Fundamentals on microevolution: understanding of the Hardy-Weinberg equilibrium (numerical examples with explications in podcasts) and factors that can change it (mutation, assortative mating, migration, natural selection, genetic drift, etc.)
7) An understanding of the natural mechanisms that maintain and favours genetic diversity.
8) An understanding of the models of speciation and other macroevolutionary concepts such as punctuated equilibrium and phyletic gradualism.
9) Concepts associated with phylogenetic research and classification of living beings
10) A basic understanding of the origin of the universe, the solar system and our planet.
11) A good understanding of the theories and experiments associated with the study of the origin of life and the origin of the first prokaryotic and eukaryotic cells.
12) A good understanding of the evolution of life and of the evolution of major morphological innovations in the main groups of living beings.
13) General notions of ecology and an understanding of biotic and abiotic factors that govern the distribution of individuals and of species in aquatic and terrestrial environment.
14) Notions in population ecology: population growth, fertility, survival curve, notions of biological cycles, island biogeography, etc.
15) Fundamentals of community ecology: e.g. keystone species.
16) Fundamentals of conservation biology: extinction vortex, effective population size, minimum viable population size, etc.

Evaluation:

Remember: at UOttawa, you can write your exams (or any other types of evaluation, including lab reports) in French or in English, independently of the language of the course. The choice is yours.

Because this course is attended by over a thousand students, it is impossible to give midterms during the regular week schedule. **Midterms will be on a Saturday** for all students. **Please ensure your availability on these days**. It is your responsibility to attend. Regulations associated with absence to midterms are detailed in the virtual campus (Brightspace). More information on content, time and location will be given a week before the exam during the term. Exams structure include usually 50 % of multiple choice questions and 50% of short and long answer questions.

There will be two midterms and a final exam. All sections of BIO1130 must attend their own scheduled midterms.

Midterm exam 1: **Saturday morning, September 28**: 15 or 20%*
Midterm exam 2**: Saturday morning, November 2:** 20 or 25%*
Final exam: December 2019 (date to be determined): 40%
Laboratories**: 20%

* The combination of midterms (15%-25% or 20%-20%) that gives the highest grade will be kept. The material tested in exams is partially cumulative, even for the final. More information on exams content during the term.

** Dr. Fabien Avaron (lab coordinator) will explain lab content and schedule during the first lecture of the term. **There is no laboratory during the first week of class.**

Academic fraud: Please read the info on the following website on academic fraud (https://www.uottawa.ca/vice-president-academic/academic-regulations-explained/academic-fraud). Not knowing the rules or regulations is not a good defence in a fraud case.

Chapters

Chapter 1. Science: definition, methodology and perception
Chapter 2. Evolutionary thinking before Darwin
Chapter 3. Charles Darwin and the theory of evolution
Chapter 4. Genetics, Neo-Darwinism and Modern Synthesis
Chapter 5. The evolution of populations
Chapter 6. Adaptation
Chapter 7. Geographic variation and speciation
Chapter 8. Phylogenetics
Chapter 9. Biosphere and ecology
Chapter 10. Ecology of populations
Chapter 11. Conservation Biology
Chapter 12. The origin of life
Chapter 13. Bacteria and Archaea
Chapter 14. Protists
Chapter 15. The Cambrian explosion
Chapter 16. The conquest of the terrestrial environment: evolution of plants
Chapter 17. Evolution of animals: general concepts
Chapter 18. Evolution of animals: from echinoderms to chordates