

Environment and Human Evolution

This is a survey course investigating the influence of environment on the evolutionary history of humans. The course will take the broad perspective that critical aspects of human adaptation result from evolutionary steps taken far back in geological time. Understanding the impact of environment on the organism must take into account the morphological, physiological and behavioral trade-offs of each evolutionary advance. The course will review the extent of environmental controls on evolutionary processes over geologic time scales, and focus on their influence in the development and diversification of our order, the Primates and our family, the Hominidae. An analysis of the interactions between material culture and the environment will conclude the survey. 3 Credit Hours.

Instructor: Craig S. Feibel feibel@eps.rutgers.edu
 207 Biological Sciences Building, Douglass Campus 848 932-9345
 238 Wright Labs, Busch Campus 848 445-2721
Office Hours: MW 4:00 – 5:00 in 207 BioSci, or by arrangement.

Class Meetings: Monday & Wednesday, 7:15-8:35 PM 206 RAB, DC

Texts (required): Hazen, R. M. 2013. The Story of Earth. Penguin.
 Shubin, N. 2009. Your Inner Fish. Vintage.
 Benton, M. 2008. The History of Life: A Very Short Introduction. Oxford.
 Additional course materials will be available on the Sakai website (<https://sakai.rutgers.edu/>)

Course Requirements: Assignments will include text readings, quizzes (scheduled bi-weekly and several pop-quizzes), and a research paper. Three hourly examinations are scheduled. Grades will be based on: exams (20, 20, 20 %), research paper (20%), quizzes and attendance (20%).

Absences: Students are expected to attend all classes; if you need to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me. Please note: I expect you to complete all work for this course. Full credit may not be given for late quizzes or exams, but arrangements should be made to make up any work inadvertently missed over the semester.

Course Syllabus

Week 1	4 Sept	Introduction: Evolution and Environment
Week 2	9 Sept 11 Sept	Earth History and Deep Time Wandering Plates and Biogeography
Week 3	16 Sept 18 Sept	The Fossil Record (Geologic Time Scale Quiz) Ecological Relationships
Week 4	23 Sept 25 Sept	Environmental Systems Theories of Evolution (Linnaean Hierarchy Quiz)

Week 5	30 Sep 2 Oct	Charles Darwin and Natural Selection Evolutionary Patterns
Week 6	7 Oct 9 Oct	First Hour Exam Origin of the Earth and Biosphere
Week 7	14 Oct 16 Oct	Precambrian Experiments Skeletons (Characteristics of Life Quiz)
Week 8	21 Oct 23 Oct	Paleozoic World Tetrapod Evolution
Week 9	28 Oct 30 Oct	Mesozoic Reptiles Mammals Take the Stage (Skeletons Quiz)
Week 10	4 Nov 6 Nov	Second Hour Exam Cenozoic World
Week 11	11 Nov 13 Nov	Paleogene Primates Miocene Apes
Week 12	18 Nov 20 Nov	The Savanna Biome (Papers Due) Hominin Diversity
Week 13	25 Nov 27 Nov	Hominin Adaptations (Biomes Quiz) No Class – Thanksgiving Holiday
Week 14	2 Dec 4 Dec	Cultural Beginnings and Out of Africa Neanderthals and the Ice Age World (Hominins Quiz)
Week 15	9 Dec 11 Dec	Anatomically Modern Humans Holocene Stability, Agriculture and the Future

Monday 16 December 8 PM Final Exam

Cheating and Plagiarism

Short version: Don't cheat. Don't plagiarize.

Longer version: Cheating on tests or plagiarizing materials in your paper deprives you of the educational benefits of preparing these materials appropriately. It is personally dishonest to cheat on a test or to hand in a paper based on unacknowledged words or ideas that someone else originated. It is also unfair, since it gives you an undeserved advantage over fellow students who are graded on the basis of their own work. The university's policy on Academic Integrity is available at http://academicintegrity.rutgers.edu/files/documents/AI_Policy_9_01_2011.pdf

I strongly advise you to familiarize yourself with this document, both for this class and for your other classes and future work.

Reading Assignments

The three books we will read for this class provide additional perspectives on topics we will discuss in class, but are not textbooks to be followed on a lecture-to-lecture basis. I suggest you try to read the books early on in the semester, and refer back to them on relevant topics as we discuss them.

Hazen's book focuses on evolution of the Earth itself, and compliments material we will initially discuss in **Weeks 2-7**.

Benton highlights aspects of the evolution of life, and follows aspects of our discussions in **Weeks 6 – 13**.

Shubin follows tetrapod evolution, and most closely relates to the topics we will discuss in **Weeks 7 – 9**.

Learning Goals

1. Knowledge and major concepts: Students will learn about:
 - the spatial and temporal scales at which Earth's processes operate.
 - Earth's systems and complex interactions.
 - how Earth and humans are inextricably linked.
 - the fossil record and its distribution through time.
 - how to use evidence to evaluate earth science concepts and draw conclusions.

2. Skills: Students will develop their abilities to ...
 - read, visualize and interpret spatial representations of scientific data.
 - distinguish among evidence (data), models, assumptions, hypotheses, theories, interpretations, and predictions / recommendations.
 - reason with and/or evaluate multiple working hypotheses.

3. Habits and attitudes: Students will
 - employ appropriate learning skills for the sciences, including evaluation of data, reasoning and questioning.
 - consider science as an ongoing endeavor that embraces curiosity, creativity and societal needs, and is not just a set of facts.
 - recognize and experience two approaches used in the Earth system sciences, including:
 - historical, descriptive, systems-oriented approaches;
 - experimental approaches.
 - ask "How do we know?", "Why do we accept it?", and "What is the evidence for ...?"