

EVOLUTION
Biology 4303 and 5303
Fall 2018

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Objectives: To understand:

1. The evidence for evolution.
2. The way evolution works.
3. The evolutionary history of life on Earth.
4. The relevance of evolution to health sciences and to conservation.

We will also encounter the points of contact between evolution and religion but (aside from the evolution of religion as an adaptation, and the history of evolutionary thought) these concepts will not be tested as course material. Atheists and creationists and everyone in between are welcome.

Procedures:

This three-credit lecture meets Monday, Wednesday, and Friday at 10:00.

I can usually be reached at the office and phone number indicated above during these office hours:

Monday: 11:00-2:00
Tuesday: 10:00-11:00
Tuesday: 12:30-2:30
Wednesday: 11:00-1:00
Thursday: 10:00-11:00

Sometimes other responsibilities may require me to miss these office hours; for instance, faculty meetings. On the other hand, I am usually on campus at other times throughout the work week. Do not hesitate to contact me at times other than office hours if necessary.

Course study materials such as PowerPoints will be available on BlackBoard. *If you print out PowerPoints, please use the handouts setting, not the slides setting—this will save you and the earth a lot of paper!* The slides will be most readable at two per sheet.

I encourage discussion during class on topics that are of interest to all the members of the class. If you see an interesting news item that you would like to share with the class, please do so.

The textbook is *Evolution Class Readings*, which are selections from my *Encyclopedia of Evolution*, now available only as part of a big science database, but revised in 2012. It is available only at the university bookstore.

Regularly check BlackBoard for announcements—for example, class cancellations.

The *grade* is based upon:

- Three hourly examinations, each worth 20% of the grade (total of 60%)
- A short paper worth 10% of the grade
- A final exam, worth 30% of the grade

Attendance scores are calculated as follows:

- Missing three or fewer classes: 2% extra credit.
- Missing four to six classes: no change in grade.
- Missing more than six classes: 1% decrease in final score for each class

The *three hourly examinations* may consist of multiple choice questions, fill-in-the-blank questions, and brief essays. I usually hand out a long list of possible essay questions from which some will be selected for the exam. There will be no need for Scantrons.

The *final examination* covers as much new material as an hourly exam, plus a short review of the topics earlier in the semester.

The *short paper* will be about what you would see if you went in a time machine back to a geological period of your choosing. It corresponds to the “history of life” part of the class and is due at the end of the day Nov 26. It should be at least two pages double-spaced, and include a link to a website with graphics about this geological period. The paper must be entirely your own work, and make it a story as if it were your own direct experience. *Turn in the paper via BlackBoard.* Your assignment should already be completed (preferably a Word document) and stored on your computer or on a flash drive. Click on the assignment, then browse and upload your assignment; click submit.

For attendance, you must *come to class on time* and stay for the whole period. Arriving more than five minutes late or leaving (without permission) more than five minutes early results in a one-half absence for that day.

Check Blackboard regularly for the posting of your exam grades and for announcements. *Do not trust the BlackBoard calendar or the BlackBoard-generated grade estimates.*

Cheating and plagiarism: Any student caught cheating will receive a zero for that exam or assignment. Looking at other students’ exams and giving help to other students during an exam both constitute cheating. Plagiarism (copying text from other students or online for the paper) is also academic dishonesty. The exam or paper will receive a score of zero and may result in an F for the course. Cheating includes any attempt to alter an exam after it has been graded. All examples of cheating or plagiarism will be submitted to the administration via the Incident Reporting System. Please see the student code of conduct ([click on link](#) if you are reading this online), especially page 3, for further clarification.

Equal Opportunity Statement: In Compliance with Title VI of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, and other Federal Laws and Regulations, Southeastern Oklahoma State University does not discriminate on the basis of race, color, national origin, sex, sexual identity, sexual orientation, age, religion, handicap, disability, or status as a veteran in any of its policies, practices or procedures, this includes but is not limited to admissions, employment, financial aid, and educational services.

Southeastern Oklahoma State University, in compliance with all applicable federal and state laws and regulations, does not discriminate on the basis of race, color, religion, national origin, sex, age, disability, sexual orientation, gender identity, or status as a veteran in any of its policies, practices, procedures, or programs. This includes, but is not limited to: admissions, employment, financial aid, and educational services. Inquiries regarding non-discrimination and equity policies may be directed to: Michael Davis, Director of Compliance and Safety & Title IX Coordinator, (580) 745-3090, or mdavis@se.edu, Administration Building Room 311 – 1405 N. 4th Ave. Durant, OK 74701.

Students with Disabilities: Any student needing special accommodations due to a disability should contact the Coordinator for Disability Services, (580) 745-3090, or mdavis@se.edu, Administration Building Room 311 – 1405 N. 4th Ave. Durant, OK 74701. It is the responsibility of each student to make an official request for accommodations to the Coordinator. The Coordinator will provide a letter to the student, which the student will leave in my mailbox. *All communications regarding disability must be between the Coordinator and the student.* The instructor will not discuss disability accommodations with students, but only with the Coordinator.

Any student experiencing mental or emotional issues who desires free, confidential, clinical counseling is encouraged to contact the SE Counseling Center at (580) 745-2988 to schedule an appointment during normal working hours Monday – Friday, 8:00 AM to 5:00 PM. For after hours mental health emergencies, please call SE Campus Police at (580) 745-2911 or the Mental Health Crisis Hotline at 1-(800) 522-1090.

For the *graduate version of this class (Biol 5303)*, an extra project will be required, based on discussion with the instructor. Usually this is an extra paper (about 8 pages) or a powerpoint presentation near the end of the semester.

Please remember to be considerate to other members of the class. This includes your choice of insignia or symbols on clothing and personal items. The instructor may ask you to conceal clothing or items that, in his judgment, might be offensive to others.

Military personnel: By law, your military orders supersede the schedule for this class (or any other class). Please provide the instructor with a copy of your orders, if deployed, and every effort will be made to accommodate you.

Tentative schedule and readings

Date Topic

Aug 20 Introduction to the course

Aug 22 Topic 1: Evolution here and now

- AIDS, evolution of

Aug 24, 27, 29, Sept 5

Topic 2: Discovery of and some evidence for evolution (+ video)

- Archaeopteryx (optional)
- Darwin, Charles
- DNA [Evidence of evolution]
- Fossils and fossilization
- Galápagos Islands (optional)
- Missing links
- Noncoding DNA
- Radiometric dating (optional)
- Scientific method
- Vestigial characteristics

Sept 3 Labor Day (no classes)

Sep 7, 10, 12

Topic 3: Where genetic variability comes from

- Developmental evolution
- DNA [Raw material of evolution]
- Founder effect and genetic drift
- Genetic inheritance patterns (optional)
- Horizontal gene transfer
- Margulis, Lynn (optional)
- Mutations
- Population genetics
- Promoter
- Symbiogenesis

Sep 14 Review

Sep 17 Examination 1

Sep 19, 21, 24 Topic 4: Natural selection and adaptation

- Artificial selection
- Coevolution
- Convergence
- Darwin's finches
- Evolutionary computation (optional)
- Gene-culture coevolution
- Natural selection
- Punctuated equilibria (optional)

Sep 26 Topic 5: Evolution of life cycles

- Life history, evolution of
- Guest Essay: Did Senescence Evolve? (Bruce Carnes)

Sep 28 No class; instructor out of town

Oct 1, 3 Topic 6: Sex and Evolution

- Reproductive systems
- Selfish genetic elements
- Sex, evolution of
- Sexual selection

Oct 5 Review

Oct 8 Examination 2

Oct 10, 12 Topic 7: Altruism

- Altruism

Oct 15, 17 Topic 8: Evolution and medicine

- Evolutionary medicine
- Resistance, evolution of
- Guest essay: Medicine is buzzing with fruit flies! (Zhang Bing)

Oct 19 Mid-level assessment (no class meeting)

Oct 22, 24 Topic 9: Where new species come from

- Adaptive radiation
- Biogeography
- Hybridization
- Isolating mechanisms
- Speciation

Oct 26 Review for exam 3

Oct 29 Exam 3

Oct 31, Nov 5 Topic 10: Origin of life and cells

- Eukaryotes, evolution of
- Mars, life on (optional)
- Origin of life
- Universe, origin of (optional)

Nov 2 No class meeting; instructor at Oklahoma Academy of Sciences

This is also when you will work on your paper about your visit to a geological period. *It is due Monday, November 26.*

Nov 7, 9, 12, 14

Topic 11: Evolutionary history of life on Earth
Read these entries as background when needed

Evolution of groups of organisms:

- Amphibians, evolution of
- Birds, evolution of
- Dinosaurs
- Fishes, evolution of
- Flowering plants, evolution of
- Invertebrates, evolution of
- Mammals, evolution of
- Reptiles, evolution of
- Seed plants, evolution of
- Seedless plants, evolution of

Geological eras and periods (in time order):

- Geological time scale
- Precambrian time
- Ediacaran organisms

- Paleozoic era
 - Cambrian period
 - Cambrian explosion
 - Burgess shale
 - Ordovician period
 - Silurian period
 - Devonian period
 - Carboniferous period
 - Permian period
 - Permian extinction
- Mesozoic era
 - Triassic period
 - Jurassic period
 - Cretaceous period
 - Cretaceous extinction
- Cenozoic era
 - Paleogene period
 - Neogene period
 - Quaternary period
 - Ice ages
 - Pleistocene extinction

Nov 19-23 Thanksgiving week

Nov 16, 26, 28

Topic 12: Human Evolution

General entries:

- Bipedalism
- Hominin
- Intelligence, evolution of
- Language, evolution of
- Religion, evolution of

Evolution of human groups (time order):

- *Sahelanthropus*
- *Orrorin*
- *Ardipithecus*
- *Australopithecus*
- *Kenyanthropus*
- *Paranthropus*

- *Homo habilis*
- *Homo ergaster*
- *Homo erectus*
- *Homo heidelbergensis*
- Flores Island people
- Neandertals
- *Homo sapiens*

Nov 30, Dec 3, 5 Topic 13: Evolution controversies

- Creationism
- Intelligent design
- Scopes trial

Dec 7 Review for final

Final exam time: Monday Dec. 10 at 11:00