

OGLALA LAKOTA COLLEGE
Course Syllabus for

Evolution (Biol 463)

Spring 2014

Instructor: Alessandra Higa
Office Hours: at the college center on Tuesday before/after class; at Piya Wiconi on Fridays.
Class meet: Tuesday from 1:00 - 4:00 pm (pictel HSCC2-PHCC)
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Course Description

Evolution (Biol 463): this course will present the history of the development of the theory of natural selection and evolution as first elucidated by Charles Darwin and Alfred Wallace. The concurrent work of Mendel will be discussed as well as more modern developments in areas of genetics, molecular biology, sociobiology, paleontology, and anthropology.

Prerequisites and Credits

Ecology (Bio 223) or permission of the instructor. 3 Credits

Course Goal

The goal of this course is to acquaint students with the major Evolution topics including the history of evolution, evolutionary processes, adaptation, and evolution as an explanatory framework - at levels of biological organization ranging from genomes to ecological communities.

Course objectives & outcomes

At the end of the semester successful students will learn the following key concepts:

- Demonstrate an understanding of the history of the evolutionary biology
- Understand biological classification and phylogeny
- Recognize patterns of evolution
- Describe, analyze, and synthesize key concepts regarding the biogeography, fossil record and the history of life on Earth, phenotypic and genetic variation, natural selection and adaptation, species and speciation, and coevolution.
- Be familiar with current research and the techniques used to study evolution

Program Outcomes

This course meets the following outcomes of the Math and Science Program:

- Formulate a research problem and design a strategy to address it using the scientific method.
- Carry out a basic research project and present the results.
- Communicate effectively in written form through words, graphs, and tables.

- Communicate orally using prepared presentations.
- Create scientific communication documents such as reports using the correct formats.

Required Text

Futuyma, D. J. 2013. *Evolution*. 3rd ed. Sinauer, ISBN: 978-1-60535-115-5

Student Companion Website

sites.sinauer.com/evolution3e

The Companion Website features review and study tools to help students master the material presented in the textbook. Access to the site is free of charge, and requires no access code. The site includes the following resources:

- *Chapter Outlines and Summaries*: Concise overviews of the important topics covered in each chapter.
- *Data Analysis Exercises*: Expanded for the Third Edition, these inquiry-based exercises involve students in working with data and analyzing methods and conclusions from published papers.
- *Simulation Exercises*: Interactive modules that allow students to explore many of the dynamic processes of evolution, and answer questions based on the results they observe.
- *Online Quizzes*: Quizzes that cover all the major concepts introduced in each chapter. These quizzes are assignable by the instructor.
- *Flashcards & Key Terms*: Easy-to-use activities that help students learn all the key terminology introduced in each chapter.
- The complete *Glossary*

Recommended websites

A quick primer on phylogenetics and interpreting evolutionary trees

http://evolution.berkeley.edu/evolibrary/article/phylogenetics_01

Supplementary Materials

Supplementary materials will be given during the semester, as needed.

Descriptive Reading Load

It is imperative that you *read* the scheduled chapters and/or scientific papers assigned *before* coming to class in order to be prepared for discussion and participation. Reading is an important key to success in this class. Grade 14 reading level.

Research

You will be required to research about any topic related to **evolution** (both micro- and macro-evolution of all types of organisms, including: molecular and microbial evolution, behavior, genetics, ecology, life histories, development, paleontology, systematics, and morphology). To fulfill this objective you will:

- 1) Collect information from scientific publications, scientific collections, local agencies reports, on topics related to your subject;
- 2) Analyze the data/text compilation;
- 3) Write a scientific report (*see details below*)
- 4) Prepare a 15 minutes presentation.

Your reports should be written in scientific style (e.g. the *Journal of Evolutionary Biology* format; http://www.blackwellpublishing.com/jeb_enhanced/) with abstract, introduction, material and methods, results, discussion, and literature cited - including all the information sources cited in the text. The literature cited section at the end must provide all publication data necessary for anyone to find your source papers.

Lakota Perspective Provided Through: Wolakolkiciyapi

Students are encouraged to display the Lakota values of respect, knowledge, generosity, fortitude, truthfulness, and courage as you perceive such.

Class Attendance and Course Requirements

1. To succeed in this course, **regular attendance** is imperative. Your presence and participation is critical to your achievement. In accordance with OLC policy, you will be dropped from the course if you miss more than three consecutive class periods or if you miss more than five class periods during the semester.
2. If you plan to miss class you must contact the instructor *in advance* by e-mail. It is **your responsibility** to make sure you receive all assignments and instructions.
3. **No Make-ups exams.**
4. All OLC and Math & Science departmental policies apply to this class.

Evaluations and Markings

1. **Homework:** read chapters and handouts, answer problems and discussion topics (end of each chapter), and carry out your research.
2. **Research:** Keep all your data and notes in a notebook. This procedure enables to better organize and analyze your data during the research project. These assignments are multifaceted: (1) you will gain experience on evolutionary biology; (2) you will learn how to search for scientific information, analyze data and, (3) you will gain experience by presenting your results in a scientific format.

3. **Exams and grading procedures:** the class grade is equal to lectures (50%) and research (50%) grades. The lecture grade will rest on one *midterm*, and one *final* (not comprehensive). The research grade will rest on *class* and *home work* and the final *report*.

Grading

Grade		The following scale will be used:
Final Exam	25%	A = 90% - 100%
Midterm	25%	B = 80% - 89.9%
Class and home work	25%	C = 70% - 79.9%
Final scientific paper Including your presentation	25%	D = 60% - 69.9%
<i>Total</i>	100%	F = below 60%

Tentative Schedule

Week	Date	Chapter	Information
1	01/21	1 & 2	Introduction, Evolutionary Bio & The tree of Life: Classification and Phylogeny
2	01/28	2	The tree of Life: Classification and Phylogeny
3	02/04	3	Patterns of Evolution
4	02/11	4 & 5	Evolution and the Fossil Record & A History of Life on Earth
5	02/18	6	The Geography of Evolution
6	02/25	7 (last part) and 9	The Evolution of Biodiversity: Diversification & Variation: The Foundation of Evolution
7	03/04	10	Genetic Drift: Evolution at Random
8	03/11		<i>Midterm Exam & Research discussion</i>
9	03/18		<i>Spring Break</i>
10	03/25	11	Natural Selection and Adaptation
11	04/01	13 & 14	Phenotypic Evolution & The Evolution of Life Histories
12	04/08	15 & 16	Sex and Reproduction Success & Conflict and Cooperation
13	04/15	17 & 18	Species & Speciation
14	04/22	19	The evolution of Interactions among Species
15	04/29		<i>Final Exam</i>
16	05/06		<i>Students presentations</i>

**Note: Information contained in this syllabus was, to the best knowledge of the instructor, considered correct and complete when distributed for use at the beginning of the semester. The instructor reserves the right to make changes in the syllabus in collaboration with the class with reasonable notice to all concerned.*