



COURSE OUTLINE : BIOL 123

D Credit – Degree Applicable

COURSE ID 005082

Cyclical Review: April 2019

Revision: October 2021

COURSE DISCIPLINE : BIOL

COURSE NUMBER : 123

COURSE TITLE (FULL) : Evolution

COURSE TITLE (SHORT) : Evolution

ACADEMIC SENATE DISCIPLINE: Biological Science

CATALOG DESCRIPTION

BIOL 123 examines the history of life on earth, and the mechanisms that have led to the diversity we see today. Topics to be covered include a brief history of evolutionary thought, adaptive vs. neutral evolution (natural selection and genetic drift), biogeography, the origin of life, population genetics and speciation, an exploration of the fossil record and modern systematics, and recent work in the fields of sexual selection, behavior, development, and human evolution.

Total Lecture Units:3.00

Total Laboratory Units: 0.00

Total Course Units: 3.00

Total Lecture Hours:54.00

Total Laboratory Hours: 0.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 54.00

Total Out-of-Class Hours: 108.00

Recommended Preparation: ENGL 100 or ESL 151.



ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	ENGL	100	Writing Workshop	Read, analyze, and evaluate contemporary articles and stories to identify topic, thesis, support, transitions, conclusion, audience, and tone;	Yes
2	ENGL	100	Writing Workshop	read, analyze, and evaluate contemporary articles and stories for the comprehension of difficult content and the identification of main ideas and (topic-based) evidence;	Yes
3	ENGL	100	Writing Workshop	write compositions (e.g., summaries and argumentative essays) that are easy to read and follow, though some errors in grammar, mechanics, spelling, or diction may exist;	Yes
4	ENGL	100	Writing Workshop	proofread and edit essays for content, language, citation, and formatting problems.	Yes
5	ESL	151	Reading And Composition V	read and critically analyze various academic readings;	Yes
6	ESL	151	Reading And Composition V	summarize readings;	Yes
7	ESL	151	Reading And Composition V	revise writing to eliminate errors in syntax, and grammatical constructions;	Yes

EXIT STANDARDS

- 1 Describe Darwin's contribution to our understanding of how evolution works;
- 2 describe the major evolutionary forces that act to change populations over time;
- 3 explain the processes of speciation and adaptive radiation;
- 4 describe key events in the history of life on earth, including the origin of life and major extinction events;
- 5 identify some important finds in the fossil record and describe what they demonstrate about the nature of evolution;
- 6 describe what is known about human evolution and the impact of our evolutionary past on modern humans.

STUDENT LEARNING OUTCOMES

- 1 describe the mechanisms of evolution and their influences on populations over time;
- 2 describe the processes of speciation and their responsibility for the diversity of life on earth;
- 3 interpret evolutionary relationships as depicted in a cladogram or phylogeny;
- 4 identify key events in the history of life on earth, including fossil discoveries and extinctions.



COURSE CONTENT WITH INSTRUCTIONAL HOURS

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	Description	Lecture	Lab	Total Hours
1	Overview of Topics in Evolutionary Biology	2	0	2
2	History of Evolutionary Ideas <ul style="list-style-type: none"> • Pre-Darwinian Ideas • Charles Darwin • Influences on Darwin 	6	0	6
3	Deep Time <ul style="list-style-type: none"> • Radiometric dating • The fossil record 	3	0	3
4	Genetics Primer <ul style="list-style-type: none"> • Mendelian inheritance • Mitosis and Meiosis • Transcription and Translation 	3	0	3
5	Microevolution <ul style="list-style-type: none"> • Mutation • Genetic drift • Gene flow Natural Selection <ul style="list-style-type: none"> • Stabilizing • Directional • Diversifying 	10	0	10
6	Speciation <ul style="list-style-type: none"> • Allopatric vs. Sympatric • Pre-zygotic vs. Post-zygotic isolation • Biological Species Concepts • Adaptive radiations 	3	0	3
7	Origin of Life <ul style="list-style-type: none"> • RNA world • Prokaryotes and the origin of photosynthesis • Endosymbiosis and the origin of eukaryotes 	3	0	3



8	Development <ul style="list-style-type: none"> • Homologous features • Master control genes • Gene duplication • Constraints 	3	0	3
9	Extinction <ul style="list-style-type: none"> • History of mass extinctions • Permian extinction and Pangaea • K-T extinction and the rise of mammals • Human-caused extinctions 	3	0	3
10	Co-evolution <ul style="list-style-type: none"> • Mutualism • Arms race 	3	0	3
11	Disease and Evolutionary Medicine <ul style="list-style-type: none"> • Parasite and host • Bacteria and antibiotic resistance • Viruses (HIV case study) 	3	0	3
12	Evolution of Sex <ul style="list-style-type: none"> • The two-fold cost of sex • Advantages of sexual reproduction • Sexual selection • Mating systems 	3	0	3
13	Behavior <ul style="list-style-type: none"> • Parent-offspring conflict • Maternal investment • Cooperation and inclusive fitness 	3	0	3
14	Phylogeny and Systematics <ul style="list-style-type: none"> • Biological classification • Cladistics • DNA sequence comparisons 	3	0	3
15	Human Evolution <ul style="list-style-type: none"> • Human ancestry • Modern humans and our evolutionary legacy 	3	0	3
				54

OUT OF CLASS ASSIGNMENTS

- 1 written responses to assigned readings or videos;
- 2 homework exercises (e.g., radiometric dating of fossils, DNA sequence database search).



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METHODS OF EVALUATION

- 1 quizzes;
- 2 homework exercises;
- 3 student presentations;
- 4 exams.

METHODS OF INSTRUCTION

- Lecture
- Laboratory
- Studio
- Discussion
- Multimedia
- Tutorial
- Independent Study
- Collaboratory Learning
- Demonstration
- Field Activities (Trips)
- Guest Speakers
- Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	ISBN	Date
The Tangled Bank: an introduction to evolution	Required	WH Freeman	2	Print	Zimmer, Carl	978-1-936221-44-8	2014