

COCONINO COMMUNITY COLLEGE
COURSE OUTLINE

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Status: Permanent

Effective: Fall 2016

November 1, 1999

March 23, 2001

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A. Identification:

1. Subject: Biology (BIO)
2. Course Number: 182 SUN # BIO 1182
3. Course Title: Unity of Life II: Multicellular Organisms
4. Credit Hours: 4
5. Course Description: The second semester of an introductory biology major's sequence. This course emphasizes general concepts pertaining to the evolution, biodiversity, and ecology of multicellular organisms. Prerequisite: BIO 181. General Education: Physical and Biological Sciences. Three lecture. Three lab. Spring.

B. Goals: To provide learners with:

1. an appreciation for the beauty and diversity of life;
2. recognition of processes of and patterns in evolution;
3. a comprehensive understanding of the interaction between living organisms and their environment;
4. and competency in using standard lab and field techniques, including research skills.

C. Course Outcomes: Students will:

1. create and interpret phylogenetic trees;
2. compare/contrast phylogeny and classification;
3. recognize and explain the importance of modern taxonomy;
4. define evolution and evolutionary theory;
5. explain the three principles which framed the theory of evolution proposed by C. Darwin;
6. explain the importance of genetic variation in populations;
7. identify five mechanisms of evolution and describe how each affects genetic variability in populations;
8. use the Hardy-Weinberg equations to determine if a population is evolving;
9. explain why natural selection results in changes in genotype frequencies and describe three possible consequences of said change;
10. discuss how genetic variation is maintained in a population;
11. discuss the constraints on evolution;
12. compare/contrast the different species concepts;
13. describe factors that influence the development of species;
14. explain the importance of genetic divergence for speciation;
15. list and provide examples of mechanisms resulting in reproductive isolation;
16. discuss factors affecting rates of speciation;
17. chart the evolution of life on Earth;
18. discuss the impact of geologic events on the evolution of life;
19. describe the origin and diversification of eukaryotes;
20. describe trends in plant evolution;
21. describe the structural changes necessary for plants to successfully transition to land (vascular tissue, flowers, and seeds) and the evolutionary advantage of each;
22. describe trends in animal evolution;
23. explain structural changes necessary to successfully transition to a terrestrial environment (body plan, nervous system, acquisition of nutrients, gas exchange, locomotion, and reproduction);
24. discuss the factors that affect the distribution of life;

25. discuss characteristics of populations and factors that affect population growth;
26. discuss characteristics of a community including factors affecting diversity and community structure;
27. define the physical laws that govern energy flow and biogeochemical cycles;
28. describe the biogeochemical cycles and the biological importance and key processes of each;
29. define the term 'conservation biology';
30. and discuss human activities that threaten the persistence of species and strategies employed to protect biodiversity.

D. Course Outcomes Assessment will include:

1. course grades determined by the instructor as outlined in the course syllabus;
2. comprehensive final exam or project;
3. intermittent exams or quizzes;
4. and various lab reports.

E. Course Content will include:

1. natural selection: definition, principles, and development of the theory of evolution by natural selection;
2. mechanisms of evolution including microevolution (population genetics) & macroevolution (speciation);
3. evidence for evolution by natural selection;
4. history of Life on Earth;
5. taxonomy, classification and phylogeny;
6. transition to land (plants and animals) including biological, anatomical, and physiological changes necessary;
7. principles of ecology including population, community and ecosystem ecology;
8. principles of conservation biology;
9. and human impact on ecosystems.