Course Description: BSC2011C Fundamentals of Biology II (5) (A.A.) Three hours lecture and 3 hours lab per week. Prerequisite of BSC 2010C with a grade of “C” or better. This course meets Area V requirements for the A.A./A.A.S./A.S. general education requirement. This course is the second portion of a comprehensive study of the fundamentals of biology including; evolution, population genetics, phylogenetic systematics, form and function of bacteria, protists, fungi, plants, and animals, and ecology. This course is intended for the science and science-related majors. Students already with credit for BSC 2011C cannot subsequently get credit for BSC 1005C, BSC 1008 or BSC 1007C.

Performance Standards:

At the successful completion of this course, the student should be able to:

1. Discuss the history of evolutionary thought including pre-Darwinian ideas.
2. Communicate the postulates of natural selection including the role of natural variation in evolutionary processes.
3. Evaluate traditional (e.g. fossils) and modern (e.g. sequence data) types of evidence used to test evolutionary hypotheses.
4. Articulate a clear understanding of the concept of homology including its importance in the inference of evolutionary relationships.
5. Calculate allele frequencies from genotype frequencies and Hardy-Weinberg expected genotype frequencies from allele frequencies in order to apply the Hardy-Weinberg Law as a null model of evolution.
6. Predict the effect that each evolutionary force (drift, selection, migration, mutation, and non-random mating) will have on a gene pool.
7. Explain the persistence of multiple species concepts and the role of reproductive isolation (prezygotic and postzygotic) and geography (allopatry and sympatry) in speciation.
8. Apply the theory and analytical methods necessary to develop a natural taxonomy through the use of phylogenetic systematics.
9. Critique current hypotheses regarding the origin of life.
10. Identify major evolutionary events in the context of geologic history.
11. Discuss the Endosymbiotic Theory of origin for the eukaryotic mitochondrion and plastids including specific examples of primary and secondary endosymbiotic events.
12. Compare and contrast life history variations across eukaryote diversity with special attention to trends in land plant evolution that are tied to modifications in the alternation of generations life history.
13. Demonstrate familiarity with the ‘prokaryotic’ domains Archaea and Eubacteria.
14. Identify the basic anatomical features which define major protistan, fungal, and terrestrial plant lineages including both sexual and asexual structures.
15. Explain the major trends in plant evolution; heterospory, pollen, seeds, double fertilization.
16. Communicate the basic concepts associated with animal developmental biology and anatomy including: symmetry, cleavage, gastrulation, tissue layers, and body cavities.

17. Identify the anatomical features which define major animal lineages and explain how modern reexamination and interpretation of animal anatomy has affected animal classification.

18. Design anatomical descriptions (both narrative and illustrative) based on dissections of representative fungi, plants, and animals.

19. Categorize the abiotic and biotic components of major aquatic and terrestrial biomes.

20. Develop models of population ecology that incorporate growth rate, carrying capacity, and population demographics.

21. Create schematics which illustrate major community level interactions including; energy transfer between trophic levels, biogeochemical cycles, and ecological succession.

Last Review: 10/20/08