Course Title & Number: General Biology Bio122 (4 credits)

Competency Area: **SCIENTIFIC REASONING** (Goal: Students will become familiar with science as a method of inquiry. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.)

Faculty submitting the Learning Outcomes: Joseph Faryniarz, Ed.D. ***Date***: February 11, 2013

[Instructions: *Please match the Learning Outcomes in the left hand column to those of the course you are submitting for Gen Ed approval. List the corresponding course outcomes in the right hand column to indicate a match.*]

BOR TAP's Learning Outcomes	Corresponding Outcomes for Course Named Above[1]
1. Explain the methods of scientific inquiry that lead to the acquisition of knowledge. Such methods include observations, testable hypotheses, logical inferences, experimental design, data acquisition, interpretation, and reproducible outcomes.	1. Write meaningful laboratory reports based on the scientific method. 2. Recognize, apply, and explain the underlying theory for experiments conducted in the laboratory.
2. Apply scientific methods to investigate real-world phenomena, and routine and novel problems. This includes data acquisition and evaluation, and prediction.	1. Solve classical and contemporary genetic inheritance problems. 2. Describe the structure of DNA, RNA, and proteins, and explain the central dogma of molecular genetics and apply this knowledge to explain mutations and to investigate genomic and proteiometric databases. 3. Use a computer simulation to investigate the effect of the Hardy-Weinburg principle of population genetics. 4. Write a book review that critically analyzes a contemporary topic in organismal biology.

[1] The student will be able to demonstrate proficiency of the learning outcomes by either exam, laboratory practical, laboratory report, homework, oral report, or demonstrated behavior.

3. Represent scientific data symbolically, graphically, numerically, and verbally.	5. Solve classical and contemporary genetic inheritance problems. 6. Use a computer simulation to investigate the effect of the Hardy-Weinburg principle of population genetics. 7. Utilize computers and computer interfaced-data acquisition probes as a scientific tools to investigate, to simulate experiments, to analyze scientific problems, and to present experimental results. 8. Describe the structure of DNA, RNA, and proteins, and explain the central dogma of molecular genetics and apply this knowledge to explain mutations and to investigate genomic and proteiometric databases. 9. Explain the mechanisms used at the various levels of gene regulation in prokaryotes and eukaryotes.
4. Interpret scientific information and draw logical references from representations such as formulas, equations, graphs, tables, and schematics.	1. Explain the important principles of genetic inheritance. Not interpretation 2. Solve classical and contemporary genetic inheritance problems. 3. Use a computer simulation to investigate the effect of the Hardy-Weinburg principle of population genetics. 4. Create and interpret cladograms that illustrate the evolutionary trends for organisms examined in this course. 5. Realize how different organismal structures support common physiological functions. Not interpretation 6. Describe the structure of DNA, RNA, and proteins, and explain the central dogma of molecular genetics and apply this knowledge to explain mutations and to investigate genomic and proteiometric

	databases.
5. Evaluate the results obtained from scientific methods for accuracy and/or reasonableness.	1. Write a book review that critically analyzes a contemporary topic in organismal biology.
Only need one Course Outcome per BOR Outcome, if all aspects of the BOR Outcome is covered by the Course Outcome.	***Additional Outcomes*** 1. Compare and contrast the processes of mitosis and meiosis and relate these processes to the alternation of generations. 2. Explain how meiosis can result in potential mutations—a the mechanism for evolution. 3. Describe how life is a continuum from fertilization, through early development, to maturity. 4. Compare and contrast the early development of sea urchin, frog, chicken, and human. 5. Apply the concept of natural selection to explain the evolution of organisms both at the micro-evolution and macro-evolution level. 6. Describe evidence supporting the Darwin-Wallace theory of evolution. 7. Describe causes for extinction and its effects on species biodiversity. 8. Compare, contrast and identify the histology of major vertebrate tissues. 9. Recognize the evolutionary diversity in the life cycles.

	10. Demonstrate proficiency in using the following standard laboratory equipment and tools: microscopes, pH meter, spectrophotometer, laminar flow hood, micropipettes, electronic balance, and gel electrophoresis apparatus. 11. Carryout standard laboratory procedures such as aseptic techniques and the safe handling of various chemicals, and utilize the metric measurement system while functioning safely, productively, and independently in a biology laboratory. 12. Prepare nutrient media for a variety of organisms used in experiments during the semester. 13. Explain how meiosis can result in potential mutations—a the mechanism for evolution.