

Course Title & Number: General Botany Bio 155 (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.	<ol style="list-style-type: none">1. Conduct experiments in photosynthesis, respiration, and transpiration and explain the effects of environmental parameters on these processes.2. Apply the scientific method to an investigations and demonstrate how the process of science works3. Utilize computers as a scientific tool to investigate, to simulate experiments, to analyze scientific problems, and to present experimental results.
2. Apply scientific methods to investigate real-world phenomena, and routine and novel problems. This includes data acquisition and evaluation, and prediction.	<ol style="list-style-type: none">1. Conduct experiments in photosynthesis, respiration, and transpiration and explain the effects of environmental parameters on these processes.2. Collaboratively investigate (via student team) a specific topic within one of the following areas of botanical research: plant disease, economic botany, secondary metabolites,

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.

	<p>pharmacology, biofuels to produce an oral and written report by the team.</p> <ol style="list-style-type: none"> 3. Apply the scientific method to an investigations and demonstrate how the process of science works. 4. Utilize computers as a scientific tool to investigate, to simulate experiments, to analyze scientific problems, and to present experimental results.
3. Represent scientific data symbolically, graphically, numerically, and verbally.	<ol style="list-style-type: none"> 1. Conduct experiments in photosynthesis, respiration, and transpiration and explain the effects of environmental parameters on these processes 2. Utilize computers as a scientific tool to investigate, to simulate experiments, to analyze scientific problems, and to present experimental results.
4. Interpret scientific information and draw logical references from representations such as formulas, equations, graphs, tables, and schematics.	<ol style="list-style-type: none"> 1. Conduct experiments in photosynthesis, respiration, and transpiration and explain the effects of environmental parameters on these processes. 2. Describe the importance of plants both for the natural ecosystems and for the survival of the human civilization. 3. Utilize computers as a scientific tool to investigate, to simulate experiments, to analyze scientific problems, and to present experimental results.
5. Evaluate the results obtained from scientific methods for accuracy and/or reasonableness.	<ol style="list-style-type: none"> 1. Conduct experiments in photosynthesis, respiration, and transpiration and explain the effects of environmental parameters on these processes. 2. Utilize computers as a scientific tool to investigate, to simulate

	experiments, to analyze scientific problems, and to present experimental results.
<u>Only need one Course Outcome per BOR Outcome, if all aspects of the BOR Outcome is covered by the Course Outcome.</u>	<p><i>Additional Outcomes</i></p> <ol style="list-style-type: none"> 1. Describe how the cell is the basic unit of function and structure for all plants. 2. Explain how all plants carry out the basic functions of all life through division of labor, which plants have evolved in response to living in varied habitats. 3. Explain how, through the process of natural selection, plants are best adapted to survive in their environments by examining plant morphology and anatomy. 4. Demonstrate a botanical vocabulary sufficient to use an identification key as well as to read literature in the plant sciences. 5. Compare and contrast terrestrial life cycles in terms of the Alternation of Generations. 6. Describe the evolutionary advances of terrestrial plants. 7. Describe the processes involved in Gymnosperm and Angiosperm reproduction. 8. Explain transpiration in relation to the space→air→soil continuum and other environmental parameters. 9. Successfully plant a tree and describe the factors to be considered for tree siting. 10. Explain and successfully conduct experiments in plant tissue

culture using aseptic technique.

11. Describe the importance of plants both for the natural ecosystems and for the survival of the human civilization.
12. Demonstrate proficiency in using the following standard laboratory equipment and tools: microscopes, pH meter, spectrophotometer, laminar flow hood, micropipettes, triple-beam and electronic balances, and computer interfaced-data acquisition probes with its software.
13. 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.