Butler Community College
Behavioral Science, Math, Science, and
Physical Education Division

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Implemented Fall 2008
Textbook Update Fall 2009

COURSE OUTLINE
Majors Biology II (Plant)

Course Description
BI 130. Majors Biology II (Plant). 5 hours credit. This course will enable a student to develop an understanding of the relationship between cell respiration and photosynthesis, biology of plants, principles of ecological interactions and basis of the evolutionary process. This is a part of a two semester course for perspective biology major. This course includes 2 one-and-a-half hour lecture periods and 2 two-hour laboratory periods per week.

Course Relevance
Ecological and evolutionary principles affect the health and daily lives of students. By understanding the connections between choices students make in everyday life and the effects of these choices on the environment, students will gain insight into relationships between organisms and how life evolved and organisms continue to evolve today.

Required Materials
Mader, S., *Biology* (10th ed.). New York, NY: McGraw-Hill.

Palladino, J. (2000). *Biologylabs-on-line.* San Francisco, CA: Benjamin-Cummings

Learning Outcomes
The intention is for the student to be able to:
1. Describe the relationship between cell respiration and photosynthesis in the cell
2. Describe basic principles of ecological interactions
3. Describe the basis of evolutionary process

Learning PACT Skills that will be DEVELOPED and/or documented in this course
Through the student's involvement in this course, he/she will develop his/her ability in the following PACT skill areas:

Analytical Thinking Skills
1. Critical thinking
   - Through the application of concepts to new situations, the student will develop critical thinking skills.

Major Summative Assessment Task(s)
These learning outcomes and the Learning PACT skills will be demonstrated by
1. Designing and executing an experiment that demonstrates a sound scientific process and reporting the results in a scientific paper format
2. Researching a particular form of cancer and making an oral presentation

Course Content

I. Themes – Key recurring concepts that run throughout this course:
   A. Scientific process
   B. Molecular and cellular basis of life
   C. Genetic basis of living processes
   D. Connection between structure and function
   E. Homeostasis feedback
   F. Evolutionary history

II. Issues – Key areas of conflict that must be understood in order to achieve the intended outcome:
   A. Balance between the reductionism (molecular/mechanical) view point and emergent properties as the level of complexity increases
   B. Comparison of the proximate (direct) causal explanation and the ultimate (evolutionary) explanation for biological phenomena
   C. Resolving personal/religious values with the implications of evolutionary process

III. Concepts – Key concepts that must be understood to address the issues:
   A. Relationship of structure and function at the cellular, individual and population levels
   B. Chemical basis of metabolism, physiological processes, cell respiration and protein synthesis
   C. Adaptations as a compromise between competing selective pressures
   D. Scientific process and acquisition, analysis and interpretation of data and general concepts
   E. Inter-relationship between man, other species and the physical environment

IV. Skills/Competencies – Actions that are essential to achieve the course outcomes:
   A. Apply the scientific process to experiments and data analysis
   B. Integrate concepts that occur at different levels of perspective: cellular, organism, population
   C. Identify biological structures and their functions
   D. Describe the relationship between processes of various systems

Learning Units

I. Scientific process
   A. Application of scientific method
   B. Writing scientific paper
   C. Analysis of scientific paper

II. Chemistry and cells
   A. Biochemical molecules
   B. Ionic versus covalent bonds
   C. Movement of materials across membrane
   D. Cell theory
   E. Cell membrane structure and function
   F. Five kingdoms

III. Cellular metabolism

A. Enzymes
B. Oxidation-reduction reaction
C. ATP cycle
D. Photosynthesis
E. Aerobic respiration
F. Anaerobic respiration
G. Connection between photosynthesis and respiration

IV. Development
A. Life cycles
B. Early development
C. Induction
D. Gene regulation
E. Cancer

V. Plant diversity
A. Fungi life cycle
B. Bryophyte life cycle
C. Fern life cycle
D. Gymnosperm life cycle
E. Angiosperm life cycle
F. Plant structure and function
G. Growth and hormones

VI. Evolution
A. Fixed versus evolving species
B. Classification
C. Population genetics
D. Natural selection
E. Speciation
F. Human evolution

VII. Ecology
A. Species interactions
B. Populations
C. Ecosystems
D. Human impact

Learning Activities

Learning activities will be assigned to assist the student with mastery of course concepts, practice of critical thinking skills applied to new situations an study guide exercises. Independent and collaborative activities will be assigned in and outside of class. Examples of activities that contribute to the learning process include the followng: instructor lecture, study guide assignments, class presentations, exams, quizzes and reports.

Grade Determination
The student will be graded on performance on quizzes and exams that measure the level of mastery of concepts. The student will also be evaluated on the completion of lab reports, lab exercises, written research activities, projects and oral presentations to the class.