

BLINN COLLEGE

MASTER COURSE SYLLABUS

Biology 1411 – General Botany

CIP Approval # 26.0301.5103

CIP Area: Life Sciences

Fall, 2005

Prepared by:

Bryan Campus / Date

Confirmed by:

Division Chair, Brenham Campus / Date

Division Chair, Bryan Campus / Date

Brenham Academic Dean / Date

Bryan Academic Dean / Date

Vice President Academic Affairs / Date

Biology 1411 General Botany

This course is in the core curriculum

Purpose Statement

The purpose of the natural science component in the core curriculum is to enable the student to understand the basic concepts in the natural sciences and to apply that understanding to the analysis of current issues in society. Specifically, Biology 1411 is an introductory biology course designed to provide students with an understanding of the plant world by using a systematic and physiological approach. Biology 1411 is a general and transferable elective or required course that will satisfy science requirements of students in the sciences, agriculture, education, humanities and related fields.

Course Description

Biology 1411 – General Botany

A systematic study of the plant world from algae through vascular plants including structure, metabolism, life cycles and genetics. Three class hours and three laboratory hours per week.

Prerequisite: None. Credit: Four semester hours.

1. Expanded Course Description

A. Major areas to be covered in lecture are:

- 1) Introduction to Plant Science
- 2) The Plant Cell: Structure and Metabolism
- 3) Photosynthesis
- 4) Diversity: Taxonomy and Systematics
- 5) Evolutionary History of Plants
- 6) Life Cycles
- 7) Plant Genetics
- 8) Biodiversity: Fungi and Algae
- 9) Biodiversity: Bryophytes and Seedless Vascular Plants
- 10) The Plant Body: Structure and Development
- 11) Biodiversity: Gymnosperms, Angiosperms
- 12) Angiosperm Plant Body: Structure and Development
- 13) Adaptations of Flowering Plants
- 14) Physiology of Seed Plants
- 15) Plant Ecology
- 16) Agriculture and Medicine
- 17) Current Issues

B. Major areas to be covered in laboratory are:

- 1) The Plant Cell: Structure and Metabolism
- 2) Chemistry: Inorganic and Organic
- 3) Energy Flow, Respiration, Photosynthesis
- 4) Plant Structure and Development
- 5) Genetics and Evolution
- 6) Plant Reproduction and Life Cycles
- 7) Taxonomy and Systematics

- 8) Fungi and Protista
- 9) Bryophytes and Seedless Vascular Plants
- 10) Gymnosperms: Biodiversity and Anatomy
- 11) Angiosperms: Biodiversity and Anatomy
- 12) Angiosperm Anatomy and Development
- 13) Physiology of Seed Plants
- 14) Plant Adaptations
- 15) Plant Ecology
- 16) Current Issues in Plant Science

2. Classroom Hours: Three lecture hours and three laboratory hours per week.

3. Credit Hours: Four credit hours.

4. Prerequisite: None

5. Core Course: This is a Core Course in the 42-hour Core of Blinn College; more can be found at www.blinn.edu/corecurriculum/. As such, students will develop proficiency in the appropriate Intellectual Competencies, Exemplary Educational Objectives, and Perspectives as listed below.

A. Intellectual Competencies

- 1) **Reading:** The ability to analyze and interpret a variety of printed materials, books, documents and articles – above the 12th grade level.
- 2) **Writing:** The ability to produce clear, correct and coherent prose adapted to purpose, occasion and audience - above the 12th grade level.
- 3) **Listening:** The ability to analyze and interpret various forms of spoken communication, possess sufficient literacy skills of writing, reading – above 12th grade level.
- 4) **Critical Thinking:** The ability to think and analyze at a critical level.
- 5) **Computer Literacy:** The ability to understand our technological society, use computer-based technology in communications, solving problems, acquiring information.

B. Exemplary Educational Objectives

- 1) Understand and apply method and appropriate technology to the study of natural sciences.
- 2) Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings and analyses.
- 3) Identify and recognize the differences among competing scientific theories.
- 4) Demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
- 5) Demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.

C. Perspectives

- 1) Recognize the importance of maintaining health and wellness.
- 2) Develop a capacity to use knowledge of how science and the environment affect their lives.
- 3) Develop personal values for ethical behavior
- 4) Use logical reasoning in problem solving.

- 5) Integrate knowledge and understand the interrelationships of the scholarly disciplines.

Course Objectives and Student Learning Outcomes

These learning outcomes and course objectives will include the student demonstrating competence in following areas.

Lecture Objectives:

- 1) Elaborate on the development of scientific problem-solving
- 2) Describe the mechanisms of evolutionary change
- 3) Demonstrate knowledge of the evolutionary history of plants
- 4) Display understanding of the anatomy of a plant cell
- 5) Communicate knowledge of plant cell physiology
- 6) Elaborate on plant life cycles
- 7) Display knowledge of plant genetics
- 8) Demonstrate knowledge of taxonomy and phylogeny
- 9) Describe plant development
- 10) Demonstrate understanding of plant structures and functions
- 11) Describe plant adaptations
- 12) Display understanding of plant ecology
- 13) Communicate understanding of agricultural practices
- 14) Relate plants to medicine
- 15) Display knowledge of plant diversity to society

Laboratory Objectives:

- 1) Demonstrate familiarity with the fundamentals of laboratory safety
- 2) Display an understanding of problem solving in science
- 3) Use laboratory equipment in a correct manner
- 4) Relate biological concepts to laboratory activities

Course Requirements

Upon completion of the course, the student will have an overall average of $\geq 60\%$ of the combined lecture and laboratory components of the course. This includes at least 3 major lecture exams and a comprehensive final examination. The student will demonstrate an understanding of the laboratory exercises through analysis of the data and the ability to use the data to solve problems. Laboratory examinations will be designed to address both knowledge and skills.

Grading System

The following areas will be clearly outlined by the instructor in the Course Information Sheet given to the students.

1. Major Exams: At least three major exams covering the lecture material, evenly distributed throughout the semester. Information from laboratory experiments may be included on major exams.
2. Laboratory: At least two laboratory examinations on knowledge and skills acquired through laboratory activities.
3. Minor Exams/Quizzes/Homework: Given at the discretion of the instructor.
4. Additional Reports or Projects: Assigned at the discretion of the instructor.

5. Final Exam: Comprehensive exam covering the entire course.

Outcomes Inventory

Biology 1411 will be evaluated through the following methods:

1. A pretest and posttest instrument to determine the extent of student improvement during the semester.
2. Each Intellectual Competency listed above will be evaluated to measure its attainment:
 - A. **Reading:**
 - 1) Exam or quiz over assigned textbook readings or
 - 2) Lab assignment or exam or quiz over lab book readings or
 - 3) Written assignment or exam over assigned journal articles.
 - B. **Writing:**
 - 1) Written assignment or term paper or
 - 2) Essay question on exam.
 - C. **Listening:**
 - 1) Exam or quiz over lecture material or video.
 - D. **Critical thinking:**
 - 1) Lab assignment or exam or quiz involving problem solving.
 - E. **Computer literacy:**
 - 1) quiz over assignments using Internet and/or other computer activities.

Calendar

The instructor will ensure that the course content is covered in a manner that fulfills the course objectives. The instructor will also provide Course Information Sheets to the students and the administration. Important details including tentative examination dates and due dates for assignments are provided.

Lecture Topics

1. Introduction to Plant Science
2. The Plant Cell: Structure and Metabolism
3. Photosynthesis
4. Diversity: Taxonomy and Systematics
5. Evolutionary History of Plants
6. Life Cycles
7. Biodiversity: Fungi and Algae
8. Biodiversity: Bryophytes and Seedless Vascular Plants
9. The Plant Body: Structure and Development
10. Biodiversity: Gymnosperms, Angiosperms
11. Angiosperm Plant Body: Structure and Development
12. Adaptations of Flowering Plants
13. Physiology of Seed Plants
14. Plant Ecology
15. Agriculture and Medicine
16. Current Issues in Plant Science

Laboratory Topics

1. The Plant Cell: Structure and Metabolism
2. Chemistry: Inorganic and Organic
3. Energy Flow, Respiration, Photosynthesis
4. Plant Structure and Development
5. Genetics and Evolution
6. Plant Reproduction and Life Cycles
7. Taxonomy and Systematics
8. Fungi and Protista
9. Bryophytes and Seedless Vascular Plants
10. Gymnosperms: Biodiversity and Anatomy
11. Angiosperms: Biodiversity and Anatomy
12. Angiosperm Anatomy and Development
13. Physiology of Seed Plants
14. Plant Adaptations
15. Plant Ecology
16. Current Issues in Plant Science

Materials:

Required:

Lecture Materials:

Biology of Plants. 7th ed. 2005. Peter H. Raven, R. F. Evert and S. E. Eichhorn.
W. H. Freeman and Company.

Laboratory Materials:

Laboratory Topics in Botany. 7th ed. 2005. Ray F. Evert, Susan E. Eichhorn &
J.B. Perry. W. H. Freeman and Company.

Recommended:

A Photographic Atlas for the Botany Laboratory, 3rd ed. 1996. K.M. Van De
Graaf & J.L. Crowley. Morton Publ. Co.