

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO205

GENERAL BOTANY

5 Credit Hours

**Prepared by:
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by
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**Arts and Science Education
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BIO205 GENERAL BOTANY

I. CATALOGUE DESCRIPTION

Prerequisite: High school biology and chemistry with a grade of "C" or better, or BIO101 5 semester hours credit

General Botany deals with structure, function and organization of plant life. It includes a survey of the plant kingdom and identification of common native plants. Laboratory time is required. General Botany will satisfy the laboratory science requirement for the Associate of Arts degree. (F)

II. GENERAL COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- A. Understand and be able to apply some basic procedures of the scientific method.
- B. Have a basic understanding of the cell and its processes
- C. Have a basic understanding of chemistry and its role in the botanical world.
- D. Understand the processes behind photosynthesis and cellular respiration.
- E. Distinguish between the two main classes of terrestrial plants.
- F. Have an understanding of the structures and functions of important plant tissues.
- G. Be able to work genetics problems involving monohybrid and dihybrid crosses.
- H. Demonstrate a knowledge of natural selection and how it operates.
- I. Understand botanical classification.
- J. Have a basic understanding of ecology, its principles and terminology.
- K. Demonstrate the ability to use floral keys to identify native vegetation.
- L. Demonstrate the ability to compile a plant collection.

III. COURSE OUTLINE (course content will be drawn from this)

- A. Scientific method
- B. Cells
- C. Chemistry
- D. Organic chemistry
- E. Energy
- F. Dominant Terrestrial Plant Classes
- G. Tissues
- H. Plant Nutrition
- I. Genetics and Heredity
- J. Evolution
- K. Classification
- L. Ecology

IV. UNIT OBJECTIVES

- A. Scientific Method
 - 1. Understand the concepts of the scientific method including the relationship of hypothesis, theory, and law.
- B. Cells
 - 1. Describe the basic characteristics of cells and explain the differences between prokaryotic and eukaryotic cells.
 - 2. Recognize cellular organelles and describe their functions.
 - 3. Identify the various phases of the cell cycle.
- C. Chemistry
 - 1. Understand basic chemical principles including atomic electron energy levels, bonding, acids, bases, and buffers.
 - 2. Describe the biologically important properties of water.

- D. Organic Chemistry
1. Recognize and know functions and examples of the basic types of biological (organic) molecules: carbohydrates, lipids, proteins, and nucleic acids.
- E. Energy
1. Understand the laws of thermodynamics.
 2. Understand how exergonic and endergonic reactions may be coupled.
 3. Describe the overall process of glycolysis and the location and conditions where these reactions occur.
 4. Explain how the presence or absence of oxygen affects the outcome of cellular respiration.
 5. Describe the overall process of the Krebs cycle and the electron transport chain.
 6. Know the differences in ATP production during aerobic vs. anaerobic respiration.
 7. Know the role of pigments in absorbing light energy.
 8. Describe the reactions of photosynthesis and where they occur.
 9. Know the structures associated with photosynthesis and their role.
- F. Dominant Terrestrial Plant Class
1. Differentiate between flowering plants and conifers.
 2. Describe the typical life cycles of flowering plants and conifers.
 3. Know the characteristic differences between conifers.
 4. Know the characteristic differences between flowering plants.
- G. Tissues
1. Characterize the basic types of plant cells.
 2. Know the structure and function of plant tissues.
 3. Know the major components and functions of tissues in the root, stems, and leaves.
- H. Plant Nutrition
1. Know the pathway of water and minerals from the soil, through the plant, and into the atmosphere.
 2. Know the pathway of movement of sugars in the plant.
- I. Genetics and Heredity
1. Know the structure and functions of DNA and the process of replication.
 2. Know the differences between RNA and DNA.
 3. Understand the steps involved in making a protein.
 4. Understand the relationship between meiosis and gamete formation.

5. Understand and be able to work Mendelian inheritance problems involving monohybrid and dihybrid crosses.
6. Understand the common variations on Mendelian themes.

J. Evolution

1. Understand Natural Selection.
2. Understand the Hardy-Weinberg Law.
3. Know the various pathways which may be followed during the process of speciation.

K. Classification

1. Know what is meant by a hierarchical system of classification and be able to list the levels of classification of the Plant Kingdom.
2. Know the classification characteristics of Kingdoms Monera, Protista, and Fungi.

L. Ecology

1. Know the basic concepts of food chains.
2. Know the processes involved in ecological succession.
3. Know the basic concepts of population ecology.

V. METHOD OF INSTRUCTION

- A. Lectures
- B. Laboratory Exercises
- C. Class Discussion
- D. Reading Textbook
- E. Field Work

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

Graham, L.E, J.M. Graham and L.W. Wilcox, Plant Biology, 2nd ed. Pearson/ Prentice Hall

Dennison, E., Missouri Wildflowers, 5th edition, Missouri Department of Conservation, 1998

Golden Field Guide, Trees of North America, St. Martin Trade, 2001.

Plotkin, M, Tales of a Shaman's Apprentice, Penguin Putnam Inc., 1993.

VII. REQUIRED MATERIALS (Student)

Writing paper, pens

VIII. SUPPLEMENTAL REFERENCES

A. Steyermark, J., Flora of Missouri, Ames, Iowa: Iowa State University Press, 1981.

B. Various floral field guides

IX. METHOD OF EVALUATION (Student)

A. Lecture Examinations

B. Laboratory Practicals

C. Plant Identification Collection