



BROWARD COLLEGE COURSE OUTLINE

LAST REVIEW: 2010-2011

(i.e. 2006-2007)

NEXT REVIEW: 2015-2016

(i.e. 2011-2012)

STATUS: A

(A, I, D)

COURSE TITLE: General Botany

COMMON COURSE NUMBER: BOT2010

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN

(Per 16 week term)

CLOCK HOURS:

(Voc. Course ONLY)

Lecture: 48

Lab:

Clinic:

Other:

PREREQUISITE(S): None

COREQUISITE(S): BOT2010L

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum)*: Course designed to treat entire plant kingdom with emphasis on structure, function and genetics of flowering plants. Fundamental cell and tissue structures of both vascular and non-vascular plants are studied. Associated physiological and chemical effects as related to function are emphasized.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): 4A
General Education Requirements – Associate in Science Degree (AS), meets Area(s): 4A
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. Reading and Writing in the Botanical Sciences
2. Introduction - The Plant
3. The Plant Cell and its Physiology
4. Structure and Growth of Stems
5. Photosynthesis and the Leaf
6. Respiration and Digestion
7. Root Structure and Development
8. Soils and Plant Nutrition (Optional)
9. The Flower Structure and Seed Development
10. Fruit Development and Structure
11. Sexual and Asexual Propagation
12. Plant Growth and Differentiation
13. The Relationship of Plants to their Environment
14. Alternation of Generations - Plant Life Cycles
15. Survey of the Plant Kingdom
16. Inheritance in Plants

*** Complete the following only if course is seeking general education status ***

GENERAL EDUCATION Competencies and Skills *:

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

Course must include <u>all</u> of the following:	
1. Read with critical comprehension**	2.2, 2.4 3.2, 3.4 4.1, 4.2 5.2 6.2, 6.4 7.4, 7.6 9.1 11.5 13.4 14.3 15.2 16.1
2. Write clearly and coherently**	2.1, 2.2 3.5, 3.7 4.3 5.4 6.2 7.3 8.1 9.4 10.1 12.1 13.2 14.1 15.1 16.3
3. Demonstrate literacy as appropriate within a given discipline** A – Information literacy B – Technology literacy F – Scientific literacy G – Environmental literacy	A – 2.1; 3.1, 3.5; 4.3, 4.4; 5.1, 5.2; 6.2; 7.3; 8.2; 9.2; 11.3; 13.3; 15.1 B – 8.9; 9.8; 12.4; 15.3 F – 2.2, 2.3; 3.1, 3.2, 3.3, 3.7; 4.1; 5.4; 6.4; 7.8; 8.3, 8.4; 9.7; 12.2; 15.2 G – 2.5; 5.5; 7.8, 7.10; 8.9; 9.8, 9.9; 11.4, 11.7; 12.4; 13.5, 15.3
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**	7.7, 7.8, 7.10; 8.9; 9.8, 9.9; 11.4, 11.7; 12.3, 12.4; 13.5; 15.3; 16.4
Course must include at least <u>one</u> of the following:	
5. Differentiate between ethical and unethical behavior	
6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.	2.5; 7.7, 7.8, 7.10; 8.9; 9.8, 9.9; 11.4, 11.7; 12.3, 12.4; 13.5; 15.3
7. Demonstrate an understanding of and appreciation for human diversities and commonalities.	
8. Speak and listen effectively.	

**General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

****Required Competencies**

1) **Read with critical comprehension.**

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

2) **Write clearly and coherently.**

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

3) **Demonstrate and apply literacy across all the disciplines (indicate which ones apply).**

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one's own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.
- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.
- g) **Environmental literacy** is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

4. **Apply problem-solving skills or methods to make informed decisions in a variety of contexts.**

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	2.4, 5.1, 7.6, 14.1
3. Research Papers	
4. Group projects	
5. Discussions (In class and online)	3.2, 7.1, 10.3, 13.2
6. Multiple Choice tests	8.6, 12.2
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	
10. Take-home tests	
11. Summaries, critiques, and analyses	3.5, 4.3, 5.4, 6.2, 8.2, 9.1, 10.1, 11.4, 12.1, 14.2
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	6.4, 11.2, 13.3, 16.2
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain) Concept maps, diagrams	2.1, 4.2, 5.2, 6.3, 9.2

UNITS**Unit 1 Reading and Writing in the Biological Sciences****General Outcome:**

- 1.0 The student shall be able to demonstrate reading with critical comprehension by clearly communicating in writing information derived from course related readings the major concepts and themes in the botanical sciences.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Demonstrate in writing the ability to analyze and extract data relevant to biology from course related readings.
- 1.2 Evaluate the validity of information from a variety of sources.
- 1.3 Demonstrate using diagrams, drawings, outlines, concept maps, and/or other methods connections among biological concepts.
- 1.4 Demonstrate the ability to use the appropriate technology to carry out course requirements.

Unit 2 Introduction - The Plant

General Outcome:

- 2.0 The student shall demonstrate an understanding of the basic characteristics of the plant and the basic areas of study in the science of plants.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through an analysis of textbook readings and assigned readings shall be able to:

- 2.1 categorize the basic fields of botany.
- 2.2 assess the identification, classification and naming of plants.
- 2.3 illustrate and explain the basic vegetative parts of the plant.
- 2.4 contrast the significant events in the history of botany.
- 2.5 evaluate the environmental impact of the significant events in the history of botany.

Unit 3 The Plant Cell and its Physiology

General Outcome:

- 3.0 The student shall: be able to demonstrate an understanding of the structure and function of different basic plant cells.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through an analysis of textbook readings and scholarly journal articles shall be able to:

- 3.1 evaluate the structure and function of the nucleus and cytoplasm.**
- 3.2 analyze the structure and function of the cell wall and cell membrane.**
- 3.3 differentiate the moderately specialized plant cells.**
- 3.4 contrast the highly specialized plant cells.**
- 3.5 critique the relationship and function of cell organelles.**
- 3.6 explain the cell cycle.**
- 3.7 generate an interpretation of ploidy.**

Unit 4 Structure and Growth of Stems

General Outcome:

- 4.0 **The student shall: be able to demonstrate an understanding of the structure, development and function of the plant stem.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and assigned readings shall be able to:

- 4.1 **evaluate the structure, development and function of the apical meristem and the 3 primary meristems in stem tips.**
- 4.2 **compare the differences between monocot and eudicot stems.**
- 4.3 **produce a summary of the functions of primary and secondary meristems.**
- 4.4 **differentiate primary and secondary growth.**

Common Course Number: BOT2010

UNIT 5 Photosynthesis and the Leaf

General Outcome:

- 5.0 **The student shall: be able to demonstrate an understanding of the basic processes involved in photosynthesis and how they relate to the morphology of the leaf.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through an analysis of textbook readings and scholarly journal articles shall be able to:

- 5.1 **justify the structure of a leaf.**
- 5.2 **discriminate between monocot, eudicot, and gymnosperm leaves.**
- 5.3 **explain the relationship of leaf cells to the tissues of the leaf.**
- 5.4 **formulate a summary of photosynthesis.**
- 5.5 **assess the environmental impact of photosynthesis.**

Unit 6 Cellular Respiration and Digestion

General Outcome:

6.0 The student shall: be able to demonstrate an understanding of cellular respiration and digestion.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and assigned readings shall be able to:

- 6.1 examine the production, storage and digestion of plant metabolites.**
- 6.2 produce an assessment of the mitochondrion.**
- 6.3 illustrate the events of cellular respiration.**
- 6.4 compare the similarities and differences between cellular respiration and photosynthesis.**

Unit 7 Root Structure and Development

General Outcome:

- 7.0 The student shall: be able to demonstrate an understanding of the structure, development and function of the root.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through an analysis of textbook readings and scholarly journal readings shall be able to:

- 7.1 determine the structure, development and function of the apical meristem and the 3 primary meristems in root tips.**
- 7.2 illustrate the 4 zones of a root tip.**
- 7.3 contrast the differences between monocot and eudicot roots.**
- 7.4 differentiate the functions of primary and secondary meristems.**
- 7.5 compare primary and secondary growth.**
- 7.6 evaluate the absorption of water and minerals with mycorrhizal associations.**
- 7.7 choose the mycorrhizae that would be best suited for a selected plant.**
- 7.8 determine the environmental impact of using the incorrect mycorrhizae for a selected plant.**
- 7.9 construct the movement of water and minerals from primary to secondary tissues in the root, stem and leaves.**
- 7.10 evaluate the environmental impact of xeriscaping.**

Common Course Number: 2010

Unit 8 Soils and Plant Nutrition (Optional)

General Outcome:

8.0 The student shall: be able to demonstrate an understanding of the structure of soil and the availability of soil nutrients.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and scholarly journal articles shall be able to:

- 8.1 explain the mineral and organic structure in soils.
- 8.2 evaluate edaphic factors and their interrelationships.
- 8.3 measure field capacity.
- 8.4 critique the ionic exchange capacity of various soil types.
- 8.5 illustrate the relationship of pH and nutrient availability.
- 8.6 categorize the 16 elements necessary for optimum plant growth and development.
- 8.7 differentiate the elements necessary for the best growth of a selected plant.
- 8.8 interpret fertilizer labels.
- 8.9 select a fertilizer that would be the most ecologically suited for a selected plant and environment utilizing appropriate University/College Library and scientific electronic databases.

Unit 9 The Flower Structure and Seed Development

General Outcome:

- 9.0 **The student shall: be able to demonstrate an understanding of the development, structure and function of the flower along with the production of seeds in the ovary.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through an analysis of textbook readings and scholarly journal readings shall be able to:

- 9.1 **analyze the development, structure and function of a flower.**
- 9.2 **categorize the major inflorescence types.**
- 9.3 **choose the collective names for all flower parts.**
- 9.4 **compare the processes of microsporogenesis and megasporogenesis.**
- 9.5 **justify double fertilization and explain its significance.**
- 9.6 **compose an illustration of the development of an ovule to a seed from the zygote to fully developed embryo.**
- 9.7 **explain synchronous dichogamy.**
- 9.8 **select a plant that would be the most ecologically suited for selected wildlife utilizing appropriate University/College Library and scientific electronic databases.**
- 9.9 **determine the impact of planting an environmentally unsuitable plant.**

Unit 10 Fruit Development and Structure

General Outcome:

- 10.0 The student shall: be able to demonstrate an understanding of the development and structures of the fruit.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and assigned readings shall be able to:

- 10.1 generate a summary of the development of a fruit from the flower ovary and accessory flower parts.
- 10.2 categorize the major fruit types.
- 10.3 compare seed distribution processes from the different types of fruit.

Unit 11 Sexual and Asexual Propagation

General Outcome:

- 11.0 The student shall: be able to demonstrate an understanding of the various methods of sexual and asexual.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and assigned readings shall be able to:

- 11.1 compare the internal and external morphology of the seed and their functions.
- 11.2 assess the factors necessary for seed germination.
- 11.3 evaluate the most common methods of seed germination.
- 11.4 determine the environmental impact of a selected seed germination method.
- 11.5 evaluate the advantages and disadvantages of sexual versus asexual propagation.
- *11.6 judge the various advantages and disadvantages of seed planting mediums.
- *11.7 evaluate the environmental impact of a selected seed planting medium.
- *11.8 contrast the various techniques of bud grafting.
- *11.9 analyze the various techniques of stem grafting.
- *Optional

Unit 12 Plant Growth and Differentiation

General Outcome:

- 12.0 The student shall: be able to demonstrate an understanding of basic plant growth and differentiation theories.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and assigned journal readings shall be able to:

- 12.1 summarize the theories of plant differentiation from the molecular to organismal.
- 12.2 interpret the complexities of hormonal control of plant development.
- 12.3 determine the most ecologically suitable hormones to be used in a selected plant.
- 12.4 evaluate the environmental impact of using inappropriate hormones on a selected plant utilizing appropriate University/College Library and scientific databases.
- 12.5 explain the photoperiodic response in plants.
- 12.6 categorize the trophic responses in plants.

Unit 13 The Relationship of Plants to their Environment

General Outcome:

- 13.0 **The student shall: be able to demonstrate an understanding of the basics of ecology.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and scholarly journal articles shall be able to:

- 13.1 **explain the basic terms in the field of ecology.**
- 13.2 **contrast the four factors necessary for an ecosystem.**
- 13.3 **categorize the 7 major world vegetation types and the factors controlling each.**
- 13.4 **evaluate the principles of plant succession.**
- 13.5 **determine the environmental impact of planting an ecologically unsuitable plant on a selected ecosystem.**
- 13.6 **design an illustration of food webs.**

Common Course Number: BOT2010

Unit 14 Alternation of Generations - Plant Life Cycles

General Outcome:

- 14.0 **The student shall: be able to demonstrate an understanding of the alternation of gametophyte and sporophyte generations as applied to the theory of plant evolution and the basic plant life cycles.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and assigned readings shall be able to:

- 14.1 **compare the alternation of gametophyte with sporophyte generations in any plant life cycle.**
- 14.2 **analyze the theory of evolution of primitive plants versus advanced plants.**
- 14.3 **explain the 3 basic life cycles.**
- 14.4 **categorize any given plant into one of the three basic life cycles.**

Common Course Number: BOT2010

Unit 15 Survey of the Plant Kingdom

General Outcome:

- 15.0 The student shall: be able to demonstrate an understanding of the phylogeny in the plant kingdom starting with the bacteria and finishing with flowering plants.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through textbook readings and scholarly journal articles shall be able to:

- 15.1 compare and contrast the characteristics which distinguish all plant divisions.
- 15.2 analyze the ways Prokaryotes, Algae, Eumycota, Bryophyta, Prototrichophytes, Pterophyta, Gymnosperms, and Angiosperms have influenced ecology.
- 15.3 select a plant that would be the most ecologically suited for a selected environment utilizing appropriate University/College Library and scientific electronic databases.

Unit 16 Inheritance in Plants**General Outcome:**

- 16.0 **The student shall: be able to demonstrate an understanding of the basic principles of heredity in plants.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student through an analysis of textbook readings shall be able to:

- 16.1 **interpret the basic Mendelian Laws of heredity.**
- 16.2 **explain the basic terms used in inheritance.**
- 16.3 **contrast monohybrid and dihybrid crosses.**
- 16.4 **solve problems of heredity.**
- 16.5 **critique linkage, crossovers and inversions as applied to genetics.**
- 16.6 **evaluate the complexities of applied genetics.**