



Course Description

BOT3015L | Survey of Plant Diversity Laboratory | 1.00 credit

This course is designed to provide the necessary laboratory experiments and dissection exercises to supplement/accompany the BOT 3015 Survey of Plant Diversity lecture course. Students will learn about the plant kingdom and with emphasis on structure, function and genetics of plants. Dissections and laboratory exercises are designed to explore the fundamental cell and tissue structures of both vascular and non-vascular plants. Prerequisites: BSC2010, 2010L, 2011, 2011L. Corequisite: BOT3015.

Course Competencies

Competency 1: The student will demonstrate knowledge of bright field microscopy and identify and contrast common organisms from Monera, Protista, Fungi, and Archaea by:

1. Describing the parts and function of a compound microscope
2. Demonstrating the care and use of both compound and dissection microscopes
3. Identifying the general shape and size of bacteria
4. Comparing different groups of protozoa and algae using representative members of each group
5. Differentiating between asexual reproduction and sexual reproduction in fungi
6. Identifying the different asexual spores in fungi
7. Identifying the different sexual reproductive structures and sexual spores in fungi, and how they are used in the classification of fungi
8. Identifying representative members of archaea
9. Describing the nature and structure of lichens

Competency 2: The student will demonstrate knowledge of and identify common vascular and nonvascular plants including bryophytes, ferns, gymnosperms, and angiosperms by:

1. Describing the life histories and related reproductive structures of mosses and liverworts.
2. Describing the distinguishing characteristics of mosses and liverworts.
3. Describing the lifecycles of ferns and their allies.
4. Describing and identifying distinguishing features of Pinophyte, Sphenophyte, Lycophyte and Pterophyte
5. Describing the distinguishing features of gymnosperms and differentiating between the different groups of gymnosperms
6. Identifying the different events in the lifecycle of a pine
7. Identifying the parts and functions of pinecones and pine seed
8. Describing the lifecycle of angiosperms
9. Explaining why angiosperms are the most advanced land plants

Competency 3: The student will demonstrate knowledge of and identify the external parts of angiosperm stems and leaves by:

1. Describing the external structure and function of stems
2. Describing the functional significance of stems
3. Differentiating between dicot and monocot stems
4. Distinguishing between a simple leaf and a compound leaf and describing the parts of a complete leaf
5. Differentiating between monocot and dicot leaves
6. Explaining the adaptations of leaves of emophytes, xerophytes, and hydrophytes

Competency 4: The student will demonstrate knowledge of the development, morphology and anatomy of root systems, stems, and leaves of vascular plants by:

1. Differentiating between tap and fibrous root systems

2. Distinguishing between root hairs and lateral roots
3. Identifying root tissues such as epidermis, cortex, endodermis, pericycle, phloem, xylem and describing their functions
4. Describing and identifying the internal tissues of monocot and dicot stems
5. Describing and identifying the internal anatomy of monocot and dicot leaves
6. Explaining the significance of anatomical differences in leaves

Competency 5: The student will demonstrate knowledge of the development, morphology, and anatomy of plant flowers, fruits, and seeds by:

1. Describing the structure and functions of flowers
2. Describing the events associated with microsporogenesis, megasporogenesis, fruit, and seed development
3. Explaining the seed structure
4. Explaining the diversity of fruits by giving examples

Competency 6: The student will demonstrate knowledge of the roles of autotrophs in ecosystems by:

1. Distinguishing between autotrophs and heterotrophs in an ecosystem
2. Describing the energy flow and nutrient recycling in an ecosystem
3. Analyzing different ecosystems and designing an ideal ecosystem

Competency 7: The student will demonstrate knowledge of the physiological processes of cell respiration and photosynthesis occurring in plant cells and tissues by:

1. Demonstrating and explaining the correlation between the presence of starch and photosynthetic activity in leaves
2. Explaining the paper chromatography technique for separating the plant pigments from leaf extract
3. Demonstrating and explaining the role of carbon dioxide in photosynthesis
4. Explaining the key events in cellular respiration

Competency 8: The student will demonstrate knowledge of plant reproduction and plant cell structures by:

1. Describing the structure and function of cellular organelles visible with a light microscope
2. Identifying and describing different tissue types such as parenchyma, collenchyma, sclerenchyma, epidermis, and vascular tissues with the help of prepared slides
3. Distinguishing between the different phases of mitosis
4. Describing the structure and function of spindle fibers, poles, equator, chromatids, cell plate and phragmoplast

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Solve problems using critical and creative thinking and scientific reasoning
- Describe how natural systems function and recognize the impact of humans on the environment