

Course discipline/number/title: BIOL 1102: Plant Biology

A. CATALOG DESCRIPTION

1. Credits: 3
2. Hours/Week: 2 lecture, 2 lab
3. Prerequisites (Course discipline/number): None
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences, Goal 10/People and the Environment

B. COURSE DESCRIPTION: This course covers the fundamentals of plant biology, focusing on the various types of plants and the basic anatomy and physiology of plants. The course is also designed to promote an awareness of the significance of plants in the natural processes of our biosphere and specifically for humans. Students will be challenged to think about the importance of plants in decision making, from individual, ethical choices to social, economic and policy making-type choices.

C. DATE LAST REVISED (Month, year): October, 2020

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Plant Classification
 - a) Binomial Nomenclature System
 - b) Major Classifications
 - i. Domains
 - ii. Kingdoms
 - iii. Plantae
2. Plant Anatomy
 - a) Gross Anatomy
 - b) Microscopic Anatomy
3. Plant Physiology
 - a) Membrane Transport
 - b) Enzymes and Energy
 - c) Metabolism
 - i. Photosynthesis
 - ii. Cellular Respiration
4. Plant Growth
 - a) Cell Division and Reproduction
 - b) Genetics and Inheritance of Traits
 - c) Responses to Environmental Conditions
 - d) Plant Breeding and Biotechnology
5. Evolution and Ecology
 - a) Evolution and Natural Selection
 - b) Ecological Interactions
 - i. Biogeochemical Cycles and Succession
 - ii. Influence of Humans on Plants

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Describe the phylogenetic relationships of plants, including flowering plants.
2. Identify and describe basic plant structures (seeds to whole plants).
3. Explain and summarize the movement and use of water in plants.
4. Compare and contrast basic life requirements of plants and how these are met.
5. Explain the cellular biology of plants and of plant growth.
6. Recognize, compare, contrast, and apply knowledge of plant physiology, genetics, and biotechnology as applied to plant development and improvement.
7. Recognize, assess, and/or evaluate the importance of plants and the impact of humans on them, e.g., political, social, economic, ethical issues.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
3. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

Goal 10/People and the Environment: The student will be able to:

1. Explain the basic structure and function of various natural ecosystems and of human adaptive strategies within those systems.
2. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions.
3. Propose and assess alternative solutions to environmental problems.
4. Articulate and defend the actions they would take on various environmental issues.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Lecture exams
2. Lecture and/or laboratory quizzes
3. Lecture and/or lab assignments
4. Laboratory practical exams
5. Plant design project
6. Student presentations

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):

1. The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of any materials used during the lab are discussed. In addition, if the lab involves any potentially infectious material, the students will be instructed on the proper use and disposal. The instructor will direct all students to wear necessary protective equipment while working with any hazardous chemicals. Safety Data Sheets for chemicals used are available online.
2. Field lab work may also be part of this course, so students may be outside for some lab activities.