

# Bemidji State University

## **BIOL 3720: Plant Form and Function**

### **A. COURSE DESCRIPTION**

Credits: 4

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

Structure, function, and development of vascular plants. Interrelationships between anatomical structures and physiological processes and how plants cope with environmental challenges. Lecture and laboratory. Prerequisites: BIOL 1211, 1212 and one year of college chemistry or consent of instructor.

### **B. COURSE EFFECTIVE DATES: 05/18/2001 - Present**

## **C. OUTLINE OF MAJOR CONTENT AREAS**

1. Cell membranes
2. Cell walls
3. Plant cell structure
4. Plant tissues
5. Plant organs and growth
6. Plant phylogeny and evolution
7. Water potential and water movement
8. Tall trees are physically impossible
9. Tall trees are physically possible
10. Tension-cohesion theory
11. Leaf E-balance: linking water and photosynthesis
12. Photosynthesis, energy, and light - the basics
13. Overall reactions of photosynthesis, and chloroplast anatomy
14. Light reactions of photosynthesis
15. Photosynthesis: carbon fixation
16. Carbon fixation (2), C3, C4, and CAM
17. Ecophysiology of C3, C4, and CAM
18. Leaf-level productivity
19. Introduction to soils
20. Water movement in soils
21. Nutrients and soils
22. Nutrient uptake and mineral nutrition
23. Plant development
24. Hormones: basics, "Growth hormones"
25. "Stress hormones"
26. Stress physiology: too hot
27. Stress physiology: too cold
28. Stress physiology: too salty
29. Stress physiology: too dry
30. Stress physiology: too wet

## **D. LEARNING OUTCOMES (General)**

1. recognize and understand the basic functions of plant structures, at the cell, tissue, and organ levels.
2. understand the role of water relations in cell turgor; water movement in plants and soil; leaf energy balance; and carbon uptake.
3. understand how photosynthesis links energy uptake from light and carbon uptake from air to produce sugars.
4. know basic soil properties, and how these interact with roots to influence water and nutrient uptake.
5. know how plant hormones coordinate plant development and responses to the environment.
6. understand how overall plant anatomy and physiology is coordinated to respond to environmental stresses.

## **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted