

# Minnesota State College Southeast

## BIOL 2240: Soil Science

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 3

Lab Hours/Week: 1

OJT Hours/Week: \*.\*

Prerequisites:

This course requires either of these prerequisites

CHEM 1010 - Fundamentals of Chemistry

CHEM 0510 - Fundamentals of Chemistry

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

This course is an introduction to soil studies with focus on agricultural soils. Main emphasis of the course will be studying soil health as the balanced condition among soil chemical, physical and biological characteristics, to be achieved through sustainable soil management. Class time will be spent in lecture, lab exercises and field studies to foster learning about agricultural soils. (Prerequisite: CHEM 1010) (4 Credits: 3 lecture/1 lab)

**B. COURSE EFFECTIVE DATES:** 09/20/2018 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Physical, chemical, and biological properties of soil
2. Biological interactions among soils, plants, and fungi
3. Soil management and conservation
4. Environmental impact of soil use

### D. LEARNING OUTCOMES (General)

1. Develop an appreciation for the complexity and diversity of soils and their management to produce food, fodder and fiber.
2. Describe the process of soil formation and the role of plants and fungi in soil formation.
3. Compare and contrast a variety of soil profiles.
4. Describe historical and modern practices and impacts regarding use of soils.
5. Explain the role of the macronutrients (N-K-P) and micronutrients (Cl-Fe-Co-B-Zn-Mo) as they relate to soil fertility.
6. Learn the physical, chemical and biological characteristics of soils and integrate this learning to understand the concept of *soil health* in reference to the soil.
7. Demonstrate methods for evaluating the physical and chemical characteristics of soils.
8. Identify biological indicators of soil health.
9. Demonstrate methods for evaluating the biological characteristics of soils including invertebrate sampling and testing for microbes.
10. Compare and contrast several agricultural methods for maintaining appropriate soil hydration levels.

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

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

## **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

## **G. SPECIAL INFORMATION**

None noted