Course Name: Plants and Civilization

Course Number: BIO* E150

Credits: 4

Catalog description: This course examines aspects of plant biology and the economic and social importance of plants. The course requires that students engage in a community service project either on or off campus for a total of 12 hours.

Prerequisite: ENG *E 101

Corequisite, or Parallel:

General Education Competencies Satisfied:

HCC General Education Requirement Designated Competency Attribute Code(s):

X SCKX **Scientific Knowledge & Understanding**

Additional CSCU General Education Requirements for CSCU Transfer Degree Programs:

X SCRX **Scientific Reasoning**

Embedded Competency(ies):

Discipline-Specific Attribute Code(s):

X SCI **Science elective**

Course objectives:

General Education Goals and Outcomes:

X Scientific Knowledge & Understanding: Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.

X Scientific Reasoning (*for CSCU Transfer Degree Programs*): Students will become familiar with science as a method of inquiry. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.

Course Specific Objectives:

Lecture:

1. Demonstrate knowledge of the economic, medicinal and social importance of plants

2. Demonstrate knowledge of basic chemistry and physiology of plants

3. Describe the gross and microscopic anatomy of plants

4. Demonstrate an understanding of the organization of cells and the hierarchy of life

5. Apply principles of Mendelian genetics to plants.

6. Research and write a term paper on the economic or medicinal importance of a plant species using Internet and library resources

7. Interpret biological information and draw logical inferences from representations such as formulas, equations, graphs, tables and schematics

Laboratory:

1. Design a controlled experiment, collect data, interpret, evaluate and apply the data to determine the effect of fertilizers on the growth and development of plants

2. Design a controlled experiment, collect data, interpret, evaluate and apply the data to describe the role of hormones on plant growth

3. Design a controlled experiment, collect data, interpret, evaluate and apply the data to describe impact of environmental disturbances on plant growth

4. Demonstrate a knowledge of plant structures such as leaves, flowers and fruits

5. Evaluate the results of Mendel's classic genetics experiment and articulate how genetic theory has been refined over the years, discussing sources of error in the design and execution of the experiment.

6. Graph and chart data from laboratory experiments

Course Content:

A. Lecture:

1. Plants in Our Daily Lives
    a. food
    b. clothing (cotton, linen)
    c. medicine
    d. recreation
2. Basic Biology
    a. cell structure and function
    b. tissues
    c. organization of life and living things
    d. osmosis and diffusion
    e. plant physiology (photosynthesis and transpiration)
    f. basic genetics
    g. environmental pollution and plant growth
    h. scientific method
3. The Plant Kingdom and Plant Diversity
    a. Lower plants (mosses, lichens, ferns)
    b. Higher Plants
        - Gymnosperms
        - Angiosperms
4. Plant Structure
    a. roots
    b. shoots
    c. flowers
    d. leaves
    e. fruits
    f. seeds
5. Plant Development
    a. from seed to fruit
6. Reproduction in Plants
    a. Asexual reproduction and propagation methods
    b. Sexual reproduction and propagation methods
7. Chemistry and Nutrition
    a. Basic Chemistry
    b. Carbohydrates
    b. Lipids (fats, oils, waxes)
    c. Proteins
    d. Nucleic Acids
8. Origins of Agriculture
9. Food Plants and What we Consume
    a. Grasses and Grains

b. Legumes
c. GMO's
b. Roots
c. Tubers
d. Stems
e. Leaves

10. Spices and Medicinal Plants

B. Laboratory:

1. Plants in Our Everyday Lives
2. Sexual reproduction and genetics of the Wisconsin Fast Plant.
3. The effects of hormones on the growth of plants
4. The effects of environmental salt on plant growth
5. Use of the Microscope
6. Cells and the organization of life.
7. Structure and function of leaves
8. Identifying trees by their leaves
9. Structure of flowers and fruits
10. Growing plants hydroponically to demonstrate the role of fertilizers
11. Asexual plant propagation using leaves and stems

Date Course Created:

Date of Last Revision: 04/08/2017