RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

BIOL 150: Plants, Humans and the Environment

I. Basic Course Information

A. Course Number and Title: BIOL 150: Plants, Humans and the Environment

B. New or Modified Course: Modified

C. Date of Proposal: Semester: Fall Year: 2023

D. Effective Term: Fall 2024

E. Sponsoring Department: Science & Engineering

F. Semester Credit Hours: 4

G. Weekly Contact Hours: 5 Lecture: 3
Laboratory: 2
Out of class student work per week: 7

H. ☐ Prerequisite (s): None
☐ Corequisite (s): None
☐ Prerequisite (s) and Corequisite (s): None

I. Additional Fees: NO

J. Name and E-Mail Address of Department Chair and Divisional Dean at time of approval: Chair: Marianne Baricevic, Marianne.Baricevic@raritanval.edu; Dean: Sarah Imbriglio, Sarah.Imbriglio@raritanval.edu

II. Catalog Description

Prerequisites: None.
This course explores the relationships between people and plants, with a focus on agriculture, ethnobotany, and the environment. Lectures provide an interdisciplinary perspective on the biological, cultural, economic and political significance of plants and agricultural systems for human societies and the environment. Labs provide a first-hand introduction to human uses of plants (e.g., food, medicine, shelter, fiber, dyes), and how the scientific method can be used to better understand their causes and consequences.

III. Statement of Course Need

A. This course contributes substantially to the diversity of general education offerings at RVCC. It is the only general education lab science course that combines the traditional focus on a body of scientific knowledge, method and theory with its real-world applications in understanding and addressing contemporary and historical environmental and social problems; in this case, related to the human uses of plants.

B. The laboratory component is essential for students to gain hands-on experience in the science of plant biology and ecology as they relate to traditional and modern uses of plants.

C. Course transferability:
    1. This course generally transfers as a General Education course in Science with Lab. This is similar to the Plants and People or Plants and Society courses offered at most four year institutions.
    2. This course generally transfers as a program requirement for ethnobotany or economic botany majors.
    3. This course generally transfers as a plant science, ecology, or related program elective.

IV. Place of Course in College Curriculum

A. Free Elective
B. This course serves as a General Education course in Science with Lab.
C. The course meets the environmental science (lab) elective requirements for the Environmental Science A.S. and ~~(~~Environmental Studies~~)~~ A.A.
D. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

Lecture:
A. Food and Agriculture
    1. Food Crop Diversity and Origins
        a. Plant Diversity, Ecology and Conservation
            i. Taxonomy and Plant Names
            ii. Artificial and Natural Selection

iii. Ecology and Conservation

2. Agricultural Systems
    a. Traditional vs. Modern Approaches
        i. Plant Propagation Methods
        ii. Cultural and Economic Consequences of Industrial Agriculture
        iii. Environmental and Health Consequences of Industrial Agriculture
    b. Organic and Other Sustainable Agriculture Methods
        i. Organic Agriculture Principles
        ii. USDA Organic Standards – History and Criteria
        iii. Modern Industrial Organic Agriculture
        iv. Other Types of Sustainable Agriculture
3. Farm Subsidies and Nutrition
    a. Plan(e)t-based Diets
    b. Politics and Economics of Farm Subsidy System
    c. Environmental and Health Consequences of Farm Subsidies
4. Genetic Engineering, World Hunger and Food Waste
    a. Green Revolution
    b. Principles and Practice of Genetic Engineering
    c. Food Waste – Causes and Consequences
    d. Causes of Famines and Hunger
5. Lawns and Landscaping
    a. Conventional vs. Ecological Approaches
    b. Green Infrastructure

B. Other Cultural Uses of Plants
1. Fibers and Dyes – Paper, Cordage, Cloth and Wood Products
    a. Consequences of Plants vs. Synthetic Materials
2. Medicines, Psychoactive Plants, and Poisons
    a. Medicinal Plants
    b. Stimulating (Caffeine) Plants
    c. Other Psychoactive Plants and Poisons
3. Wood Products and Forestry
    a. Wood Products and Preservatives
        i. Paper Production and Recycling
        ii. Pressure-Treated Wood and Other Engineered Wood Products
    b. Consequences of Deforestation
        i. Illegal Logging Causes and Solutions
    c. Forest Management and Sustainable Forestry

Lab:

A. Understanding the scientific method
    a. Scientific vs. other forms of knowledge
    b. Information literacy and critical thinking
    c. Testing hypotheses
    d. Standards and methods of data collection
    e. Analyzing and interpreting data
    f. Forming conclusions
B. Lab Projects

a. Adaptive significance of crop varieties and diversity: evolution through artificial selection
b. Using online databases to analyze health and environmental consequences of pesticide use
c. Effects of seed stratification and other propagation methods on growing food plants
d. Energy budgets and plant fibers: comparing traditional and industrial cordage production
e. Biology of fermentation – ethanol, lactic acid & acetic acid
f. Chemistry of biofuel, medicine and/or soap production
g. Analysis of arsenic in pressure-treated wood and other contaminants in consumer products
h. campus tour
i. Tree and invasive plant species identification

VI. A. <u>Course Learning Outcomes</u>:

Outcomes:
At the completion of the course, students will be able to:

1. Describe basic aspects of plant biology and their relevance to human uses of plants
2. Describe the importance of representative plants to human economies, cultures, and history
3. Describe the role of science, politics, economics, and culture in shaping our use of plants;
4. Demonstrate the process of producing food, fiber, fuel, and/or other useful products from plants
5. Apply the scientific method to analyze and evaluate the environmental and health consequences of different human uses of plants (GE-3);
6. Evaluate the ethical implications of human uses of plants (GE-ER);

B. <u>Assessment Instruments</u>

Given the outcomes described above, the following assessment methods may be used:

1. laboratory products (required)
2. exams (required)
3. reading quizzes (required)
4. class participation (required)

~~5. journals~~

VII. Grade Determinants

The following may be used to determine the final grade:

A. mid-term and final exam
B. reading quizzes
C. laboratory assignments
D. class participation

Given the goals and outcomes described above, the primary formats, modes, and methods for teaching and learning that may be used in the course include:

A. lecture/discussion
B. small-group work
C. computer-assisted instruction
D. guest speakers
E. laboratory
F. student oral presentations
G. student collaboration
H. independent study

VIII. Texts and Materials

The following types of course materials may be used:

A. Suggested Texts:
   1. Estabrook, Barry. Tomatoland. 2018. Andrews McMeel Publishing.
   2. Pollan, M. 2021. This Is Your Mind on Plants. Penguin Press.
   3. Wicker, Alden. 2023. To Dye For. GP Putnam & Sons
   4. Levetin, E. and K. McMahon. 2020. Plants and Society. 8th Ed. McGraw-Hill.

B. Articles from scientific journals and periodicals
C. Interview transcripts
D. Book Reviews
E. Student Writing
F. Films and Documentaries
G. Radio Recordings
H. Internet Databases and Information Sources
I. Library Article Databases

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

A. RVCC passenger van and/or bus rental;
B. Library databases and other computer and library resources;

C. RVCC garden plots, landscaped and natural areas on campus;
D. RVCC greenhouse and plant propagation supplies;
E. Laboratory equipment and supplies;
F. Films and documentaries from RVCC Library;
G. Field guides, posters, and literature from RVCC Library

X. Check One: ☐Honors Course ☐Honors Options X N/A

Definition: According to the Honors Council, an Honors course is one that enriches and challenges students beyond a course's regular scope and curriculum. An Honors course will offer a sophisticated use of research, introduce intellectually stimulating readings and critical perspectives, promote a higher level of critical discussion and written work, and encourage independent study projects, at the option of the instructor.