RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

ENVI 102: Environmental Science and Sustainability

I. Basic Course Information

A. Course Number and Title: ENVI-102: Environmental Science and Sustainability

B. New or Modified Course: Modified Course

C. Date of Proposal: Semester: Fall Year: 2018

D. Effective Term: Fall 2019

E. Sponsoring Department: Science & Engineering

F. Semester Credit Hours: 4

G. Weekly Contact Hours: 6 Lecture: 3
Laboratory: 3
Out of class student work per week: 7.5

H. Prerequisites/Corequisites: None

I. Laboratory Fees: Yes

J. Department Chair & Divisional Dean: Dr. Marianne Baricevic, marianne.baricevic@raritanval.edu, Dr. Sarah Imbriglio, sarah.imbriglio@raritanval.edu

II. Catalog Description

Prerequisites or Corequisite: None
This is an interdisciplinary lecture and laboratory course that uses a scientific approach to analyze the biophysical, social, political, and economic causes and consequences of environmental problems. Students will be encouraged to explore how these concepts and issues relate to their own lives, from both global and local perspectives. Students will study existing solutions and develop concepts and designs for their own potential solutions to common environmental problems documented on campus, at home, or in the surrounding community. Students will gain hands-on experience and build skills in environmental science and research through field work, online databases, group projects inside and outside the classroom, and service learning opportunities. The course will use campus sustainability as an overarching framework to introduce students to the theory and practice of environmental science. Students cannot receive credit for both ENVI 101 and ENVI 102.

III. Statement of Course Need

A. This course serves as an introductory survey course to understanding current environmental issues in the context of sustainability and resilience. Students will analyze the science of environmental issues while also exploring the political, economic, social, cultural, and philosophical dimensions of human impacts on the environment. By focusing on basic aspects of human life (e.g., food, energy, air, water, etc.), the course is relevant and meaningful both to students engaged in formal environmental programs of study, as well as the general student body. The causes and consequences of environmental problems will be explored as well as potential solutions at individual and institutional scales.

B. Through the laboratory portion of the course, students will employ a scientific approach to understand and address environmental, social and economic aspects of sustainability in places and landscapes familiar to them, including the RVCC campus, their own homes, and the surrounding community. Using the scientific method, students will develop basic skills in data collection and analysis by measuring indicators of environmental, social and economic health. This will enable students to understand and apply scientific methodologies related to documenting environmental issues; these types of skills are transferrable to a wide range of fields and professional endeavors. This laboratory will introduce students to the practice of sustainability, including identifying and analyzing suitable indicators of environmental and societal health, exploring existing best practices and developing conceptual frameworks and designs for solutions.

C. Course transferability:
   1. This course may transfer as a General Education course in Science with Lab.
   2. This course may transfer as a program requirement for Environmental Studies A.A. and Environmental Science A.S. majors.
   3. This course does not generally transfer as a 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. This course may be used to meet a program requirement for the Environmental Studies A.A. and Environmental Science A.S. majors.

D. Course transferability: 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

A. Introduction to Environmental Science and Sustainability
   a. Defining “Sustainability”
   b. Triple Bottom Line
   c. Ecosystem Services
   d. Ecological Footprint
   e. Individual Versus Institutional Contributions to Sustainability

B. Air Pollution
    a. Air Quality and Atmospheric Science
    b. History of Air Pollution and Regulation
    c. Major Categories of Air Pollutants
    d. Case Studies
        1. Leaded Gasoline
        2. CFC's and the Ozone Layer
C. Water Pollution
    a. The Water Cycle and Fresh Water Scarcity
    b. Major Categories and Causes of Water Pollutants
    c. Case Studies
        1. Surface and Ground Water Quality in U.S.
        2. Ocean Pollution
        3. Tap Water vs. Bottled Water
    d. Other Water Issues
        1. Droughts and Water Scarcity
        2. Coastal Flooding
        3. Dams and Water Diversion
D. Waste and Recycling
    a. Human "Waste" and Natural Systems
    b. Solid Waste Management
    c. Where Your Garbage Goes…
        1. Garbage Barges and Landfills
        2. Recycling
        3. Incineration
    d. Case Studies
        1. Paper vs. Plastic Bags
        2. Life Cycle Analysis
        3. Marine Plastic Debris
E. Toxic Waste, Toxins and Toxicity
    a. Types of Toxins
    b. Determining Toxicity
    c. Hazardous Waste Management
    d. Case Studies
        1. E-Waste
        2. Love Canal and Bhopal
        3. Household Products and Consumer Safety
F. Climate Change
    a. Scientific evidence
    b. International cooperation
    c. Local solutions
G. Laboratory
    a. Campus Waste Assessment and Behavior Change Project
    b. Analysis of Soil and Water Samples from Campus and Local Community
    c. Life Cycle Analysis of Common Products
    d. Ecological Footprint

e. Home and Campus Energy Use Analysis
f. Service Learning Projects Related to Water Quality on Campus and in the Local Community

H. Online Environmental Databases
a. Using online public databases to analyze local and global environmental problems
i. water quality – USGS, MyEnvironment, National Tapwater, Scorecard, NRDC (bottled water), Private Well Test Act Program Databases
ii. air pollution – ToxMap, Scorecard, MyEnvironment, NJDEP, TRI
iii. pesticide residues in produce – USDA Pesticide Residues Program, Pesticide Action Network, Beyond Pesticides Databases
iv. toxins in consumer products – SkinDeep Cosmetics Database
v. e-waste – EPEAT, Silicon Valley Toxics Coalition, Basel Action Network
vi. local toxic waste sites – Superfund NPL Sites, ToxMap, MyEnvironment
b. Use scientific method to evaluate conditions, identify problems and develop solutions

I. Examination of Best Practices
a. Guest Lectures
b. Field Trips to Campus and Local Facilities

VI. Educational and Course Learning Outcomes

A. **General Education Learning Outcomes**

Students will:

1. understand ethical issues and situations related to environmental problems (GE-NJ ER);
2. use technological resources to access, process and present scientific data and evidence needed to answer questions about local and/or global environmental quality (GE-NJ 4, IL);
3. students will apply the scientific method to analyze environmental problems and draw conclusions from data and evidence (GE-NJ 3);
4. evaluate and think critically about information related to the scientific, political, economic, social, and historical dimensions of environmental issues and/or solutions (GE-NJ IL*);
5. prepare written reports and/or poster presentations of environmental and sustainability research/practice in a technical format (GE-NJ 1)

*embedded critical thinking

B. **Course Learning Outcomes**

See above.

C. **Assessment Instruments**

a. examinations
b. laboratory/technical reports
c. presentations
d. homework exercises
e. self and peer evaluations

f. online/computer database assignments

VII. Grade Determinants

Given the goals and outcomes described above, the following may be used to determine the final grade:

a. examinations
b. laboratory/technical reports
c. presentations
d. homework exercises
e. self and peer evaluations
f. online/computer database assignments

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. student independent research using qualitative and quantitative methodologies
D. online database assignments
E. laboratory and field exercises
F. field trips
G. student oral presentations
H. student collaboration
I. experiential learning
J. service learning

VIII. Texts and Materials

The following types of course materials may be used:

A. Suggested Text:
   Stander, E. and J. Kelly. 2016. Introduction to Environmental Issues.
B. articles from scientific journals and periodicals
C. technical reports from colleges, universities, trade associations, governmental agencies, and non-governmental organizations
D. textbooks
E. custom-made laboratory exercises
F. books and book reviews
G. films and documentaries
H. internet databases
I. library article databases
J. laboratory equipment
K. datasets on pertinent aspects of campus operations

(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 van and/or bus rental
B. library databases and other library resources
C. natural areas and built infrastructure on campus, at home, and in the surrounding community
D. RVCC science laboratories, greenhouse and related supplies
E. environmental monitoring equipment
F. computers with internet access, Excel, ArcMAP (GIS), and SAS-JMP statistical software
G. field guides, literature, films and documentaries from RVCC Library and Science and Engineering department

X. Honors Option

Not applicable.