

Clackamas Community College

Online Course/Outline Submission System

Show changes since last approval in red

ESR-171 Environmental Science

General education certified: Yes No

- Writing
- Oral Communication
- Arts and Letters
- Science & Computer Science
- Mathematics
- Social Science
- Cultural Literacy
- Health & Physical Education

Approved Date (mm/dd/yyyy): / /

Section #1 General Course Information

Department: Sciences

Submitter

First Name: Richard

Last Name: Reub

Phone: 3357

Email: richr

Course Prefix and Number: ESR - 171

Credits: 4

Contact hours

Lecture (# of hours): 33

Lec/lab (# of hours):

Lab (# of hours): 33

Total course hours: 66

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Course Title: Environmental Science

Course Description:

Introduction to environmental science issues, the scientific method, systems and feedback, biogeochemical cycles, human population growth, communities and ecosystems, productivity and energy flow, world food supply, environmental effects of agriculture, and endangered species.

Type of Course: Lower Division Collegiate

Is this class challengeable?

No

Can this course be repeated for credit in a degree?

No

Is general education certification being sought at this time?

Yes

Check which General Education requirement:

Science & Computer Science

Is this course part of an AAS or related certificate of completion?

No

Are there prerequisites to this course?

No

Are there corequisites to this course?

No

Are there any requirements or recommendations for students taken this course?

Yes

Recommendations: Pass MTH-060 with a C or better or placement in MTH-065; pass RD-090 or placement in RD-115; pass WR-095 or placement in WR-121

Requirements: None

Are there similar courses existing in other programs or disciplines at CCC?

No

Will this class use library resources?

Yes

Have you talked with a librarian regarding that impact?

No

Is there any other potential impact on another department?

No

Does this course belong on the Related Instruction list?

No

GRADING METHOD:

A-F or Pass/No Pass

Audit: Yes

When do you plan to offer this course?

Fall

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

No

Will this course appear in the college catalog?

Yes

Will this course appear in the schedule?

Yes

Student Learning Outcomes:

Upon successful completion of this course, students should be able to:

1. summarize the issues basic to the study of environmental science, (SC2)
2. utilize the metric system and concepts of accuracy and precision to make measurements, and graph scientific data; (SC1)
3. describe scientific reasoning and the scientific method, conduct and evaluate a scientific experiment, and explain the nature of scientific knowledge; (SC1), (SC2)
4. compare and contrast open and closed systems and positive and negative feedback, compute system flux and residence time, and apply the general properties of systems to the Earth; (SC1)
5. describe the components and processes of biogeochemical cycles, diagram Earth's major biogeochemical cycles, and describe the effects of human activities on Earth's major biogeochemical cycles; (SC1), (SC2)
6. summarize the history and causes of human population growth, calculate human population growth rates and doubling times, compare exponential and logistic growth forms, use population age structure diagrams and the demographic transition to predict human population growth, and identify methods for controlling human population growth; (SC1), (SC2)
7. compare and contrast the characteristics of ecosystems and communities and describe the processes and ecological interactions that occur in ecosystems and communities, (SC1)
8. use production equations to calculate gross production, net production, and respiration; describe the

laws of thermodynamics; and explain how the laws of thermodynamics affect the movement of energy through ecosystems; (SC1), (SC2)

9. contrast natural ecosystems and agroecosystems (agricultural ecosystems) and evaluate the environmental advantages and disadvantages of the possible approaches to agriculture, (SC1)

10. describe the environmental effects of mechanized agricultural methods such as intensive plowing, use of pesticides, and genetically modifying crops, and explain how alternative agricultural methods such as contour plowing, no-till agriculture, and integrated pest management can provide environmental benefits; (SC1)

11. compare the causes and rates of background (natural) extinction with those attributed to humans, identify ways by which people cause extinction, describe the traits of species likely to become endangered, give reasons for conserving endangered species, and describe goals and methods of conserving endangered species. (SC1), (SC3)

AAOT/ASOT GENERAL EDUCATION OUTCOMES

COURSE OUTLINE MAPPING CHART

Mark outcomes addressed by the course:

- Mark "C" if this course completely addresses the outcome. Students who successfully complete this course are likely to have attained this learning outcome.
- Mark "S" if this course substantially addresses the outcome. More than one course is required for the outcome to be completely addressed. Students who successfully complete all of the required courses are likely to have attained this learning outcome.
- Mark "P" if this course partially addresses the outcome. Students will have been exposed to the outcome as part of the class, but the class is not a primary means for attaining the outcome and assessment for general education purposes may not be necessary.

As a result of completing the AAOT/ASOT general education requirements, students will be able to:

WR: Writing Outcomes

1. Read actively, think critically, and write purposefully and capably for academic and, in some cases, professional audiences.

2. Locate, evaluate, and ethically utilize information to communicate effectively.

3. Demonstrate appropriate reasoning in response to complex issues.

SP: Speech/Oral Communication Outcomes

1. Engage in ethical communication processes that accomplish goals.

2. Respond to the needs of diverse audiences and contexts.

3. Build and manage relationships.

MA: Mathematics Outcomes:

1. Use appropriate mathematics to solve problems.

2. Recognize which mathematical concepts are applicable to a scenario, apply appropriate mathematics and technology in its analysis, and then accurately interpret, validate, and communicate the results.

AL: Arts and Letters Outcomes

1. Interpret and engage in the Arts & Letters, making use of the creative process to enrich the quality of life.

2. Critically analyze values and ethics within range of human experience and expression to engage more fully in local and global issues.

SS: Social Science Outcomes

1. Apply analytical skills to social phenomena in order to understand human behavior.

2. Apply knowledge and experience to foster personal growth and better appreciate the diverse social world in which we live.

SC: Science or Computer Science Outcomes

S

1. Gather, comprehend, and communicate scientific and technical information in order to explore ideas, models, and solutions and generate further questions.

S

2. Apply scientific and technical modes of inquiry, individually, and collaboratively, to critically examine the influence of scientific and technical knowledge on human society and the environment.

S

3. Assess the strengths and weaknesses of scientific studies and critically examine the influence of scientific and technical knowledge on human society and the environment.

CL: Cultural Literacy Outcome

1. Identify and analyze complex practices, values, and beliefs and the culturally and historically defined meanings of difference.

Outcomes Assessment Strategies:

:

Major Topic Outline:

1. Key themes in environmental science, measurement, and graphing.
 - a. Human population growth.
 - b. Sustainability and carrying capacity.
 - c. Global perspective on environmental problems.
 - d. Urbanization of the human population.
 - e. Justifications for valuing the environment.
 - f. The metric system and accuracy and precision in measurement.
 - g. Guidelines for graphing.
2. Scientific thinking and knowledge.
 - a. Assumptions of science.
 - b. Inductive reasoning and proof in induction.
 - c. The scientific method.
 - d. The nature of scientific knowledge.
3. Systems and change in systems.
 - a. Open and closed systems.
 - b. Positive and negative feedback.
 - c. Exponential growth.
 - d. The concept of environmental unity.
 - e. Steady state systems.
 - f. Average residence time and its implication for environmental systems.
 - g. The "balance of nature."
4. The major biogeochemical cycles.
 - a. The reservoirs (components) of Earth's system.
 - b. Storage and flux within systems.
 - c. The major storage reservoirs and processes/pathways of the hydrologic, carbon, nitrogen, and phosphorous cycles.
 - d. Ways by which humans are altering the hydrologic, carbon, nitrogen, and phosphorous cycles.
5. Human population growth.
 - a. Human population growth rate and doubling time.
 - b. Total fertility rate and replacement level fertility.
 - c. Population age structure and the use of population age structure in predicting future population growth.
 - d. Logistic growth, logistic carrying capacity, and zero population growth.
 - e. The stages of the demographic transition and the use of the demographic transition in predicting future population growth.
 - f. The human carrying capacity of the Earth.
 - g. Methods for achieving zero population growth.
6. Ecosystems and ecological communities.
 - a. The parts of an ecosystem.
 - b. Ecosystem processes.
 - c. Food chains and food webs.
7. Biological productivity and ecosystem energy flow.

- a. Biological production.
- b. The flow of energy through ecosystems.
- c. The laws of thermodynamics.
- d. Trophic level efficiency.
- e. Energy pyramids for food chains and food webs.
- f. "Eating lower on the food chain."
- 8. World food supply.
 - a. The ways by which people starve.
 - b. The characteristics of agroecosystems versus those of natural ecosystems.
 - c. The major technological approaches to agriculture.
 - d. Center pivot and drip irrigation.
 - e. Polyculture as an alternative to monoculture.
 - f. The wisest approach to sustainable agriculture.
 - g. Examples of genetic engineering of crops.
- 9. Effects of agriculture on the environment.
 - a. Soil structure and the effects of plowing on soil.
 - b. The use of contour plowing and no-till agriculture in making soil sustainable.
 - c. Types of pesticides used in the control of major agricultural pests.
 - d. Integrated pest management.
 - e. Potential environmental problems posed by genetically modified crops.
 - f. Overgrazing.
 - g. Desertification.
- 10. Endangered species.
 - a. Local and global extinction.
 - b. The causes of "punctuated extinctions" or mass extinctions.
 - c. The ways that people cause extinction.
 - d. Common traits of species likely to become endangered through human activities.
 - e. Reasons for the conservation of endangered species.
 - f. The definitions of "endangered species" and "threatened species."
 - g. The goals of saving endangered species.
 - h. A minimum viable population.

Does the content of this class relate to job skills in any of the following areas:

- 1. Increased energy efficiency No
- 2. Produce renewable energy No
- 3. Prevent environmental degradation No
- 4. Clean up natural environment No
- 5. Supports green services No

Percent of course: 0%

Section #2 Course Transferability

Concern over students taking many courses that do not have a high transfer value has led to increasing attention to the transferability of LDC courses. The state currently requires us to certify that at least one OUS school will accept a new LDC course in transfer. Faculty should communicate with colleagues at one or more OUS schools to ascertain how the course will transfer by answering these questions.

1. Is there an equivalent lower division course at the University?
2. Will a department accept the course for its major or minor requirements?
3. Will the course be accepted as part of the University's distribution requirements?

If a course transfers as an elective only, it may still be accepted or approved as an LDC course, depending on the nature of the course, though it will likely not be eligible for Gen Ed status.

Which OUS schools will the course transfer to? (Check all that apply)

Identify comparable course(s) at OUS school(s)

How does it transfer? (Check all that apply)

:

Provide evidence of transferability: (minimum one, more preferred)

First term to be offered:

Next available term after approval

:
