

**Clackamas Community College**  
Online Course/Outline Submission System

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**Section #1 General Course Information****Department:** Sciences**Submitter**

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**Course Prefix and Number:** ESR - 173**# 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 minerals and the environment, the scientific method, environmental economics, waste management, biological diversity, biogeography and invasive species, ecological succession and restoration, water management, water pollution, urban environments, and environmental sustainability.

**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?

**✓ Spring**

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. analyze the economic importance and availability of mineral resources and the environmental impacts of mineral development; (SC1) (SC2)
  2. describe the "tragedy of the commons," contrast externalities and direct costs, describe the public service functions of nature, and explain how the total cost of pollution is determined; (SC1) (SC3)
  3. identify the features of integrated waste management, the design and operation of sanitary landfills, and the management of hazardous waste;
  4. apply the basic concepts of evolution and biological diversity, explain the importance of the competitive exclusion principle and the ecological niche in the conservation of species, and analyze the kinds and importance of interactions between species; (SC2)
  5. explain the relationship between the concept of biological realms and the problems caused by invasive species, describe biomes and the factors that can be used to predict them, and describe the ways by which people have altered biodiversity; (SC1)
  6. analyze the process of ecological succession and explain how to use concepts of ecological succession to restore nature; (SC2)
  7. assess the environmental effects of groundwater use, wetland loss, and dams; summarize the values of wetlands for people; and describe methods of making water use sustainable; (SC1) (SC3)
  8. identify the major categories of water pollutants and their environmental effects, and explain how water pollution can be controlled and treated; (SC1)
  9. explain how a city is an ecological system, contrast cities and nonurban areas with respect to climatic conditions, explain how cities impact the water cycle and soils, describe the health effects of urban pollution, and explain how cities can be environmentally designed; (SC2)
  10. assess the best way to conserve biological resources, the justifications for valuing the environment, and ways to solve environmental problems and resolve environmental conflicts. (SC3)
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**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:**

✓ Projects

✓ Presentations

✓ Multiple Choice Test

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**Major Topic Outline:**

1. Minerals and the environment.
  - a. Importance of minerals to society.
  - b. Distribution of minerals.
  - c. Consumption, conservation, and recycling of minerals.
  - d. Environmental impacts of mineral development.
  - e. Use of the R-to-C (reserve-to-consumption ratio) in describing the scarcity of mineral resources.
2. The scientific method.
3. Environmental economics.
  - a. The "tragedy of the commons."
  - b. The relationship between resource sustainability and profit.

- c. Externalities (indirect costs) and direct costs.
- d. Natural capital and the public service functions of nature.
- e. The total cost of pollution.
- 4. Waste management.
  - a. The zero waste movement and integrated waste management (IWM).
  - b. The environmental benefits of recycling.
  - c. On-site disposal, composting, and incineration of solid waste.
  - d. Features of a modern sanitary landfill.
  - e. Hazardous waste management.
  - f. Oceans as dumping grounds for waste.
- 5. Biological diversity.
  - a. Biological evolution and the characteristics of natural selection.
  - b. Concepts of biological diversity.
  - c. The number and kinds of species on Earth.
  - d. The importance of habitat and the ecological niche in the conservation of species.
  - e. The competitive exclusion principle.
  - f. Nonsymbiotic and symbiotic interactions between species.
- 6. Biogeography and introduced species.
  - a. Wallace's concept of realms or biotic provinces.
  - b. Endemic and introduced species.
  - c. The rule of climatic similarity and the concept of the biome.
  - d. Convergent and divergent evolution.
  - e. Ways by which people have altered biodiversity.
  - f. Rules for moving species around the planet.
- 7. Ecological succession and restoration
  - a. Primary and secondary succession.
  - b. Stages and features of ecological succession.
  - c. The "intermediate disturbance hypothesis."
  - d. The use of disturbance in the conservation of biodiversity.
  - e. The application of concepts of ecological succession to restoration.
  - f. Approaches to possible restoration goals.
  - g. Ecosystems that are the focus of restoration efforts
- 8. Water supply, use, and management.
  - a. Groundwater and the problems of overdraft of groundwater.
  - b. Off-stream, consumptive, and in-stream uses of river water.
  - c. Major uses and conservation of water.
  - d. The natural service functions and values of wetlands.
  - e. The environmental effects of dams.
- 9. Water pollution and treatment of water pollution.
  - a. Concept of thresholds for water pollutants.
  - b. Causes and environmental effects of BOD (biochemical oxygen demand).
  - c. Important waterborne diseases and fecal coliform bacteria as an indicator of the disease potential of water .
  - d. Causes and effects of cultural eutrophication.
  - e. Sediment pollution and environmental effects of sedimentation.
  - f. Regulation of point sources of surface water pollution.
- 10. Urban environments.
  - a. The city as an ecological system.
  - b. The effects of cities on climatic conditions.
  - c. The effects of cities on the water cycle.
  - d. The impacts of cities on soils.
  - e. Health effects of urban pollution.
  - f. Benefits of urban vegetation.
- 11. Environmental sustainability and values.
  - a. The qualities of an "ecotopia."
  - b. The Wildlands Project and the conservation of biological resources.
  - c. Justifications upon which the value of the environment is based.
  - d. Environmental ethics.
  - e. The philosophical movement known as "deep ecology."
  - f. Solving environmental problems and resolving environmental conflicts.

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

- |                                      |            |
|--------------------------------------|------------|
| 1. Increased energy efficiency       | <b>No</b>  |
| 2. Produce renewable energy          | <b>No</b>  |
| 3. Prevent environmental degradation | <b>Yes</b> |
| 4. Clean up natural environment      | <b>No</b>  |
| 5. Supports green services           | <b>No</b>  |

Percent of course: 70%

## 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)

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

First term to be offered:

Next available term after approval

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