

Course Number and Title: ENV 190 Introduction to Environmental Science and Technology

Campus Location:

Stanton

Effective Date:

2021-52

Prerequisite:

SSC 100 or concurrent

Co-Requisites:

None

Course Credits and Hours:

3.00 credits

3.00 lecture hours/week

0.00 lab hours/week

Course Description:

This course introduces environmental science, pollution control, and environmental technology. It provides students with a basic understanding of the normal ecology of the planet and the risks associated with polluting the environment. Environmental pollution and control technology topics include safe drinking water, wastewater treatment, air pollution, and solid and hazardous waste management.

Required Text(s):

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:

None

Schedule Type:

Classroom Course

Video Conferencing

Web Conferencing

Hybrid Course

Online Course

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Discuss the concept of environmental ethics. (CCC 4; PGC EET 1, 5, 6)
2. Describe how significant figures, events, and literature in environmental history have shaped today's environmental regulations. (CCC 1, 2, 5; PGC EET 1, 4, 5)
3. Discuss the role of regulatory oversight in protecting the environment. (CCC 1, 2, 5; PGC EET 1, 6)
4. Identify major differences among related fields in engineering and environmental science. (CCC 1, 4; PGC EET 1, 6)
5. Describe the science of ecology and associated natural ecosystems. (CCC 1, 5; PGC EET 1, 5)
6. Discuss geology as it pertains to soil formation and classification. (CCC 1, 5, 6; PGC EET 1, 4, 5)
7. Describe the basic principles of hydrology and the major differences between the study of hydraulics and hydrology. (CCC 1, 2, 5, 6; PGC EET 1, 4, 5)
8. Summarize the basic methods of managing storm water. (CCC 1, 2, 5, 6; PGC EET 1, 4, 5, 6)
9. Discuss the impacts of water pollution and water quality within the environment. (CCC 1, 2, 6; PGC EET 1, 5, 6)
10. Identify and describe the basic concepts in the water treatment process. (CCC 1, 2, 6; PGC EET 1, 5, 6)
11. Identify and describe the basic concepts in the wastewater treatment process. (CCC 1, 2, 6; PGC EET 1, 5, 6)
12. Identify the practices associated with solid waste, hazardous waste, and industrial waste management. (CCC 1, 2, 4, 6; PGC EET 1, 5, 6)
13. Identify the practices associated with air pollution and control. (CCC 1, 2, 4; PGC EET 1, 5, 6)
14. Discuss climate change. (CCC 1, 2, 6; PGC EET 1, 5, 6)
15. Demonstrate professional and ethical conduct as expected in industry. (CCC 1, 3, 4; PGC EET 1, 3, 6)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Discuss the concept of environmental ethics.
 1. Discuss the evolution of how humans have viewed the environment through time, including land and water resources.

2. Distinguish between Muir's philosophy of preservation and Pinchot's philosophy of conservation.
3. Discuss the concept of environmental ethics as it relates to Leopold's land ethic.
4. Discuss environmental justice.
2. Describe how significant figures, events, and literature in environmental history have shaped today's environmental regulations.
 1. Describe events and literature that influenced the formation of the Environmental Protection Agency (EPA).
 2. Describe events and literature that influence the creation of the Clean Water Act.
 3. Describe events and literature that influence the creation of the Clean Air Act.
 4. Describe events and literature that influence the creation of the National Environmental Policy Act.
 5. Describe events and literature that influence the creation of other important environmental regulations.
3. Discuss the role of regulatory oversight in protecting the environment.
 1. Describe the growth of human population on earth as it relates to scientifically-supported exponential growth patterns.
 2. Identify projected resource needs as they relate to the environment in the future.
 3. Discuss the EPA and the state agency roles in administering environmental laws.
4. Identify major differences among related fields in engineering and environmental science.
 1. Discuss the differences among the fields of environmental science, ecology, engineering, and environmental engineering technology.
 2. Discuss the relationship between environmental health and public health.
 3. Discuss the environmental and public health concerns related to pollution.
 4. Discuss technologies employed to protect public health and the environment.
5. Describe the science of ecology and associated natural ecosystems.
 1. Define *ecology*, and discuss the importance of habitat in ecosystems.
 2. Discuss food webs/food chains and natural energy systems.
 3. Describe chemical, physical, and biological cycles, and explain their relevance to the environment.
 4. Discuss the importance of different types of ecosystems.
 5. Describe the process of conducting a wetland delineation.
 6. Describe the characteristics used to identify a jurisdictional wetland (i.e., soil, water, and plants).
6. Discuss geology as it pertains to soil formation and classification.
 1. Discuss different soil types.
 2. Discuss soil classification methods.
 3. Describe how soils are formed.
 4. Identify the physical properties of soils.
7. Describe basic principles in hydrology and the major differences between the study of hydraulics and hydrology.
 1. Describe the differences between hydrology and hydraulics.
 2. Identify the phases in the water cycle.
 3. Discuss rainfall frequency, duration, and return rate.
 4. Discuss infiltration as it relates to runoff coefficient.
 5. Define a watershed as it relates to boundaries.
 6. Identify major impacts of urbanization on the environment, including impacts to stream water quality, hydrology and water quantity, and the water cycle.
8. Summarize the basic methods of managing storm water.
 1. Discuss storm water runoff estimating.
 2. Discuss storm water treatment via detention, retention, and infiltration ponds.
 3. Discuss floodplains as they relate to storm water management.
9. Discuss the impacts of water pollution and water quality in the environment.
 1. Define *water pollution* and *water quality*.
 2. Discuss basic water supply.
 3. Discuss the consequences of water pollution to society and natural ecosystems.
 4. Discuss the differences between point and non-point source pollution.
 5. Discuss methods for measuring and monitoring water quality.
 6. Identify steps in the scientific process as they relate to conducting a water quality analysis.
10. Identify and describe the basic concepts in the water treatment process.
 1. Discuss fundamental water treatment methods.
 2. Discuss the physical and chemical methods used to treat drinking water.
 3. Discuss the Clean Water Drinking Act and maximum concentration limits and secondary limits of pollution.
 4. Distinguish between ground water and surface water sources as they relate to treatment of drinking water.
11. Identify and describe the basic concepts in the wastewater treatment process.
 1. Discuss the basic design elements of a wastewater treatment facility.
 2. Discuss treatment methods employed in wastewater systems: preliminary treatment, primary treatment, secondary (biological) treatment, activated sludge process, solids handling, and disinfection.
12. Identify the practices associated with solid waste, hazardous waste, and industrial waste management.
 1. Define the characteristics of municipal solid waste.
 2. Discuss the collection and processing of solid waste.
 3. Describe general recycling techniques as they relate to municipal waste.
 4. Discuss sanitary landfill construction and operation.
 5. Discuss the characteristics of hazardous waste.
 6. Discuss basic techniques used in the collection and transport of hazardous waste.
 7. Describe common hazards with disposal of hazardous waste.
 8. Discuss brownfield redevelopment.
13. Identify the practices associated with air pollution and control.
 1. Identify the atmospheric factors affecting air quality.
 2. List the origins and effects of air pollution, both indoor and outdoor.
 3. Discuss the major global implications of air pollution.
 4. Discuss common air quality sampling and analysis methods.

5. Discuss air pollution control technologies.
14. Discuss climate change.
 1. Identify the atmospheric factors affecting climate change.
 2. List the origins and effects of climate change.
 3. Discuss the major global implications of climate change.
 4. Discuss fossil fuels and traditional energy production.
 5. Discuss alternate sources of energy.
15. Demonstrate professional and ethical conduct as expected in industry.
 1. Identify the need for self-discipline and time management in technical industries.
 2. Communicate and function effectively as a member of a team.

Evaluation Criteria/Policies:

The grade will be determined using the Delaware Tech grading system:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
0	-	69	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:

Calculated using the following weighted average

Evaluation Measure	Grade Break-out
Summative: 3 Exams (weighted equally)	30%
Summative: Final Project	15%
Formative: Assignments (Quizzes, Readings, Labs, Journals, Participation, etc.) (weighted equally)	55%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):

1. Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering activities, including but not limited to site development, hydraulics and hydrology, grading, water and wastewater treatment, pollution prevention and treatment, and sustainable design.
2. Conduct standardized field and laboratory testing.
3. Demonstrate a commitment to quality, timeliness, professional development, and continuous improvement.
4. Use graphic techniques and productivity software to produce technical documents.
5. Explain the major aspects of the normal ecology of the planet and risks associated with polluting the environment.
6. Apply current federal, state, and local environmental and safety regulations and industry best management practices.

Disabilities Support Statement:

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.