



## Course Number and Title: ENV 277 Environmental Engineering Processes

**Campus Location:**  
Georgetown, Stanton

**Effective Date:**  
2018-51

**Prerequisite:**  
MAT 282, CHM 151

**Co-Requisites:**  
None

**Course Credits and Hours:**  
3.00 credits  
3.00 lecture hours/week  
0.00 lab hours/week

**Course Description:**

This course applies mathematical and chemical concepts to quantitatively analyze contaminant behavior in natural and engineering environments.

**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

**Disclaimer:**  
None

**Core Course Performance Objectives (CCPOs):**

1. Model environmental processes using engineering principles. (CCC 2, 6; PGC 1, 2, 3, 5, 10, 12)
2. Apply chemistry concepts to environmental processes. (CCC 2, 6; PGC 1, 2, 3, 5, 10)
3. Evaluate environmental processes using reaction models. (CCC 2, 6; PGC 1, 2, 3, 5, 10)
4. Demonstrate professional and ethical conduct as expected in industry. (CCC 1, 3, 4; PGC 4, 7, 8, 9, 11, 12)

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. Model environmental processes using engineering principles.
  1. Apply scientific units to commonly encountered environmental parameters.
  2. Convert between different commonly encountered environmental units.
  3. Describe the processes of environmental modeling.
  4. Develop appropriate assumptions for environmental modeling.
  5. Identify the fundamental dependent variables in an environmental model.
  6. Identify the characterizing dependent variables in an environmental model.
  7. Estimate model parameters using regression.
  8. Apply conservation of mass, energy, and momentum to environmental processes.
  9. Describe environmental processes using mathematics and chemistry.
2. Apply chemistry concepts to environmental processes.
  1. Describe how acid-base chemistry relates to environmental processes.
  2. Analyze environmental processes using acid-base chemistry concepts.
  3. Apply air-water partitioning concepts to environmental processes.
  4. Apply equilibrium concepts to environmental processes.
  5. Analyze environmental processes using air-water partitioning and equilibrium concepts.
3. Evaluate environmental processes using reaction models.
  1. Apply rate laws to environmental processes.
  2. Apply the concept of batch reactors to environmental processes.
  3. Apply the concept of semibatch reactors to environmental processes.
  4. Apply the concept of continuously stirred tank reactors to environmental processes.
  5. Apply the concept of plug flow reactors to environmental processes.
  6. Apply complete mixed flow reactors to environmental processes.
  7. Determine first and second order reaction rate constants for environmental processes.
  8. Analyze reversible reactions.
4. 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:**

Students must demonstrate proficiency on all CCPOs at a minimal 75 percent level to successfully complete the course. The grade will be determined using the Delaware Tech grading system:

92	-	100	=	A
83	-	91	=	B
75	-	82	=	C
0	-	74	=	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.

**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 modern tools of the discipline to narrowly defined engineering technology activities.
2. Apply a knowledge of mathematics, science, engineering, and technology to engineering technology programs that require limited application of principles but extensive practical knowledge.
3. Conduct standard tests and measurements, and conduct, analyze, and interpret experiments.
4. Function effectively as a member of a technical team.
5. Identify, analyze, and solve narrowly defined engineering technology problems.
6. Apply written, oral, and graphical communication in both technical and nontechnical environments; and identify and use appropriate technical literature.
7. Recognize the need for and an ability to engage in self-directed continuing professional development.
8. Integrate a commitment to address professional and ethical responsibilities, with a respect for diversity.
9. Demonstrate a commitment to quality, timeliness, and continuous improvement.
10. Explain the major aspects of the normal ecology of the planet and risks associated with polluting the environment.
11. Apply the concepts of professional practice and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.
12. Apply current federal, state and local environmental and safety regulations.

**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.