Course Number and Title: CET 125 Civil & Environmental Drafting & Design

Campus Location:
Georgetown, Dover, Stanton

Effective Date:
2018-52

Prerequisite:
ENG 101 or concurrent, MAT 180 or concurrent, SSC 100 or concurrent

Co-Requisites:
none

Course Credits and Hours:
3.00 credits
2.00 lecture hours/week
4.00 lab hours/week

Course Description:
This course introduces drawing and design problems encountered in civil and environmental engineering. Topics include site analysis, site layout, grading and drainage, utility layout and profiles, erosion control, and sustainable site design. Students design and develop a conceptual commercial site design and produce elements of the drawing set.

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

Additional Materials:
Drafting tools, hard hat, level 3 safety vest, safety glasses

Schedule Type:
Classroom Course

Disclaimer:
None

Core Course Performance Objectives (CCPOs):

1. Recognize the various drawings that make up a set of site design plans, and explain the various items included in each drawing using proper terminology. (CCC 1, 4, 5; PGC: CET 1, 4, 5; SET 1, 4, 6; CTO 1, 2, 4)
2. Demonstrate proper drafting techniques. (CCC 1, 2, 4, 5, 6; PGC: CET 1, 4, 5; SET 1, 4, 6; CTO 1, 2, 4)
3. Use legal descriptions to draft plot plans. (CCC 1, 2, 4, 5, 6; PGC: CET 1, 4, 5; SET 1, 4, 6; CTO 1, 2, 4)
4. Draw contours from survey point data using the various types of contours and the proper contour relief. (CCC 1, 2, 4, 6; PGC: CET 1, 3, 5; SET 1, 4, 5, 6; CTO 1, 2, 3, 4)
5. Apply ordinances and regulations in the site design process. (CCC 1, 2, 3, 4, 5, 6; PGC: CET 1, 3, 4, 5; SET 1, 3, 4, 6; CTO 1, 2, 3, 4)
6. Demonstrate sustainable site design methods. (CCC 1, 2, 3, 4, 5, 6; PGC: CET 1, 3, 4, 5; SET 1, 3, 4, 6; CTO 1, 2, 3, 4)
7. Calculate critical design elevations for proposed drainage. (CCC 1, 2, 3, 4, 5, 6; PGC: CET 1, 3, 4, 5; SET 1, 3, 4, 6; CTO 1, 2, 3, 4)
8. Calculate critical design elevations for proposed wet utilities such as stormwater, sanitary sewer, and water distribution systems. (CCC 1, 2, 3, 4, 5, 6; PGC: CET 1, 3, 4, 5; SET 1, 3, 4, 6; CTO 1, 2, 3, 4)
9. Explain erosion and sediment control.(CCC 1, 2, 4, 5, 6; PGC: CET 1, 4, 5; SET 1, 3, 6; CTO 1, 2, 4)
10. Demonstrate professional and ethical conduct as expected in industry.(CCC 1, 2, 3, 4, 5, 6; PGC: CET 1, 5; SET 1, 6; CTO 1, 4)

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. Recognize the various drawings that make up a set of site design plans, and explain the various items included in each drawing using proper terminology.
    1. Define *civil/environmental engineering technology* and *civil/environmental engineering*.
    2. Determine what education is needed for various civil/environmental engineering careers.
    3. Define terms related to civil drafting, mapping, and surveying.
    4. Identify the various drawings that make up a set of site design plans.
    5. Distinguish between the differences in the various drawings that make up a set of site design plans.
2. Demonstrate proper drafting techniques.
    1. Identify various drafting tools and their uses, including mechanical pencil, lead holder, lead pointer, drafting triangles, scale, irregular curves, protractor, and compass.
    2. Describe the standard drafting linetypes and their uses, including object lines, center lines, hidden lines, and phantom lines.
    3. Identify industry standard symbols and linework, and explain the importance of drafting standards.
    4. Construct various geometric shapes, a scaled sketch, standard single-stroke engineering lettering shapes, and dimensions with consistent linework and appropriate linetypes and lineweights.
    5. Produce plan, section, and profile view drawings using orthographic projection.
3. Use legal descriptions to draft plot plans.
    1. Define terms related to legal descriptions and plot plans.
    2. Illustrate bearings and distances utilizing drafting tools.
4. Draw contours from survey point data using the various types of contours and the proper contour relief.
    1. Identify different types of contour lines.
    2. Explain how surveying field data is used to produce a civil drawing.
    3. Produce a contour map from survey field data using the interpolation method.
5. Apply ordinances and regulations in the site design process.
    1. Identify the role of the various government agencies in the land development process.
    2. Identify the characteristics and purpose of zoning ordinances and subdivision regulations.
    3. Recognize design constraints from local zoning ordinances and subdivision regulations as they apply to building placement, driveway layout, parking space configurations, vehicle and pedestrian circulation, and American with Disabilities Act (ADA) accessibility.
    4. Sketch various site design layouts incorporating design constraints from local ordinances and subdivision regulations.
    5. Draft a conceptual site plan.
6. Demonstrate sustainable site design methods.
    1. Describe United States Green Building Council's Leadership in Energy and Environmental Design (USGBC LEED) certification sustainable sites credits.
    2. Explain how site analysis and various construction methods and materials can earn LEED credits.
    3. Illustrate common site analysis techniques.
7. Calculate critical design elevations for proposed drainage.
    1. Explain the concept of a watershed.
    2. Identify and define landforms from contour maps, and recognize how various landforms effect watershed delineation.
    3. Identify and describe terms related to the hydrologic cycle and standard site drainage practices.
    4. Explain minimum and maximum allowable slopes for various design applications.
    5. Calculate slope, change in elevation, distance, and critical design elevations using the slope equation.
    6. Produce proposed contours.
    7. Sketch a proposed grading plan concept.
8. Calculate critical design elevations for proposed wet utilities such as stormwater, sanitary sewer, and water distribution systems.
    1. Identify and describe the difference among stormwater, sanitary sewer, and water distribution systems.
    2. Explain how critical design elevations relate to the surface elevations.
    3. Use the appropriate vocabulary for critical design elevations in wet utility design.
    4. Calculate critical design elevations for wet utility systems.
9. Explain Erosion and Sediment Control.
    1. Identify scenarios of high erosion potential.
    2. Identify common erosion and sediment control measures.
10. 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 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: Exam 1	10%
Summative: Exam 2	10%
Summative: Exam 3	10%
Summative: Final Design Project	30%
Summative: Final Design Presentation	5%
Formative Assessments: In-Class Drafting Assignments/Homework (weighted equally)	35%
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):
CETAASCET:

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, and structural systems.
2. Conduct standardized field and laboratory testing on civil engineering materials.
3. Select appropriate materials and estimate material quantities for technical projects.
4. Use graphic techniques and productivity software to produce engineering documents.
5. Demonstrate a commitment to quality, timeliness, professional development, and continuous improvement.

CETAASSET:

1. Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities, including but not limited to site development, hydraulics and hydrology, grading, and structural systems.
2. Conduct standardized field and laboratory testing on civil engineering project materials.
3. Select appropriate materials and estimate material quantities for technical projects.
4. Use graphic techniques and productivity software to produce engineering documents.
5. Integrate appropriate surveying methods for land measurement and/or construction layout and the acquisition of spatial data in accordance with the laws and regulations pertaining to Professional Land Surveying.
6. Demonstrate a commitment to quality, timeliness, professional development, and continuous improvement.

ENVAASEET:

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.

CETAASCTO:

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, and structural systems.
2. Use graphic techniques and productivity software to produce engineering documents.
3. Apply fundamentals of science and mathematics to solve engineering problems.
4. Demonstrate a commitment to quality, timeliness, professional development, and continuous improvement.

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 web page or visit the campus Advising Center.