Course Number and Title: AET 164 Architectural CAD Applications

Campus Location:
Georgetown, Dover, Stanton

Effective Date:
2018-52

Prerequisite:
ENG 090 or ENG 091, MAT 010, SSC 100 or concurrent

Co-Requisites:
None

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

Course Description:
This course introduces three-dimensional (3D) parametric architectural computer-aided design (CAD) software to develop building models used to produce drawing documents, including site plans, floor plans, elevations, sections, and schedules. Topics include creation of 3D pictorial representations of interiors and exteriors, including materials, lighting, rendering, and animation.

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:
None

Schedule Type:
Classroom Course
Hybrid Course
Online Course

Disclaimer:
None

Core Course Performance Objectives (CCPOs):

1. Construct parametric building models with appropriate values and settings. (CCC 1, 2, 5, 6; PGC 5, 6)
2. Create parametric building models using software tools to select and define site work, foundations, walls, ceilings, roofs, windows, doors, stairs, architectural components, and structural members. (CCC 2, 6; PGC 3, 5, 6)
3. Use and modify drawing profiles, templates, object types, and other parametric software tools. (CCC 2, 5, 6; PGC 3, 5, 6)
4. Prepare architectural views and drawings from the model such as site, foundation, plans, elevations, sections, details, legends, and schedules. (CCC 2, 5, 6; PGC 3, 5, 6)
5. Use standard documentation conventions for the annotation and dimensioning of architectural drawings. (CCC 2, 5, 6; PGC 3, 5, 6)
6. Produce presentation quality renderings and animations of the model in isometric and perspective interior and exterior views. (CCC 2, 5, 6; PGC 3, 5, 6)
7. Use printers, plotters, and file export functions to make transmittable, readable, and hard copies of drawings, model views, and renderings. (CCC 2, 5, 6; PGC 5, 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. Construct parametric building models with appropriate values and settings.
    1. Compare parametric modeling products in use today in the local, regional, and global architectural engineering and construction (AEC) industry.
    2. Define parametric building modeling and building information technology terminology.
    3. Explain bi-directional associativity among components, views, and annotation, and discuss its importance to contemporary architectural drafting and design.
    4. Prepare files with correct settings for both residential and commercial buildings.
    5. Operate the software tools found on the ribbon, toolbars, menus, dialog boxes, and other locations.
    6. Adjust and modify default settings as needed to customize both the software environment and model as needed.
    7. Use standard file-naming conventions.
    8. Create backups of all files to various storage media and locations.
2. Create parametric building models using software tools to select and define site work, foundations, walls, ceilings, roofs, windows, doors, stairs, architectural components, and structural members.
    1. Produce site topography and surface infrastructure.
    2. Prepare horizontal building grid and vertical elevations.
    3. Select and define foundation types and place in model.
    4. Choose and modify wall types and place in model.
    5. Use and revise ceiling types, openings, bulkheads, and place in model.
    6. Employ and adjust roof types and place in model.
    7. Identify and customize window and door types and place in model.
    8. Select and adjust stairs, ramps, and railings and place in model.
    9. Use and adapt architectural components and place in model.
    10. Select and define structural members and place in model.
3. Use and modify drawing profiles, templates, object types, and other parametric software tools.
    1. Use drawing profiles and templates.
    2. Change component locations, dimensions, colors, and other characteristics.
    3. Modify object categories to create custom objects.
    4. Prepare multiple design element alternatives contained within a model.
    5. Demonstrate collision checking among objects.
4. Prepare architectural views and drawings from the model such as site, foundation, plans, elevations, sections, details, legends, and schedules.
    1. Arrange sheets for various paper sizes and drawing scales.
    2. Use and modify software-supplied title blocks.
    3. Prepare new title blocks.
    4. Produce standard architectural views such as site, foundation, plans, elevations, sections, details, legends, and schedules.
    5. Manipulate scales, object visibility, cutting planes, line types, and other software variables to achieve required appearance for both views and sheets.
5. Use standard documentation conventions for the annotation and dimensioning of architectural drawings.
    1. Use software-supplied annotation and dimensions.
    2. Modify formatting of software-supplied annotation and dimensions.
    3. Employ dimensions both for object parameters and non-parametric labeling.
    4. Use cut lines and elevation markers to create section and elevation views.
    5. Employ tags for details such as doors, windows, and rooms, and develop corresponding schedules.
    6. Use keynotes to label elements and materials using the MasterFormat organizational structure.
    7. Apply two-dimensional (2D) line work and detail to section views.
6. Produce presentation quality renderings and animations of the model in isometric and perspective interior and exterior views.
    1. Prepare isometric and perspective interior and exterior views using both 3D navigation techniques and virtual cameras.
    2. Use and edit material attributes such as pattern size, brightness, intensity, gloss, transparency, reflection, and other characteristics.
    3. Apply and edit different types of lighting: ambient, directional, natural, and artificial.
    4. Use and modify shade and shadows, both default and those based on location, season, and time of day.
    5. Employ plants, people, vehicles, and other non-architectural objects for heightened realism.
7. Use printers, plotters, and file export functions to make transmittable, readable, and hard copies of drawings, model views, and renderings.
    1. Convert line drawings, rendered images, and animations to compact file formats that are easily transmittable and readable by commonly available viewing software on a variety of devices and platforms.
    2. Use printers and plotters to produce line drawings, rendered images, and animations.

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	Percentage of final grade
Textbook and Tutorial Activities (summative)	20%
Practical Skills Test (summative)	20%
Textbook Project (summative)	20%
Final Project Checkpoints (formative)	15%
Final Project Submission (summative)	25%
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. Research and analyze existing site conditions.
2. Apply principles of sustainability to the built environment.
3. Employ the architectural design process.
4. Interpret and apply building codes.
5. Create technical drawings and presentation graphics.
6. 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.