Course Number and Title: EDT 252 Engineering Design III

Campus Location:
Georgetown

Effective Date:
2018-52

Prerequisite:
EDT 152, ENG 101, MET 123, (MET 132 or concurrent)

Co-Requisites:
none

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

Course Description:
This advanced course provides an overview of the rules, standards, and practices in designing, drawing, dimensioning, and tolerancing mechanical components and assemblies. The use of computer-aided design (CAD), engineering design standards, product end-use requirements, manufacturability considerations, and vendor-supplied specifications in the design process are covered. Original designs for complex functional mechanical components and systems are developed, dimensioned, and drawn to acceptable professional standards.

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:
Notebook, scale, calculator, and flash drive/data storage

Schedule Type:
Classroom Course
Hybrid Course

Disclaimer:
None

Core Course Performance Objectives (CCPOs):

1. Synthesize drafting standards and techniques to develop and document design information for complex mechanical components drawn to American National Standards Institute (ANSI) and/or other applicable industry standards and conventions. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5, 6)
2. Use conventional and geometric tolerancing techniques to accurately define mechanical component and assembly designs for manufacture. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5, 6)
3. Apply basic mechanical design principles, reference materials, and standards to develop mechanical designs. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 5, 6)
4. Use engineering documentation procedures to produce and maintain an accurate and up-to-date set of engineering drawings and specifications. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4, 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. Synthesize drafting standards and techniques to develop and document design information for complex mechanical components drawn to American National Standards Institute (ANSI) and/or other applicable industry standards and conventions.
    1. Use the design constraints process to develop and generate computer-aided design (CAD) based working drawings from design guidelines.
    2. Generate a complete and accurate engineering title block.
    3. Correctly identify, draw, and interpret common weld symbols and explain their implications relative to weld fabrication.
    4. Design a simple mechanical assembly for fabrication as a weldment.
    5. Correctly use orthographic, auxiliary, sectional, and isometric views with all required dimensions, tolerances, and notes to fully define a complex mechanical component for manufacture.
2. Use conventional and geometric tolerancing techniques to accurately define mechanical designs and assembly designs for manufacture.
    1. Accurately read and create limit dimensions for common mechanical geometries.
    2. Describe and apply nominal sizes and stock sizes in the design of complex mechanical components.
    3. Dimension mating parts and assemblies using limit dimensions, unilateral tolerances, and bilateral tolerances.
    4. Describe and properly apply clearance fits, interference fits, and transition fits.
    5. Describe and properly apply tolerances and finishes needed for machining mechanical components.
    6. Draw, apply, and explain the functional implications of common geometric tolerances.
3. Apply basic design principles, reference materials, and standards used to develop mechanical designs.
    1. Define the principles and advantages of designing from stock shapes.
    2. Find and accurately apply engineering design information from references such as the *Machinery's Handbook* and vendor-supplied technical data.
    3. Perform a basic stack tolerance analysis on a mechanical component or assembly.
    4. Use engineering design standards, product end-use requirements, manufacturability considerations, and vendor-supplied specifications in the design process.
4. Use engineering documentation procedures to produce and maintain an accurate and up-to-date set of engineering drawings and specifications.
    1. Produce a complete set of drawings, including individual detail drawings, three-dimensional (3D) assembly drawings, isometric or 3D exploded views, parts lists, design constraints, and bill of materials (BOM) for a detailed mechanical assembly.
    2. Generate and explain the rationale behind a part numbering system for a mechanical assembly and/or product line.
    3. Document an engineering change notification for a mechanical design, and explain the implications of keeping such a system up to date in an engineering and/or manufacturing operation.

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
Summative: Base Design Package (Project 1)	15%
Summative: Design Project Drawing Package	50%
Formative: Bills of Material for Selected Design	20%
Summative: Written Design Constraints & Specification report	15%
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 skills, techniques, and modern tools of the discipline to narrowly defined engineering technology activities.
2. Apply mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge.
3. Identify, analyze, and solve narrowly defined engineering technology problems.
4. Demonstrate a commitment to quality, timeliness, professional development, and continuous improvement.
5. Demonstrate technical competency in engineering materials, applied mechanics, and manufacturing methods.
6. Apply in-depth technical competency in applied drafting practice emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and computer aided drafting and design.

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.