MET-2601: 3D SOLID MODELING

Cuyahoga Community College

Viewing: MET-2601: 3D Solid Modeling

Board of Trustees:
2013-06-27

Academic Term:
Fall 2018

Subject Code
MET - Mech Eng/Manuf Ind Eng Tech

Course Number:
2601

Title:
3D Solid Modeling

Catalog Description:
Introduction to computer-aided engineering, design of mechanical component and system using computer-aided design technique, AutoCAD solid and surface model for product development, optimization of design and design documentation. Complete set of production drawings created using 3D drawing environments. Principles of parametric design, and functional assemblies directly applied. Emphasis tailored to 3D modeling for enhanced part description. Students work on Individual design projects to stimulate spatial abilities and problem-solving techniques.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
3

Requisites

Prerequisite and Corequisite
MET-1230 Drawing & AutoCAD.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms. Blackboard accessibility information is available at http://access.blackboard.com.

Eastern (216) 987-2052 - Voice
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is, in part, based on your enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of the financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course, before financial aid funds can be applied to students’ accounts. Therefore, attendance will be recorded in the following ways:

For in-person courses, students are required to attend the course by the 15th day of the semester, or equivalent for terms shorter than 5-weeks, to be considered attending. Students who have not met all attendance requirements for an in-person course, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

For blended-learning courses, students are required to attend the course by the 15th day of the semester, or equivalent for terms shorter than 5-weeks, or submit an assignment, to be considered attending. Students who have not met all attendance requirements for a blended-learning courses, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

For online courses, students are required to login in at least two (2) times per week and submit one (1) assignment per week for the first two (2) weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for an online course, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

At the conclusion of the first two weeks of a semester, or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class, wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with class work because of a prolonged absence should confer with the instructor or a counselor.

IV. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdfYou must also comply with the College’s Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes

Course Outcome(s):
Create a complete set of production drawings with specified geometric and feature changes for a specified class assignment.

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Create solid model part drawings with CAD software capabilities.
2. Create a section view
3. Create a complete 3D assembly drawing
4. Extract orthographic views of each part
5. Apply the proper tolerance specifications to part dimensions

Course Outcome(s):
Re-design a product and follow it through the design process

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Use constraints effectively in part modeling
2. Create orthographic drawings from 3d models
3. Modify 3D models with software rendering techniques.
4. Apply materials to part for display and printing
5. Create 3D presentation assemblies from 3d parts
6. Utilize interference and clearance assembly analysis
7. Create orthographic and section view of object from solid model.

Course Outcome(s):
Use AutoCAD solid and surface modeling tools to create computer model of designed object.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Demonstrate an understanding of the different phases of mechanical design.
2. Create solid model part drawings with CAD software capabilities.
3. Create 3D part models
4. Create a section view
5. Use constraints effectively in part modeling
6. Create orthographic drawings from 3d models
7. Modify 3D models with software rendering techniques.
8. Apply materials to part for display and printing
9. Demonstrate an understanding of the computer in all phases of design process.
10. Demonstrate an understanding of the manufacturing processes of rapid prototyping that utilize 3D CAD drawings.
11. Recognize the relationship between 3D models and rapid prototyping
12. Understand the process of rapid prototyping
13. Create orthographic and section view of object from solid model.
14. Analyze mass and geometric properties of model created.

Methods of Evaluation:
1. Assignments
2. Tests
3. Final examination

Course Content Outline:
1. Concepts
   a. Production drawings
   b. Parametric design changes
   c. Feature-based design
   d. Geometric parameters
   e. Assembly drawings
   f. General assembly
   g. Exploded assembly
   h. Sectioned assembly
   i. View/model rendering
   j. Rendering
k. Solid modeling  
l. Individual class project  
m. Project requirements  
n. Tolerances  
o. Design process  
p. AutoCAD surface modeling  
q. Assembly modeling  
r. Design analysis  
s. Computer aided engineering  
t. Engineering design process  
u. Concurrent Engineering  

2. Skills  
a. Computer efficiency  
b. Software application and customization  
c. Integrating programming for individualized software application  
d. Debugging program code  
e. Design and modify parts and systems using a design process  
f. Applying and identifying the proper tolerances for a drawing  
g. Creating 2D detail and assembly drawings  
h. Utilizing threads on drawings with the proper standards.  
i. Team work and oral communication  

3. Issues  
a. Working with diverse individuals and teams  
b. Developing a level of comfort with the computer and software  
c. Developing a positive attitude about using tools of the Engineering field.  
d. Presenting solutions using a problem solving process.  

Resources  


Resources Other  
1. AutoCAD and Inventor software.  
2. Laboratory exercise handout.  
3. USB Drive  

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