

ME 116: Engineering Computer-Aided Design and Visualization

Course description: Introduction to 3-D solid modeling, parts, drawings, assemblies, multi-body parts, sketch editing, sheet metal, weldments, surface and mold tools.

Number of credits: 2 (0-6). This course is required.

Course Coordinator: D. Torick

Prerequisites by course: Math 171 or concurrent enrollment

Prerequisites by topic: None

Postrequisites: Required course for ME majors, ME 216

Textbooks/other required materials: Reyes, A. *Beginner's Guide to SolidWorks 2019 - Part I*, Schroff Dev. Corp., 2019.

- Course objectives:*
1. To develop an understanding of the fundamental principles and applications of computer aided design in engineering using industry standard solid modeling software.
 2. To develop an ability to visualize complex 3D structures and the relationships between entities in these structures.
 3. To develop an ability to graphically represent design information using current industry standard solid modeling software.
 4. To develop skills in using 3D computer aided design software.
 5. To develop an insight into the capabilities of computer aided design and visualization of engineered parts and assemblies.
 6. To develop an ability to communicate design ideas and problem solving methods through CAD models and drawings to peers, instructors, and future professional colleagues.
 7. To enhance and promote creativity for design innovations.
 8. To understand fundamental surface modeling techniques and applications.
 9. To become familiar with using specialized CAD modules for specific engineering design applications.
 10. To foster an awareness of current engineering design issues and their relevance to ongoing world events.

- Topics covered:*
1. Fundamentals of CAD part modeling; conventions and techniques.
 2. Creation of engineering drawings from CAD models.
 3. Techniques for creating assembly models from parts models in CAD.
 4. Creating exploded and assembly drawings from assembly models in CAD.
 5. Projections – creation of orthographic, isometric, and oblique projection drawings from part and assembly models using solid

- modeling CAD systems.
6. Fundamental surface modeling techniques.
 7. Application of dimensioning tolerancing techniques and to CAD models, drawings and assemblies.
 8. Fundamentals of engineering design and its expression as a design in CAD.

Expected learning outcomes:

1. Ability to accurately describe and construct three-dimensional parts and assemblies using CAD software.
2. Ability to read and produce detailed parts and assembly drawings in CAD using accepted visual, dimensioning and tolerance techniques.
3. Ability to produce original three-dimensional computer models of components and their assemblies.
4. An understanding of the application of CAD drawing and visualization to engineering design.
5. Ability to use a computer, web browser, e-mail, CAD software and word processing software to accomplish the objectives of the course.
6. The ability to participate in classroom discussions involving world events and understanding their impact on the direction of engineering trends.
7. An understanding of the fundamentals of surface modeling in CAD.
8. The ability to use a combination of surface and solid modeling to create CAD models.
9. Familiarity with CAD sheetmetal and weldments modules.

Class schedule: Not applicable

Laboratory schedule: Two 3-hour lab sessions per week for one semester

Contribution to meeting the professional component: Engineering Topics

Relationship of course to student outcomes: Meets:

1. School of MME educational objectives: 1, 2, 3
2. School of MME program outcomes: 1, 2, 4, 5, 6, 7
3. ABET EC 2019, Criterion 3 program outcomes: 2, 3, 5, 7

Prepared by: Amy Johnson and D. Torick *Date:* June 6, 2019

POLICIES

A. Reasonable Accommodation (the nature of the particular course determines which one applies):

- **Pullman Campus.** Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.
- **WSU Online Course.** Reasonable accommodations are available in online classes for students with a documented disability. All accommodations must be approved through your WSU Disability Services office. If you have a disability and need accommodations, we recommend you begin the process as soon as possible. For more information contact a Disability Specialist on your home campus: Pullman or WSU Online (<http://accesscenter.wsu.edu>), Spokane (<http://spokane.wsu.edu/students/current/studentaffairs/disability/>), Tri-Cities (<http://www.tricity.wsu.edu/disability>), Vancouver (<http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services>).

B. Academic Integrity

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The Standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

C. WSU Safety

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu> to become familiar with the information provided.