

## ME 116: Engineering Computer-Aided Design and Visualization

<i>Course description:</i>	Introduction to 3-D solid modeling, parts, drawings, assemblies, multi-body parts, sketch editing, sheet metal, weldments, surface and mold tools.
<i>Number of credits:</i>	2 (0-6). This course is required.
<i>Course Coordinator:</i>	D. Torick
<i>Prerequisites by course:</i>	Math 171 or concurrent enrollment
<i>Prerequisites by topic:</i>	None
<i>Postrequisites:</i>	Required course for ME majors, ME 216
<i>Textbooks/other required materials:</i>	Reyes, A. <i>Beginner's Guide to SolidWorks 2019 - Part I</i> , Schroff Dev. Corp., 2019.
<i>Course objectives:</i>	<ol style="list-style-type: none"><li>1. To develop an understanding of the fundamental principles and applications of computer aided design in engineering using industry standard solid modeling software.</li><li>2. To develop an ability to visualize complex 3D structures and the relationships between entities in these structures.</li><li>3. To develop an ability to graphically represent design information using current industry standard solid modeling software.</li><li>4. To develop skills in using 3D computer aided design software.</li><li>5. To develop an insight into the capabilities of computer aided design and visualization of engineered parts and assemblies.</li><li>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.</li><li>7. To enhance and promote creativity for design innovations.</li><li>8. To understand fundamental surface modeling techniques and applications.</li><li>9. To become familiar with using specialized CAD modules for specific engineering design applications.</li><li>10. To foster an awareness of current engineering design issues and their relevance to ongoing world events.</li></ol>
<i>Topics covered:</i>	<ol style="list-style-type: none"><li>1. Fundamentals of CAD part modeling; conventions and techniques.</li><li>2. Creation of engineering drawings from CAD models.</li><li>3. Techniques for creating assembly models from parts models in CAD.</li><li>4. Creating exploded and assembly drawings from assembly models in CAD.</li><li>5. Projections – creation of orthographic, isometric, and oblique projection drawings from part and assembly models using solid</li></ol>

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:*

3 strongly supported; 2 supported; 1 minimally supported

Student Outcomes Pre-Fall 2018  
(ABET EC2000)

a	b	c	d	e	f	g	h	i	j	k
		2	1			1		1		3

Student Outcomes Fall 2018 forward  
(ABET EC2019)

1	2	3	4	5	6	7
	2	1		1		2

*Prepared by:* Amy Johnson and D. Torick

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