ME 216: Integrated CAD Design

Course description: CAD based analysis for engineering design, the application of motion, FEA and CFD, CAD simulations to the engineering design process.

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

Course Coordinator: D. Torick

Prerequisites by course: ME 116 with a grade of C or better; CE 215 or concurrent enrollment.

Prerequisites by topic: None

Postrequisites: Required course for ME majors, ME 316 (concurrent).

Textbooks/other required materials:

1. Chang, K.H. *Motion Simulation and Mechanism Design with SolidWorks Motion*, Schroff Dev. Corp., 2016.
2. Kurowski, P.M. *Engineering Analysis with SolidWorks Simulation 2019*, Schroff Dev. Corp., 2019.

Course objectives:

1. To develop a further understanding of assembly creation techniques and analysis.
2. To learn to use the CAD based computational analysis modules and their application to the design of engineered models.
3. To introduce students to the fundamental engineering design process sequence.
4. To develop fluency in using CAD for the creation of design documentation for engineering designs.
5. To develop an ability to communicate design ideas and problem solving methods through CAD models and drawings to peers, instructors, and future professional colleagues.
6. To enhance and promote creativity for design innovations.
7. To introduce students to Geometric Dimensioning and Tolerances.
8. To foster an awareness of current engineering design issues and their relevance to ongoing world events.
9. To introduce the concepts teamwork and team organizational skills in engineering design.

Topics covered:

1. Advanced assembly techniques and analysis.
2. Engineering analysis and visualization capabilities in the CAD framework.
3. Engineering design in CAD using finite element analysis modules.
4. Engineering design in CAD using SolidWorks Flow Simulation.
5. Animation and motion analysis using SolidWorks Motion.
6. Introduction to the engineering design process.
7. CAD techniques for engineering design documentation and communication.

8. Organizing workflow and prioritization in engineering team environments.
9. Geometric Dimensioning and Tolerances- Datums, Conditions, and Form.
10. Engineering design for conservation and sustainability.
11. The global environment and its impact on engineering design.

Expected learning outcomes:

1. Familiarity with the tools used to create and analyze advanced assembly models.
2. An understanding of the application of CAD computational analysis tools to engineering design.
3. An understanding of the fundamental engineering design sequence.
4. The ability to create a complete CAD documentation for an engineering design.
5. The ability to apply GD&T to specify form for a part.
6. The ability to participate in classroom discussions involving world events and understanding their impact on the direction of engineering trends.

Laboratory schedule: Two 3-hour laboratory 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	2			2		2		3

Student Outcomes Fall 2018 forward (ABET EC2019)

1	2	3	4	5	6	7
	2	2		2		3

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