

ME 416: Mechanical Systems Design

<i>Course description:</i>	Integrative design in mechanical engineering; multidisciplinary design project considering both technical and non-technical contexts; organizational dynamics and communications.
<i>Number of credits:</i>	3 (1-6). This course is required.
<i>Course Coordinator:</i>	C. Pezeshki
<i>Prerequisites by course:</i>	Certified major in Mechanical Engineering; ME 304; ME 348; ME 415; senior standing; OR certified major in Materials Science and Engineering; MSE 320; MSE 413 or concurrent enrollment; one of MSE 401, 402, or 403; senior standing.
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. Machine design2. Knowledge of all areas of engineering physics (thermodynamics, fluids, system theory, dynamics, statics, mechanics of materials, and material science)3. Design processes and practice4. Technical writing
<i>Postrequisites:</i>	None
<i>Textbooks/other required materials:</i>	None
<i>Course objectives:</i>	<ol style="list-style-type: none">1. Capstone design objectives—assign students a project that will allow them to integrate a majority of their skills acquired in the last four years regarding both engineering science, design, and communication2. Students will work in groups on a funded project sponsored by and industrial partner, and will be mentored by both a professor in the School and an industrial mentor assigned by the company3. Students will learn a "customer" ethic in providing a deliverable and appropriate level of engineering service to their industrial sponsor4. Students will learn and demonstrate both oral and written engineering communication skills5. Students will consider cost and time constraints (economic considerations) in execution of their design project6. Students will consider safety, ethical, and other societal constraints in execution of their design projects
<i>Topics covered:</i>	Design sequence, project planning, engineering ethics, patent law, negotiation skills, career paths, technical report writing, group dynamics, integration of skills and concepts developed in previous

courses to find a design solution for an industrial project.

Expected learning outcomes:

1. Students will understand how to prepare a needs-assessment for a given project
2. Students will learn how to define a deliverable and make a budget for a project
3. Students will learn successful group interaction for a project
4. Students will produce an intermediate and final design report as part of their deliverable for a project
5. Students will deliver a final oral presentation for their project, including intermediate oral updates of their project as required by the project sponsor
6. Students will learn appropriate corporate etiquette and a strong "customer" ethic

Class schedule:

One 50-minute lecture session per week, for one semester.

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
		3	2	3	2	3	2	3	2	3

Student Outcomes Fall 2018 forward
(ABET EC2019)

1	2	3	4	5	6	7
3	3	3	2	3	2	3

Prepared by: Andrea Butcherite and C. Pezeshki *Date:* May 30, 2018