

## 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>	Admitted to major in Mechanical Engineering; ME 304; ME 348; ME 415; senior standing; OR admitted 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"><li>1. Machine design</li><li>2. Knowledge of all areas of engineering physics (thermodynamics, fluids, system theory, dynamics, statics, mechanics of materials, and material science)</li><li>3. Design processes and practice</li><li>4. Technical writing</li></ol>
<i>Postrequisites:</i>	None
<i>Textbooks/other required materials:</i>	None
<i>Course objectives:</i>	<ol style="list-style-type: none"><li>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 communication</li><li>2. 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 company</li><li>3. Students will learn a "customer" ethic in providing a deliverable and appropriate level of engineering service to their industrial sponsor</li><li>4. Students will learn and demonstrate both oral and written engineering communication skills</li><li>5. Students will consider cost and time constraints (economic considerations) in execution of their design project</li><li>6. Students will consider safety, ethical, and other societal constraints in execution of their design projects</li></ol>
<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:*

Meets:

1. School of MME educational objectives: 1, 2, 3
2. School of MME program outcomes: 1, 2, 3, 4, 5, 6, 7
3. ABET EC2019, Criterion 3 program outcomes: 1, 2, 3, 4, 5, 6, 7

*Prepared by:* Amy Johnson and C. Pezeshki

*Date:* December 16, 2020

#### **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.