

School of Engineering and Computer Science
MECH 417 [CAPS] Mechanical Systems Design II

<i>Catalog Data:</i>	417 [CAPS] Mechanical Systems Design II 3 Course Prerequisite: MECH 416; junior standing. Second term of the year-long capstone design; integrative design in mechanical engineering; multidisciplinary design project considering technical and nontechnical contexts. Typically offered Spring.
<i>Class Schedule:</i>	Three 50-minute lecture sessions per week, for one semester.
<i>Laboratory Schedule:</i>	None
<i>Prerequisites by Course:</i>	MECH 416
<i>Prerequisites by Topic:</i>	<ol style="list-style-type: none"> 1. Machine design 2. Knowledge of all areas of engineering physics (thermodynamics, fluids, system theory, dynamics, statics, mechanics of materials, and material science) 3. Design processes and practice 4. Technical writing
<i>Textbook:</i>	None
<i>Course Coordinator:</i>	Dr. Dave Kim
<i>Course Objectives:</i>	<ol style="list-style-type: none"> 1. Mechanical systems design objectives—assign students a project that will allow them to integrate a majority of their skills acquired in the last four years regarding engineering, science, design, and communication. 2. Learn how to conduct research and how to apply the knowledge gained in other classes to formulate and solve problems encountered in the practice of mechanical engineering. 3. Work in groups on a sponsored project, and will design and realize thermal and mechanical components, systems, or processes to meet desired needs and realistic constraints. 4. Learn a "customer" ethic in providing a deliverable and appropriate level of engineering service to their sponsor. 5. Learn and demonstrate both oral and written engineering communication skills. 6. Consider cost and time constraints (economic considerations) in execution of their design projects. 7. Consider safety, ethical, and other societal constraints in execution of their design projects. 8. Develop the capability to design and conduct experiments and to use modern engineering tools necessary for mechanical engineering practice.
<i>Topics Covered:</i>	<ol style="list-style-type: none"> 1. Design sequence and project planning 2. Engineering ethics, patent law, and negotiation skills 3. Career paths 4. Technical report writing 5. Technical oral presentation 6. Group dynamics 7. Integration of skills and concepts developed in previous courses to find a design solution for an industrial project
<i>Lab Experiments and Activities:</i>	None

Course Outcomes:	Students will be able to:		
	Assessed for Student Outcomes	<p>2-b. Apply the engineering design process (such as concept generation, modeling, evaluation, and iteration) to satisfy project requirements for thermal or mechanical systems.</p> <p>2-c. Analyze an engineering system for the projects within realistic constraints, such as economic, environmental, social, cultural, global, public health, safety, welfare, and other factors appropriate to the defined project constraints.</p> <p>2-d. Produce solutions that meet specified needs for engineering designs.</p> <p>3-a. Produce a variety of documents, particularly project final reports, using discipline-specific conventions to deliver the project results and conclusions to the project sponsors (professional/technical audiences).</p> <p>3-b. Deliver well-organized, logical oral presentations accommodating audience interests and background, including good explanations when questioned.</p> <p>5-a. Establish common goals, tasks, timeline, etc., as a project team.</p> <p>5-b. Share responsibilities and information on project schedule and tasks with other members as a project team.</p> <p>5-c. Collaborate with individuals with diverse backgrounds, skills, and/or perspectives to meet project objectives.</p>	
	Other	<p>1-d. Apply mathematics, scientific and/or engineering principles toward solving engineering problems encountered while conducting projects.</p> <p>2-a. Define engineering problems clearly while conducting projects.</p> <p>7-a. Able to use resources effectively to acquire new information for the projects.</p> <p>7-b. Able to use appropriate learning strategies such as communicating with an expert, using credible sources, experimentation, simulation, etc., when conducting the projects.</p> <p>7.c. Apply new knowledge in solving engineering problems of the projects.</p>	
Required or Elective Course:	Required		
Relationship of Course to Program:	Meets: Educational <u>1, 2, 3, 4</u> Student Outcomes <u>1, 2, 3, 5, 7</u>		
Prepared by:	Dr. Dave Kim	Date:	4/6/2018 (4.6.18 mb)
Approved by USC:	4/16/2018		