WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

MECH 416 [M] Mechanical Systems Design I

Catalog Data:	**416 [M] Mechanical Systems Design I** 2 Course Prerequisite: MECH 310; MECH 404; MECH 414 or concurrent enrollment. First term of the year-long capstone design; integrative design in mechanical engineering; multidisciplinary design project considering technical and nontechnical contexts. Typically offered Fall.
Class Schedule:	Two 50-minute lecture sessions per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	MECH 310; MECH 404; MECH 414 or c//.
Prerequisites by Topic:	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
Textbook:	None
Course Coordinator:	Dr. Dave Kim
Course Objectives:	Students will complete 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. They will: 1. Identify and define the design project through class presentations from practicing mechanical engineers from a sponsor company. 2. Learn how to conduct research and how to apply the knowledge gained in other classes to solve mechanical engineering problems, and write an individual progress note and/or research paper as a weekly assignment. 3. Draft, revise, and resubmit their progress notes and/or research papers as their work is being evaluated. (Students will be encouraged to work with the WSU Vancouver Writing Center staff throughout the semester.) 4. Work in groups on a sponsored project and design thermal and mechanical systems with the assistance of both faculty and/or an industrial mentor assigned by the sponsor. 5. Learn a "customer" ethic in providing a deliverable and an appropriate level of engineering service to the sponsor. 6. Learn and demonstrate both oral and written engineering communication skills. 7. Consider cost and time constraints (economic considerations) in execution of the design project. 8. Consider safety, ethical, and other societal constraints in execution of their design projects.
Topics Covered:	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.

Lab Experiments and Activities:		None		
Course Outcomes:	Students will be able to:			
	Assessed for Student Outcomes	2-a. Analyze needs to produce problem definition for thermal and mechanical systems. 3-a. Produce a variety of documents, particularly project proposals, using discipline-specific conventions to deliver clear proposed ideas (approaches and potential solutions) to the project sponsors. 4-a. Evaluate proposed solutions in consideration of the global, economic, environmental, and/or societal impacts. 5-a. Establish common goals, tasks, timeline, etc., as a project team. 5-b. Share responsibilities and information on project schedule and tasks with other members as a team. 5-c. Collaborate with individuals with diverse backgrounds, skills, and/or perspectives to meet the project objectives. 7-a. Use resources effectively to acquire new information for the projects.		
	Other	2-b. Carry out the design process (such as concept generation, modeling, evaluation, iteration) to satisfy project requirements for thermal and mechanical systems. 2-c. Analyze an engineering system within realistic constraints, such as economic, environmental, social, cultural, global, public health, safety, welfare, and other factors appropriate to the discipline. 2-d. Produce engineering design solutions that meet specified needs from the project sponsors. 7-b. Use appropriate learning strategies such as communicating with an expert, using credible sources, experimentation, simulation, etc., when conducting the projects. 7-c. Apply new knowledge in solving engineering problems of the projects.		
Required or Elective Course:		Required		
Relationship of Course to Program:		Meets: Educational Objectives 1, 2, 3, 4 Student Outcomes 2, 3, 4, 5, 7		
Prepared by:		Dr. Dave Kim	Date:	3/26/2018 (4.23.18mb)
Approved by USC:		4/23/18		