WASHINGTON STATE UNIVERSITY
VANCOUVER
World Class. Face to Face.

School of Mechanical Engineering and Computer Science

Mech 417 [M] Mechanical Systems Design II

Catalog Data:	**Mech 417 Mechanical Systems Design II;** 3 credits [M] The second term of the year-long capstone design; integrative design in mechanical engineering; multidisciplinary design project considering both technical and non-technical contexts.
Class Schedule:	Three 50-minute lecture sessions per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	Mech 416, senior standing, and consent of academic coordinator
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
Required Texts:	None
Course Coordinator:	Dr. Linda (Xiaolin) Chen
Course Objectives:	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.
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: B1. Identify the constraints, assumptions, or models (i.e. budget, time, facilities, etc) for the projects. B2. Use appropriate equipment and techniques for data collection. B3. Analyze experimental data using appropriate tools and/or statistical tools. B4. Validate experimental results with respect to assumptions, constraints, and theory. C1. Analyze needs to produce problem definition for thermal and mechanical systems. C2. Carry out design process (such as concept generation, modeling, evaluation, iteration) to satisfy project requirements for thermal and mechanical systems. C3. Work within realistic constraints (such as economical, environmental, social, political, manufacturability, health and safety, ethical, and sustainability) in realizing systems. C4. Build prototypes that meet design specifications. D1. Share responsibilities and information on schedule with others on the team. D2. Participate in the development and selection of ideas. D3. Demonstrate what one must do to be effective in a team setting. E1. Classify information to identify engineering problems. E2. Examine alternatives using mathematical, scientific, and engineering knowledge to formulate solutions. E3. Use analytical, computational, and/or experimental methods to obtain solutions. F2. Interact with industry. G1. Produce a variety of documents, particularly project proposals, using appropriate formats, grammar, and mechanics with discipline-specific conventions including citations. G2. Plan, prepare, and deliver well-organized, logical oral presentations; explain when questioned. I1. Find, evaluate & use resources to learn new material not taught in class. K1. Set-up and/or operate engineering equipment for projects. K2. Establish interfaces among systems. K4. Use software for analysis, synthesis and presentation.		
Required or Elective Course:	Required		
Contribution to Professional Component:	Engineering Topics		
Relationship of Course to Program:	Meets: Educational Objectives 1, 2, 3, 4 Program Outcomes B, C, D, E, F, G, I, K		
Prepared by:	Dr. Linda (Xiaolin) Chen	Date:	November 1, 2006
Approved by CAC:			