

School of Mechanical Engineering and Computer Science
Mech 416 [M] Mechanical Systems Design I

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| Catalog Data: | Mech 416 Mechanical Systems Design I; 2 credits [M] The first term of the year-long capstone design; integrative design in mechanical engineering; multidisciplinary design project considering both technical and non-technical contexts. |
| Class Schedule: | Two 50-minute lecture sessions per week, for one semester. |
| Laboratory Schedule: | None |
| Prerequisites by Course: | Mech 414 or c//, senior standing, and consent of academic coordinator |
| Prerequisites by Topic: | <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 |
| Required Texts: | None |
| Course Coordinator: | Dr. Dave (Dae-Wook) Kim |
| Course Objectives: | <p>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:</p> <ol style="list-style-type: none"> 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: | <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. |

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| | 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 Program Outcomes | C-1. Analyze needs to produce problem definition for thermal and mechanical systems. D-1. Share responsibilities and information on schedule with others on the team. D-2. Participate in the development and selection of ideas. G-1. Produce a variety of documents, particularly project proposals, using appropriate formats, grammar, and mechanics with discipline-specific conventions including citations. H-2. Examine economic tradeoffs in engineering designs. I-1. Find, evaluate, and use resources to learn new material not taught in class. I-2. List sources for continuing education opportunities. I-3. Recognize the need to accept personal responsibility for learning and the importance of lifelong learning. | |
| | Other | C-2. Carry out the design process (such as concept generation, modeling, evaluation, iteration) to satisfy project requirements for thermal and mechanical systems. E-1. Classify information to identify engineering problems. F-2. Interact with industry. | |
| Required or Elective Course: | Required | | |
| Contribution to Professional Component: | Engineering Topics | | |
| Relationship of Course to Program: | Meets: Educational Objectives <u>1, 2, 3, 4</u> Program Outcomes <u>C, D, E, F, G, H, I</u> | | |
| Prepared by: | Dr. Dave (Dae-Wook) Kim | Date: | October 10, 2008 |
| Approved by CAC: | | | |