

PROJECTS FOR CAPSTONE DESIGN

Mechanical Engineering

University of Kentucky

SUMMARY:

The curriculum of the Mechanical Engineering Department has included a Capstone or senior design project for several decades, as a one-semester course taken by students in their senior year. Beginning in Fall 2005, we expanded the Capstone experience to a two-semester sequence, ME 411 and 412. This change was based on a comprehensive survey of other institutions and input from students and other constituents. We believe this offers several advantages to students and the project sponsors/advisors:

1. The additional time allows for more comprehensive projects, allows students to more fully develop their design and conceptualization abilities, and allows for stronger development of teamwork and other project-related skills.
2. The two-course sequence provides integrated coverage of multiple aspects of the design process, including engineering economics, safety and reliability, engineering ethics, communication, and the design process.
3. The additional time allows for increased development of technical communication abilities, with more deliverables (written and verbal) during the two-semester sequence.

The courses include lectures and assigned work on the major topics in design. Students are organized into teams of four or five students, and each team is assigned a project for the two-semester sequence. Each team is expected to organize and carry out the design tasks, with faculty or industry sponsors serving as advisors.

PROJECTS:

We are seeking proposals for projects to assign to the student teams, with projects for this year beginning in the fall semester. Projects need to allow substantial design and conceptualization potential, not merely design changes of scale or duplication of existing systems. It must be possible to complete them within the two-semester time-frame. Based on past experience, we have found three types of projects to be effective:

1. **Industry projects:** Industry representatives would define the project requirements, and provide guidance to the student team during the semester. These projects are often those which the company needs to have completed, but either does not have the resources to complete, or is willing to treat them as “back-burner” needs. Sometimes the project can provide opportunity for a fresh look at efforts underway within the company. The company needs to identify a resource person within the firm to answer student questions, meet with the student team periodically for progress reviews, and attend the final presentation at the end of the semester. We address any requirements for confidentiality with industry sponsors when needed (You will note that information on industry projects in this mailing, and on the website, is limited for this reason).
2. **Student Extra-Curricular Projects:** Our students are involved in a number of extra-curricular projects such as the Solar Car, Big Blue, Formula Car, Mini-Baja, and Solar Decathlon. There are often specific design efforts which can be carved out of these projects for the Capstone design teams. These projects also have opportunities for industry participation or sponsorship.
3. **Student Design Competitions:** There are several engineering organizations that sponsor student design competitions in addition to those such as the solar car or Mini-Baja. For example, ASME develops a new contest each year, requiring novel approaches to design and build a device to meet specific requirements. A recent contest required students to develop a device to purify water with only human power. These projects also have opportunities for industry participation or sponsorship.

HOW CAN YOU HELP?

We are seeking brief proposals for possible projects for the upcoming academic year. All we need is a paragraph or two describing the project requirements. We would contact the potential sponsors for clarification, and if the project seems to be a good fit, would present it with other projects to student teams in late August. Sponsors would be contacted by the students during the year as they define a project plan and carry out the work.

We do not require a financial contribution for the projects. If there are substantial hardware or equipment needs, these are provided by the sponsor, and financial support is always appreciated.

If you are interested, please send a brief paragraph describing your project by August 1 to any of the following:

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