Challenges and Solutions in Developing a Three Department Interdisciplinary, Capstone Design Course at the University of Houston

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Abstract

In 1998 the Department of Electrical and Computer Engineering at the University of Houston began requiring the completion of a new capstone design course as part of its BSEE and BSCE degrees. Through mutual agreement they created a new course, ECE 4334, and joined the existing INDE/MECE 4334 capstone design course, required of all students in the Departments of Industrial Engineering and Mechanical Engineering. Traditionally, the course had drawn most of its projects from local industry, primarily companies working in "oil patch." However, the new course would be dominated by Electrical and Computer engineering students (65% of the students) so that additional sources of projects would be needed. Recent experiences have led us to provide more of the projects ourselves, although we still have a good number of industry provided and sponsored projects. This paper, which is drawn from the four recent papers listed in the references, describes the challenges and the specific problems encountered and the changes, i.e., solutions, that have been implemented.

Some of the solutions implemented are:

- A Cohort structure was established to handle more than 80 students a semester.
- All projects are addressed by four member teams that must have representation from at least two academic departments.
- A facilitation structure based on the Studio/Critique format used in teaching the visual arts was established to provide better communication between the facilitators and the teams and to encourage more interaction among teams working on different projects.
- An evolving relationship was established with the University of Houston Writing Center for support in both written and oral communication issues in which the Writing Center, in collaboration with the capstone instructors, has developed and delivers communications workshops for the capstone students, provides "writing

consultants" for the capstone students, and has developed grading rubrics for both written and oral proposals, progress reports, and technical reports.

- Each student makes one individual oral presentation and submits one individual (different) written report during the semester (two of the following: proposal, progress report, or technical report).
- Oral presentations are made throughout the semester to a rotating audience of different cohorts so all students learn about all projects.
- Each team submits bi-weekly planning reports and at the end of the semester provides: a poster, an extended abstract, a formal written final report, a formal oral final report, and formal "project defense."
- Each project has a client (financially responsible person), an engineer-in-charge (client's technical liaison), faculty advisor (technical consultant) and a facilitator (one of the course instructors).
- A web based communication system is used to "run" the course.
- A project "ownership" policy requires students to specifically define their end-of-semester deliverables by mid-semester.
- A validation process requires that the students formally and explicitly state the expectations for the performance of their "solution", develop the specifications for the "testing" of their artifacts at the end of the semester, and then demonstrate that they have been successful.

References

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