

Project-Based Introduction to Engineering - a University Core Course

This paper describes a first year engineering course that is taken by both engineering and non-engineering students. The project-based Introduction to Engineering course, EAS107P, fulfills a university core curriculum elective. Although engineering students take the course during their first year, students from other majors typically take the course later in their curriculum.

The focus of EAS107P is to have students experience the engineering design process in a multi-disciplinary, team-based setting. In addition to learning about design, students develop an interest in the engineering profession and build a foundation of skills for future work. An additional expectation for engineering students is that they gain a basic understanding of engineering foundation topics, such as basic circuits, mechanics, mass balances and programming concepts. Students' understanding of these topics is enhanced as they are revisited along the "***Multi-Disciplinary Engineering Foundation Spiral***". Non-engineering students benefit by learning how to apply the engineering methodology to solving problems and by developing a greater understanding of how engineering contributes to society.

Students develop skills in problem solving, team-work and technical communication through a series of projects that showcase the primary engineering disciplines. Each project emphasizes a different step or aspect of the design process, including computer simulation, optimization, and construction of physical models. Typical projects include the design, construction and testing of bridges based on the West Point Bridge Design program; development of characteristic curves for fuel cell system; building and programming robots to maneuver through an obstacle course, and solid 3-D modeling of puzzle cubes. For each project, pre- and post-tests are used to evaluate the student's increased understanding of concepts.

This paper provides details of the project modules and summarizes our experiences to date using this active learning style. Pilot versions of this course have been offered since Fall 2002 with positive feedback.