Work in Progress – Engineering Education Innovation Center

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Abstract - To further enhance our efforts in providing the highest quality engineering education, Ohio State has established the Engineering Education Innovation Center (EEIC). The EEIC is the focal point for the College's innovative instructional programs, building upon our reputation for and commitment to creative undergraduate education. It is to provide academic as well as professional activities designed to enrich the undergraduate student experience both inside and outside the classroom. And it can create new courses and programs and strengthens existing ones to ensure that students are well prepared for an ever-expanding employment environment. Key Programs include: 1) First-Year Engineering Program 2) Multidisciplinary capstone programs, 3) Core and multidisciplinary engineering programs, 4) Technology literacy courses and minors, 5) Professional development and enhancement for students, 6) Faculty professional development opportunities and 7) Technologically enhanced and enabled instruction support. Our vision is that EEIC will provide vision, leadership, resources, and connections that will contribute to the Ohio State College of Engineering achieving increased recognition as a leader in creative, modern engineering education.

Index Terms – First-year engineering, capstone design, technological literacy, professional development.

BACKGROUND

The purpose of the Engineering Education Innovation Center (EEIC), established in May 2007, is to provide academic and professional activities designed to enrich the student experience both inside and outside the classroom; complement existing learning opportunities and outstanding program of study by developing new and vital multidisciplinary innovations; and support faculty in expanding and applying the latest research and scholarship in teaching and learning. Leadership of the Center is vested in a full-time faculty member as center director. The following sections will briefly highlight the major elements of the Center.

KEY EEIC PROGRAMS

First-Year Engineering Program

The College of Engineering at The Ohio State University requires all students to successfully complete a college common, introduction to engineering course sequence. This First-Year Engineering program provides students with practical, 'hands-on' engineering experience through project-based design courses. There are two tracks; standard track of two courses serving approximately 1100 students per year and a more challenging honors track of three courses serving approximately 320 students per year. Courses in each track have both lecture and hands-on laboratory components. These programs are well established and highly successful [1].

Multidisciplinary Capstone Design

Our engineering disciplines have a rich history of using industry developed and sponsored projects for student capstone design projects. The EEIC is building on this by being both a conduit for industries who want to connect to Ohio State's existing capstone courses and by supporting new multidisciplinary capstone opportunities. The new college-wide multi-disciplinary course sequence will be an alternative to the discipline sequences. It will be a three-quarter sequence with industry sponsored projects. The sponsoring companies are expected to provide the problem of interest, a statement of project deliverables and an engineer to act as the point of contact for the students. A nominal fee is assessed for industry participation. An industry experienced engineer has been hired to guide this element of the program. A college-wide event for showcasing capstone design projects is now planned as an annual event of the EEIC.

Core and Multidisciplinary Engineering Programs

The Center has the mission of being the host for experimental or unique opportunity courses that may be of interest to multiple disciplines in the college. For example, two currently offered are entitled “Product Realization” and “Holistic Design – Design and Delivering Consumer Experiences”.

A walk-in writing center is available for engineering students to get help and consultation on all stages of writing and writing tasks; a report, a summary, or a presentation.
The center provides consultation for both graduate and undergraduate students as well as engineering staff and faculty. It works with individuals one-on-one to identify patterns of errors, talk about readability, coherence, and work through ideas for revisions.

In the future multi-disciplinary engineering minors will also be part of the portfolio of the center.

Technology Literacy Courses and Minors

University review of General Education at Ohio State has brought forth the need for technological literacy as an insight area within general education. However, to date no satisfactory solutions as to how to address this insight area have been established. In order to offer the most value the College of Engineering through the EEIC is proposing two new minors. The first will focus on students most likely to be working most directly with engineers in the future and who can be expected to have mathematics capability through beginning calculus. A minor for this group is termed Engineering Sciences Minor. The second minor will be for those that are looking to the minor to build their technological literacy in a more general sense and who may not have as high a level of quantitative coursework background. A minor for this group is termed the Technological Studies Minor and is intended for the goal of creating a more technologically literate citizen.

In addition to the minor, two new courses in Engineering History have been approved for General Education credit across the university. They will be offered for the first time in academic year 08-09. They are entitled: History of American Technology and History of Ancient Engineering. They will be taught by the College of Engineering through the EEIC.

Student Professional Development and Enhancement

Starting in Autumn of 2009, the EEIC will support an Engineering Scholars program for 140 students. This is a two year program beginning with incoming first year students who have a strong interest in engineering but who did not qualify for the engineering honors program. Engineering as it relates to innovation, green engineering including alternative energy development, energy and service will be a program theme. The “living-learning” arrangement that the Scholars enjoy allows the students to interact on both academic and social levels. Engineering Scholars are students enrolled in the College of Engineering as Pre-engineering students (any major or undeclared) or students from any academic unit at the university who have a passionate interest in engineering and technology. Partnerships with faculty and staff are developed to enhance professional development and a high ethical standard of behavior. Engineering Scholars will be expected to take selected first-year engineering courses together and participate in events that include related tours, speakers, and programs while at the same time maintaining a competitive grade point average.

Formal leadership development opportunities for students are being expanded by the EEIC. Two formal courses in leadership are now available within the college. One is being offered by a concentrated weekend experience. This is complimented by a service learning course opportunity offered at the College level.

Faculty and Future Faculty Professional Development

The EEIC will be recruiting visiting faculty in the area of engineering education innovation to provide intellectual and programmatic support, stimulation and guidance. The EEIC is pleased to have funds through the Honda Fund for Academic Enrichment Endowment to partially support a Honda Visiting Faculty position on an ongoing basis.

Other faculty development will be supported by such things as an ongoing seminar series, book study groups and professional conference support. It is expected that the EEIC will be a catalyst for the development of proposals for funded scholarship of teaching and learning across the various units of the college.

The Center Director annually offers a three-credit course for graduate students, new faculty and advanced undergraduates with interest, entitled “College Teaching in Engineering”. This courses focus on fundamental aspects of teaching and using the scholarship of teaching and learning.

Technologically Enhanced and Enabled Instruction

The EEIC has a seed grant program to assist faculty in including technology applications in their teaching. Each year ten to twelve small grants are awarded for such things as faculty or staff training, course development support and specialized hardware and software.

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REFERENCES


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