Call For Proposals for Curricular Innovation in Undergraduate Engineering Education

Purpose
The Office of the Associate Dean for Undergraduate Education seeks proposals designed to increase our undergraduates’ preparation for creative problem identification and solution through:

- introduction and expansion of open-ended problems and activities,
- development and use of problems that require students to deal with ambiguity,
- engaging students in design with prototyping,
- requiring students to design experiments,

or similar activities, all within their departmental disciplines. These and other activities should provide students with practice synthesizing their knowledge and using their creativity to attack unrehearsed and even undefined problems relevant to engineering practice by defining the problem, creating a solution, and assessing it against reality.

Through the expansion of these activities we expect to increase our student’s creativity and future success as professionals and graduate students.

Introduction
The recent Michigan Engineering 2020 report (http://www.engin.umich.edu/admin/adue/undergradcommission/) noted that alumni, employers and also students consistently observe that our students need opportunities to use the foundational knowledge gained in classes within the context of creative engineering practice involving problem identification and definition, addressing ambiguity, the search for required knowledge, the use of quantitative data to make decisions, and hands-on experiences that connect the students’ work to reality. CoE faculty reflecting on the report then broadly reinforced this observation.

This RFP is designed to encourage departmental curricular development to engage students in creative analysis of increasingly ambiguous problems that demand research & discovery of information, as well as to provide students with experiences that involve increasing exposure to design, to prototyping and to testing. These problems and projects could be inspired by social and global needs, by industry, by student entrepreneurs, by student teams, by College of Engineering researchers, and even by more advanced student design groups tasking their less experienced colleagues.

Detailed Instructions
All instructional faculty are invited to submit proposals for developing and implementing new problems and projects in their existing departmental courses. Proposals should include:
1. A narrative describing the proposed course(s) impacted, the changes proposed, and student problems, projects or activities to be introduced. A plan for sustaining the innovation after the funding provided under this program is exhausted must be provided, including a plan for disseminating the problem or project ideas to other CoE faculty so that the investment has a broad and sustained impact.

2. The number of undergraduate students expected to be impacted per term or academic year.

3. A detailed budget justification, also describing any cost sharing. ADUE support is limited to $5,000 per project. Smaller budgets may be viewed positively. Department cost sharing is not required but is encouraged. Departmental contributions might be in the form of direct funding, undergraduate instructional aides, graduate student graders, or GSIs. Academic year salary offset cannot be claimed as cost sharing.

4. A timeline for implementation and for reporting the impacts of the change.

5. A letter of endorsement from the appropriate department chair or associate chair is required. This letter should indicate when the modified course will first be taught with the proposed changes in place. If appropriate, identification of space or facilities for activities should also be included.

Submissions are limited to 8 pages. The letter of endorsement does not count against this page limit.

Eligibility: All faculty teaching regular departmental undergraduate CoE courses are eligible to apply. Proposals must be directed towards specific existing departmental courses, and these courses must have a majority undergraduate engineering student enrollment. Problems and projects in core required courses are particularly encouraged, as are innovative activities in laboratory classes in which students engage in the creative aspects of experimental design (beyond running “canned” laboratories). Proposals related to sophomore and junior courses are particularly encouraged, although proposals related to senior courses are also invited. Because the goal of this program is to broaden engagement with open-ended problems and experience in working with ambiguity beyond the major design experiences, proposals for senior capstone major design experiences are not encouraged. While the goals in this RFP are also applicable to the first year courses and to programs such as Entrepreneurship and Multidisciplinary Design, these programs are beyond the scope of this call.

Funds can be used for any purpose that furthers the educational goals for students, including hiring undergraduate or graduate student graders or assistants, educational supplies, equipment, student or faculty travel subsidy, and workshops, as long as the outcome is improved student learning around dealing with ambiguity and open-ended problem definition and solution. We are looking for innovative solutions to addressing this issue, and therefore educators are welcome to pose a nontraditional utilization of the requested funds.

Selection: A faculty committee will review the proposals and make recommendations to the Associate Dean for Undergraduate Education (ADUE). Key criteria will include the potential for meaningful improvements in undergraduate student creativity in dealing with
ambiguity and open-ended work, prospects for sustainability and wider dissemination, and appropriateness of budget. Final decisions on funding particular proposals will be made by the ADUE. Selection will be based on alignment of the proposal with the desire to increase our students’ ability to deal with open-ended problems, to be problem definers rather than just problem solvers, to deal with ambiguity, to work with the reality beyond theory, and to learn to learn.

Proposals should be submitted electronically as a single pdf document to the ADUE (hagar@umich.edu) by February 22, 2010.

Related Calls
There are a number of RFP from CRLT that faculty might also consider to support curricular innovations. Related submissions to the CRLT programs and this program are acceptable. CRLT programs of immediate interest include:

• Faculty Development Fund (Due February 4, 2010). Note that the FDF will not support equipment, but it will support the development of new courses.
• Investigating Student Learning Grant (Due January 26, 2010). This program focuses on scholarly work on how students learn, including rigorous assessment of new pedagogies. The ADUE and ADAA will cost share any grant made to CoE faculty under this program.

See http://www.crlt.umich.edu/grants/grants.php for more information.