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Memorandum

To: CBE Faculty
From: Assessment Subcommittee (DJK, TWR, RES)
Re: Fall 2003 Assessment Results Summary

Results from the latest assessment tools for the fall 2003 semester have been compiled and evaluated. The current analysis provides conclusions in several areas: overall trends, updates on areas of earlier concern, and new areas to monitor.

Assessment Tool Inputs

The new data available this fall is from the end-of-semester course evaluation input from students in all CBE courses and from co-op/intern supervisors. EBI exit surveys were completed by students graduating in December, but these forms will be included with those collected in May 2004 (for May and August 2004 graduates) and analyzed in the once-yearly comparisons conducted by EBI in June-July 2004. Looking at the Assessment calendar, many more inputs (EBI survey, Visiting Committee, Summer Lab Oral Evaluations) will be available in fall for a more diverse review.

Course evaluation outcomes assessments provide general feedback on how students perceive their competence in the departmental program outcome areas. As usual, ratings are high in many courses (10 or more of the 14 rated) for the hard, technical skill areas:

- a – apply knowledge of math, science and engineering,
- e – identify, formulate and solve engineering problems,
- l – engineering topics,

and also i – lifelong learning.

Lowest scores (6 or fewer courses) are in:

- c – design a system, component or process
- f – professional, ethical responsibility,
- g – communicate effectively,
- j – knowledge of contemporary issues.

Communication skills did receive high scores in the lab courses (CE 324, 450) as well as the courses with substantial projects (CBE 426 and 540), and this indicates that the coverage is at the expected level for semester courses. Design skills were also rated highly in CBE 450, as desired, along with 250, 426, 270, and 540. Outcome h – global and societal impact is achieving target levels in 8 courses, and improving. Outcomes f and j will continue to need extra attention.

One other notable result is the continued strong assessments received for CBE 426 (all 12 at or above target thresholds), and this reflects well both on the energy and examples brought to the course by Prof. Shusta this semester, and to the impact of the design project that was used this semester. In contrast, several of the earlier courses in the program (CBE 311, 320, and 326) had very few outcomes at or above the target levels (2, 3, and 0, respectively). Two of these courses are fundamentals courses, and will be followed by more applications courses that can make the connections to the full spectrum of outcomes. However, CBE 326 – Heat and Momentum Transfer Operations is a surprise on this list, and this bears further study. The Curriculum Committee has been considering modernizing this course, and these ratings underscore the need to review the course material and presentation to clarify course objectives and determine what improvements are possible.

Co-op and intern evaluations were very good for summer and fall 2003. For review, the rating forms collect comments as well as ratings of ‘exceeds expectations,’ ‘met expectations,’ ‘below expectations,’ or ‘not available’ (EE, ME, BE, or NA) for each ABET outcome a-k and for overall performance. In summer 2003, overall ratings indicated that 8 students exceeded expectations and 2 students met expectations. The ratings in the individual ABET a-k listings were all EE or ME, with a few NA scores. In fall 2003, the overall ratings were 8 ‘exceed’ and 5 ‘met’ for a similar positive result. However, two students at Cargill did receive ‘below expectations’ ratings in one or two specific ABET criteria: d (function on teams), g-1 (communication – interpersonal skills), and b (design, conduct experiments, analyze data). Concern on these two students has been returned to their advisors, and they will be watched in upcoming semesters to determine the depth of problems and what remedial actions may be needed. Other students received ratings of ME or EE in these areas, so this does not seem to be a general problem with the course of instruction.

Follow-up on Areas of Previous Concern

Our students continue to be rated highly for technical expertise. Assessment in the ‘softer’ areas continue to lag.

Four areas are currently being monitored: 1) physics courses, 2) multidisciplinary teams, 3) oral reports, and 4) “understanding the impact of engineering solutions in a societal/global context.” Current assessment tools provide no new inputs into the physics issue. This remains a college-wide problem, and will be a continuing concern for the APCRC working group.

Team-related feedback places 7 (of 14) courses above the target level, which is out of the bottom tier and shows the positive impact of course projects in the several courses using them.

Oral communication skills are not treated separately in the course evaluation. Communication is rated lower in general, but is recognized in the courses where it receives significant attention. The ratings in the co-op/intern evaluations are satisfactory to strong, so our employers are satisfied with current levels. We will get more data to evaluate this from the EBI Exit Survey and the CBE 424 evaluations this summer.

The global/societal impact item (h) is at acceptable levels in this evaluation. We will continue to monitor it.

New Areas to Watch

No new weaknesses in outcomes assessment are apparent in these inputs. Our only concern is that several early courses have very low achievement of target levels. We question whether there can be improvements in these courses in connecting with department program outcomes, or if it is unrealistic for them to contribute at this early stage. If the latter is true, then it may be more appropriate to remove them from the collection of activities being monitored.

Action Items

- consider increased opportunities for team project training and practice
- identify increased opportunities for oral presentation training and practice
- improve awareness of applications, connections, and impact on outside world
- re-examine objectives and delivery of CBE 326 to improve impact and contribution.