Department of Chemical and Biological Engineering
University of Wisconsin
1415 Engineering Drive
Madison, WI 53706

telephone: (608) 262-8999
fax: (608) 262-5434
email:thatcher@engr.wisc.edu

October 2, 2005

Memorandum

To: CBE Faculty
From: Assessment Subcommittee (TWR)
Re: Spring 2005 Assessment Results Summary

Results from the latest assessment tools for the spring and summer 2005 terms 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:

- Spring 2005 course evaluation assessments
- Spring and Summer 2005 Co-op/Intern evaluations
- 2005 EBI Senior Exit Survey (received late; not included)
- 2005 Summer Lab Oral Presentation Evaluations
- Spring 2005 Instructor Course Evaluations (new)
- 2004 Alumni Survey (analysis to be presented separately)

Course evaluation outcomes assessments provide general feedback on how students perceive their competence in the departmental program outcome areas. Spring semester course ratings were moderately strong. As usual, ratings are high in many courses (10 or more of the 16 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 scores are now staying high in other areas, such as

h – impact in a global and societal context,
i – lifelong learning
j – knowledge of contemporary issues.

Lowest scores (7 or fewer courses) are in:

c – design a system, component or process
d – function on multi-disciplinary teams,
f – professional and ethical responsibility, (fell from higher last year)
g – communicate effectively
k – use techniques and modern tools for engineering practice (surprising drop).

Communication skills did receive high scores in the lab courses (CBE 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. Outcomes f - professional and ethical responsibility, and k – use techniques and modern tools for engineering practice, have both dropped, and will need continued monitoring to see if this is noise or true signal.

Uniformly high scores were also seen for the capstone design course, CBE 450, and for the separations course, CBE 426, again with Prof. Shusta. Clearly, this course has potential to be taught in a very outcome-friendly way and strengthens the curriculum.

Co-op and intern evaluations were very good for Spring and Summer 2005. 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. The overall ratings and the ratings in the individual ABET a-k listings were all EE or ME, with a few NA scores. However, one spring student and two summer students did receive 'below expectations' ratings in one or two specific ABET criteria. Concern on these three 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.

Instructor Course Evaluation Forms

Continued review of ICE forms is becoming routine at the start of each semester. The discussion this fall has begun with individual course issues but commentary on pre-requisites has generalized to consideration of the value of ECE 376, Stat 324, and Comp Sci 310. In particular, the numerical and computational skills of the students are not at the level expected from the Comp Sci syllabus, and a small group (JBR, DJK, MM, TWR) has been asked to look into possibilities and report back. Their recommendations will be discussed at upcoming faculty meetings.

Follow-up on Areas of Previous Concern

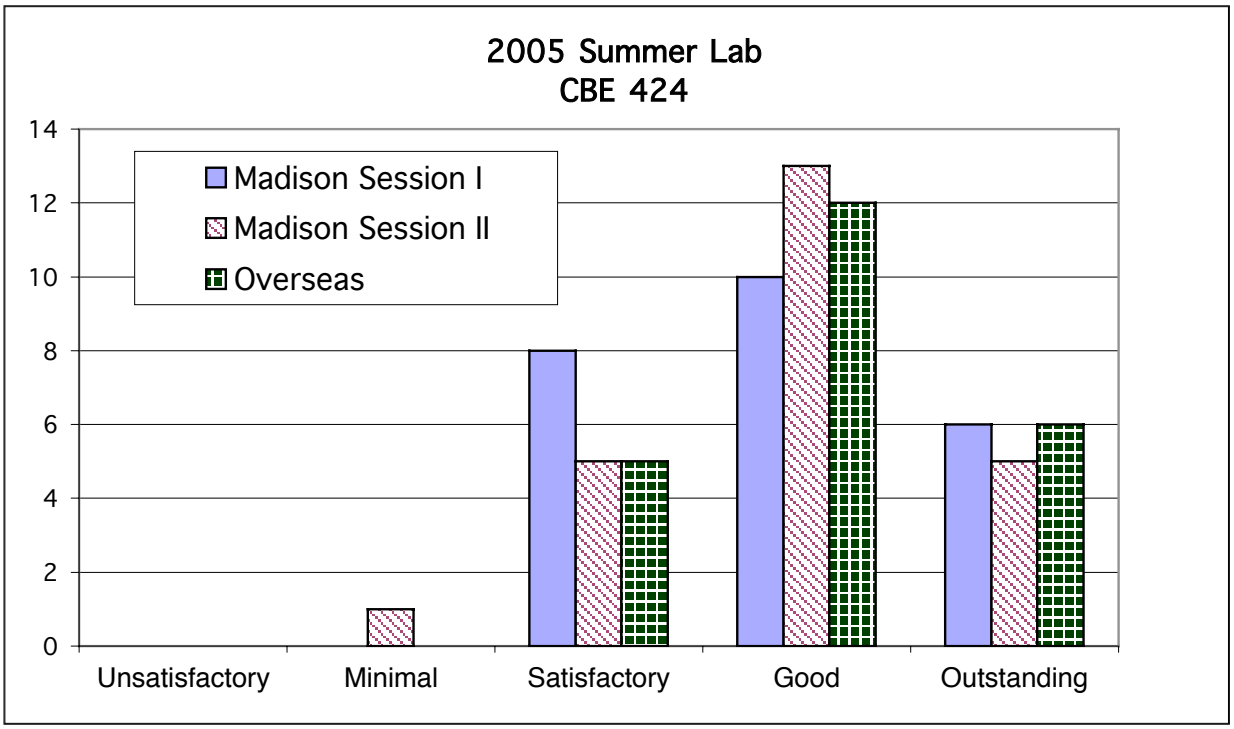
The experience in CBE 424 – Summer Lab confirmed the need to add CBE 430 and 426 to 326, as one student in Summer 2005 with only CBE 326 was unable to keep up and dropped the course in the second week. In future summers, all students will have all three of these core Unit Operations courses and will be better prepared. Next summer we may have a slight dip in enrollment because of this adjustment and some students delaying the course for one year.

After the addition of two biology courses to the curriculum, the *ad hoc* Biology committee continues to monitor their implementation. Prof. Murphy has continued to report on concerns by the faculty teaching Biochem 501 and Zool 570 about student performance. She has tracked this, and investigated possible reasons. Both aspects were presented to the faculty and will continue to be monitored by the committee.

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.

Explicit evaluations of Oral Presentation assessments by instructors in the Summer Lab sections continue. All students make individual presentations, and this score was pulled out separately as a diagnostic and also as a course completion requirement. Overall, presentations were rated as Good (4 on a 1-5 scale), and individually no students were 1 - Unacceptable or 2 – Marginal. The score distributions are as follow.



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. Explicit Direct Measures of written and oral communication are being implemented in several courses, and results should be available for examination in the future. We will continue to emphasize this area, and to monitor progress.

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. The drops in course evaluation ratings for f – professional and ethical responsibility, and k – use techniques and modern tools for engineering practice are both of concern and will be 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.