2007-2008 Civil Engineering Assessment Report

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1. What goals or learning objectives/outcomes were assessed in AYs 2007-2008?

   1. Ability to apply analytical and quantitative problem solving skills:
   2. Ability to apply knowledge of mathematics, science, and engineering (formerly ABET a), with proficiency in math through differential equations, chemistry, and calculus based physics
   3. Ability to use techniques, skills, and modern engineering tools necessary for engineering practice (formerly ABET k), with proficiency in five basic areas of Civil Engineering namely: environmental, geotechnical, structures, transportation, and water resources.
   4. Ability to do Civil Engineering work
      a. Ability to design and conduct experiments, as well as to analyze and interpret data in two areas of Civil Engineering (formerly ABET b).
      b. Ability to design a system, component, or process to meet desired needs (formerly ABET c).
      c. Ability to function on a team contributing a fair share of work, encouraging others to participate, cooperating with team members, sharing information, and helping to reconcile personal differences among fellow team members.
      d. Ability to function on a multi-disciplinary team (formerly ABET d), including the ability to learn the vocabulary of other disciplines and to perceive the interactions between disciplines.
   5. Ability to identify, formulate, and solve engineering problems (formerly ABET e), including the ability to gather, evaluate, and synthesize information, develop alternative solutions, discourage premature conclusions, synthesize knowledge from various sources, challenge the way things are normally done, and to take new information and integrate it with past knowledge.
   6. Recognition of the need for, and an ability to engage in life-long learning (formerly ABET i).
   7. Ability to communicate effectively (formerly ABET g), including the ability to articulate ideas clearly and concisely; prepare written materials that flow logically and which are grammatically correct, and to make presentations that are planned and delivered effectively.
   8. Ability to consider the wider societal impacts of engineering projects.
   10. Knowledge of contemporary issues. (formerly ABET j)
   11. Ability to carry out the Civil Engineer’s responsibility towards the public, client, and employer
12. Understanding of Civil Engineering practice in areas such as procurement of work, fee bidding versus qualification based selection, how design and construction professionals interact, and the importance of professional licensing.
13. Understanding of professional and ethical responsibility for ensuring occupational and public safety and for conducting work in a professional and ethical manner. (formerly ABET f).

2. How did you assess these learning outcomes?

a. Describe the measures you used and the information gathered. (Description, date administered, results)

1. **Graduating Senior Surveys.** Each semester, graduating seniors are surveyed to better understand our student population, document student’s self-reported success in the EIT/FE exam, document the extent to which students feel they achieved the learning outcomes, and identify the learning outcomes in most need of improvement as evaluated by students.

2. **Graduating Senior Exit Interviews.** Each semester, graduating seniors also participate in one-on-one exit interviews where a broader range of, albeit anecdotal, data are collected about the student’s experience in the program.

3. **Assessment by Professional Engineers of Senior Design Project Class.** Practicing engineers act as “clients” to evaluate and assess the work completed by students in the Senior Design Project Class. Projects are evaluated for both the technical content of the project and the quality of the design presentation. Additionally, practicing engineers evaluate how well the Senior Project class meets ABET criteria for that class.

4. **Self-Assessment by Students of Senior Design Project Class.** Students completing the senior the Senior Design Project Class are evaluated how well their own work met the ABET culminating requirement.

5. **Evaluation of Senior Design Project Class Oral Presentations.** Students completing the senior the Senior Design Project Class are evaluated on their group presentations. These evaluations were completed by both civil engineering faculty and faculty from other departments within the College of Engineering and Computer Science.

6. **Industry Focus Groups.** After the spring semester each academic year, the CE program invites practicing engineers and managers from local engineering firms to conduct focus groups with Cici Matuzzi. This year faculty met with transportation engineers from Fehr & Peers Transportation Consultants, Bennett Engineering Services, and Dokken Engineering. Minutes from these meetings were taken and are available in the Civil Engineering office.

7. **Standardized Exams.** We have obtained the EIT/FE reports for the previous few years for our students. The Department evaluated the results available for the EIT/FE exam. However, the data available are not adequate. In most cases, we have few students that report the school code. The school code information is voluntary for students when they take the EIT/FE exam. In order to encourage students to provide the school when they take the EIT/FE exam, the department used the following approaches:
1. The Department has a full lecture in the Civil Engineering Seminar (CE001A) on licensure in civil engineering. In this lecture and discussion, students learn about the importance of licensure in the profession. The statistics of pass rates are also introduced to students. Students are made aware of the importance of reporting the school code when they take the exam so that their results can be tracked by the Department as part of its assessment efforts.

2. The Department has implemented a policy of reimbursing the students if they pass the exam on their first attempt. The purpose of this policy is threefold: 1) to encourage students to take the exam despite any financial hardship that may exist, 2) to encourage students to prepare for the exam by completing the subject courses covered on the exam in the civil engineering curriculum, and 3) to encourage students to report the school code on the exam.

b. As a result of these assessments what did you learn about the program’s success in helping its students achieve these learning outcomes?

In general, we plan to evaluate all of the end-of-year assessments during our summer faculty meeting prior to the fall semester. These assessment activities will continue to build this year and next as we prepare for our ABET program review.

1. In the senior exit interviews, the graduating seniors consistently rate the Department very highly in terms of their experience in the program, the faculty availability, and the Department’s work within the professional civil engineering community. The students appreciate the Evening with Industry that the Department organizes every year as one of its efforts to improve student retention. Students also consistently mention that the part-time faculty members are appreciated for their practical experience that they bring to the class. However, accessibility to the part-time faculty is limited outside of class.

3. As a result of faculty reflection on these results, are there any program changes anticipated?

1. **New Faculty.** The Department has hired two new full-time faculty starting Fall 2008. These changes will hopefully increase student/faculty interaction and maintain a high-level of quality among its course offerings.

2. **Retention.** Faculty agreed that more interaction between faculty and incoming freshmen continues to be necessary. Remedies have been implemented such as the new Freshman Scholarship. The department worked very closely with the industry to establish the first Freshman Scholarship in Civil Engineering. The Department also introduced a class for the freshmen (CE001A/B) to improve the retention in the freshman population. The class is designed to introduce freshmen to the civil engineering practice and give them an opportunity to connect with the Department. Otherwise, students did not have much contact with the Department while taking lower division courses outside of civil engineering.
a. How will you know if these changes achieved the desired results?

1. **Retention.** We plan to track and monitor the recipients of the freshman scholarship. We hope that the retention rates among these students will be higher than the general student population. The Department will evaluate retention data after we have run the CE001A class for at least three semesters and compare retention rates to cohorts that were not required to take CE001A.

4. Did your department engage in any other assessment activities such as the development of rubrics or course alignment?

The Department continues to collect writing samples from students in CE001 (Freshman Seminar). These writing samples will be compared to students in their third year in CE100 (Engineering Geology) or CE146 (Contracts and Specifications). These writing samples may also be compared with other writing samples in the fourth-year curriculum such as in CE170 (Environmental Engineering).

The department also participated in the development and application of an oral presentation rubric with other assessment coordinators in the College of Engineering and Computer Science. This rubric was used to evaluate senior project presentations in Spring 2007, but a revision of the rubric is anticipated as part of future college-level assessment activities.

No other assessment activities were developed at the department level in AY 2007-2008. The development of rubrics and additional course alignment are both planned for 2008-2009 (discussed below).

1. **Revised Course Matrix.** We have completion one revision of our existing course matrix that matches outcomes and required courses to also include an indication of the depth of knowledge (e.g., novice, intermediate, expert) expected by each course.

2. **Standardized Course Syllabus.** A standard course syllabus template will be developed, and faculty will be asked to standardize their course syllabi to include specific program outcomes.

5. What assessment activities are planned for the upcoming academic year?

All of the above listed assessments will continue in addition to following planned activities:

1. **Revised Course Matrix.** We plan to continue to revise and analyze the revised the revised course matrix to identify areas of strength and weakness in our exiting curriculum. This course matrix must still be aligned with the new ABET learning outcomes. The matrix must also be analyzed as part of a program review to help verify that both breadth and depth of our required courses are in alignment with ABET learning outcomes. This analysis may necessitate changes in some required courses to fill gaps in the program or avoid excessive overlap.
2. **Standardized Course Syllabus.** We plan to collect course syllabi from all faculty and review them for both consistency with the department template and review for consistency with the breadth and depth identified in revised course matrix.

3. **Assessment Area on Department Website.** We plan to make assessment documents available on the Department website. Some of these documents will be publicly available to current students and visitors to the website, such as the revised course matrix. Some documents will be password protected, specifically for ABET and other program reviewers.