07-08 Assessment Report

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

1. Demonstrate a knowledge of the science, mathematics, and engineering principles that are fundamental to thermal and mechanical systems design and manufacturing.
2. Plan, conduct, analyze, and interpret experiments and apply experimental results, using the principles of science and mathematics and appropriate computer technology.
3. Apply creativity in the design of systems, components, or processes to meet desired needs.
4. Function effectively as part of a multidisciplinary team.
5. Identify, analyze, and solve technical problems in the areas of machine design, including solid mechanics and control systems; fluid mechanics, thermodynamics, and heat transfer; materials properties and selection; and manufacturing, using the principles of multivariate calculus and differential equations, including the appropriate use of computer technology.
6. Show understanding of professional, ethical, and social responsibilities.
7. Communicate effectively through speaking, writing, and graphics, including the appropriate use of computer software.
8. Show understanding of the impact of engineering solutions in a global and societal context.
9. Show understanding of the need for a commitment to life-long learning and participation in professional societies.
10. Show understanding of contemporary issues.
11. Use the techniques, skills, and modern engineering tools necessary for engineering practice with proficiency in design, manufacturing, materials science, thermal and fluid systems.
2. How did you assess these learning outcomes?
   a. Describe the measures you used and the information gathered.
      (Description, date administered, results)

   1. Course Surveys. We administered a standardized survey for courses identified as indicators for the learning outcomes. The survey asked the students to rate the effectiveness of the course for each of the learning outcomes.
   2. Graduating Senior Surveys. We administered a short survey to the graduating seniors within the program. The survey was designed to get global feedback on the perceptions of the students on the effectiveness of the program.
   3. Industrial Visits. A faculty committee met with representatives of the state Air Resources Board. The representatives were asked questions as to the effectiveness of the program. The results of this meeting are available from Cici Matuzzi.
   4. Senior Project Evaluation. The senior design projects were evaluated by faculty and industry representatives. The evaluation was for both the technical content of the project and the quality of the design presentation.
   5. Written Communications Skills. An evaluation was performed on the senior project reports on the quality of the technical communication. The reports were evaluated by a faculty committee using a standard rubric as the basis for the evaluation. The rubric was also used by other departments within the college of engineering.
   6. Exit Interviews. Several graduating seniors participated in an exit interview. The students were interviewed by the department chair and asked a set of standard questions.

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

   The assessment identified weaknesses in the writing skills of our students. The immediate results were that example reports would be made available to the students and the format for the reports would be documented in the senior project handbook. A greater emphasis on report writing will be included in the senior project class. The evaluation will continue to identify trends in the communications skills of our students.

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

   Assessment. The new assessment plan is currently being implemented. The course surveys are being moved to an electronic format. Key courses in the core technical competencies for Mechanical Engineers were identified along with specific concepts within those courses that will be evaluated using targeted exam questions. This will be
implemented in Fall 2008. The assessment data is being converted to electronic format and an assessment web page is being created for the department.

**Curriculum** The program curriculum is being reviewed by comparing it to curriculums at other universities.

**Retention.** The faculty are reviewing the retention rate for the program. The order of the courses in the curriculum is being reviewed to improve the retention rate for incoming freshmen.

a. *How will you know if these changes achieved the desired results?*

There should be a significant improvement in the amount and the quality of the assessment data we receive. The data will be evaluated for its ability to identify problems within our program.

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

The assessment committee is implementing the changes in the methods for performing the program assessment.

The Department will continue to evaluate writing samples from the senior project class. The oral presentations will also continue to be evaluated by the department and members of industry.

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.

The department identified key courses in core technical areas and also created example exam questions to be used for a direct assessment of learning outcomes.

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

The new assessment methods will be implemented to track the performance of the program versus the set of learning outcomes. An emphasis will be placed on direct assessment within the classroom. The assessment surveys will be converted to electronic surveys to aid in reducing and understanding the data. All assessment data will be converted to electronic format and included in a department assessment web site. The faculty will complete the comparison of our curriculum with the curriculum of similar universities.