Program Assessment Report

Department: Civil & Environmental Engineering Dept.  Completed by: Paul Bosela

Program Name: MS Civil Engr., MS Env. Engr, MS Engr Mech  Date: May 31, 2006

Introduction

Civil Engineers deal with the design and construction of facilities necessary for the quality of life. It is a broad discipline which includes structural analysis and design, environmental engineering, water resources, transportation, engineering mechanics, geotechnical engineering and construction. The graduate program in civil engineering is designed to provide the student with knowledge of advanced methods for analysis and design or for research and development. Focus areas include structures/foundations, water resources and transportation (which is a new focus area in the program). Environmental engineering, which is a sub-discipline of Civil Engineering, is a separate degree. Engineering mechanics, which includes coursework in civil and mechanical engineering, is also offered as a separated degree. Due to statistical significance based upon the size of the programs, their location within the Civil Engineering Department, and the fact that students in all three of these civil engineering related masters programs take many of the same courses, they are included together in this assessment report. The programs all include both thesis and non-thesis options.

Goals

Program goals were developed by the Department faculty in 2002. The goals have been reviewed by our faculty, and were reviewed by our visiting committee in 2003, and again in 2006. At the present time, there are no recommendations to update our goals, although we will continually use the assessment process and make changes as warranted, with the input of our constituents (faculty, alumni, graduates and students).

The goals are:

1. Knowledge of advanced engineering analysis and design tools
2. Ability to use advanced engineering analysis and design tools to design practical systems
3. Ability to access and use literature in one’s field
4. Ability to communicate effectively

Outcomes

The department’s outcomes were initially developed in 2002-2003. All of the department faculty were involved in their development. Several changes have been made, based upon the assessment process. They are identified in the individual sections.

Research Methods

See the individual sections.

Findings

See the individual sections.

Review

Review of the findings was done by the department faculty. It will be presented to the Visiting Committee in 2005 for their input. See the individual sections for each review.

Actions

Based upon faculty review and recommendations, changes were made as noted.
1-1. **Goal #1**  
**Knowledge of advanced engineering analysis and design tools**

2a. **Outcome Measure #1**  
Thesis defense questionnaire for thesis committee faculty

3a. **Research Completed**

26 evaluation forms were received.

4a. **Findings**

Question 1a, depth of knowledge, 35% checked exemplary, and the remaining 65% satisfactory. 
Question 1b, breadth of knowledge, 46% checked exemplary, and the remaining 54% satisfactory. 
Question 2, familiarity with advanced methods of analysis and synthesis, 46% exemplary, 54% satisfactory.

5a. **Review**

All of the above evaluations indicate that the students met or exceeded the objective.

6a. **Actions**

None required.

7a. **Improvement**

This was the first use of the new questionnaire, which is a better assessment tool than the previous one.
1-1.  **Goal #1**  
**Knowledge of advanced engineering analysis and design tools**

2b. **Outcome Measure #2**  
Exit survey

3b. **Research Completed**  
10 evaluations forms were received and reviewed.

4b. **Findings**  
Based on a score 1=unacceptable, 2=poor 3=average, 4=good, and 5=excellent)

   Question 1, knowledge of advanced analysis tools, Mean = 4.1, standard deviation = 1.101
   Question 2, knowledge of advanced design tools, Mean = 4.0, standard deviation = 1.247

5b. **Review**  
Based on the above scores, the criterion has been exceeded.

6b. **Actions**  
None required.

7b. **Improvement**
1-1. **Goal #1**  
**Knowledge of advanced engineering analysis and design tools**

2c. **Outcome Measure #3**  
Classroom performance

3c. **Research Completed**  
Faculty follow well-defined syllabi with specific engineering analysis and design topics defined, use exam testing on subject matter to demonstrate knowledge gained by the students, and a graduate level grading system. Courses which are dual-listed with senior technical electives follow ABET (Accreditation Board of Engineering and Technology ) syllabi.

4c. **Findings**

Graduate gpa

5c. **Review**

Minimum 3.0 gpa for graduation

6c. **Actions**

Structured coursework and minimum gpa assures compliance

7c. **Improvement**
<table>
<thead>
<tr>
<th>1-2.</th>
<th>Goal #2</th>
<th>Advanced engineering analysis and design tools to design practical systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a.</td>
<td>Outcome Measure #1</td>
<td>Thesis defense questionnaire for thesis committee faculty</td>
</tr>
<tr>
<td>3a.</td>
<td>Research Completed</td>
<td></td>
</tr>
<tr>
<td>4a.</td>
<td>Findings</td>
<td></td>
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<tr>
<td>5a.</td>
<td>Review</td>
<td>Since it is not the intention for each thesis to demonstrate the use of engineering and design tools to design a practical system, this is being removed as an outcome measure for this goal and will not be included in future reports.</td>
</tr>
<tr>
<td>6a.</td>
<td>Actions</td>
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<tr>
<td>7a.</td>
<td>Improvement</td>
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</tbody>
</table>
1-2. **Goal #2**  
*Advanced engineering analysis and design tools to design practical systems*

2b. **Outcome Measure #2**  
Exit survey

3b. **Research Completed**  
10 evaluation forms were received and reviewed

4b. **Findings**  
Based on a score 1=unacceptable, 2=poor 3=average, 4=good, and 5=excellent)

Question 3, learned how to use analysis and design tools to design practical systems,  
Mean = 3.8, standard deviation = 1.229

5b. **Review**  
Based on the above scores, the criteria has been exceeded.

6b. **Actions**  
None required to meet criteria.

7b. **Improvement**
1-2. **Goal #2**  
*Advanced engineering analysis and design tools to design practical systems*

2c. **Outcome Measure #3**  
Classroom performance

3c. **Research Completed**  
Faculty follow well-defined syllabi with specific engineering analysis and design topics defined, use exam testing on subject matter to demonstrate knowledge gained by the students, and a graduate level grading system. Courses which are dual-listed with senior technical electives follow ABET (Accreditation Board of Engineering and Technology) syllabi.

4c. **Findings**  
Graduate gpa

5c. **Review**  
Minimum 3.0 gpa for graduation

6c. **Actions**  
Structured coursework and minimum gpa assures compliance

7c. **Improvement**  
None required
1-3.  **Goal #3**  
**Access and use of literature in one’s field**

2a.  **Outcome Measure #1**  
Thesis defense questionnaire for thesis committee faculty

3a.  **Research Completed**

26 evaluation forms were received.

4a.  **Findings**

For question 3, ability to independently read and understand the significance and limitations of the relevant literature, 46% checked exemplary, and 54% satisfactory.

5a.  **Review**

Criteria has been met.

6a.  **Actions**

None required.

7a.  **Improvement**
1-3.  Goal #3  
**Access and use of literature in one’s field**

2b.  Outcome Measure #2  
Exit survey

3b.  Research Completed  
5 evaluation forms were received and reviewed.

4b.  Findings  
Based on a score 1=unacceptable, 2=poor 3=average, 4=good, and 5=excellent)

Question 4, learned how to access the literature in my field of study, the mean score was 4.3, the standard deviation was 1.252.

5b.  Review  
Based on the above scores, the criteria has been exceeded.

6b.  Actions  
None required. New seminar course includes training in literature search, and using it in seminar presentation.

7b.  Improvement
1-4. **Goal #4**  
**Ability to communicate effectively**

2a. **Outcome Measure #1**  
Thesis defense questionnaire for thesis committee faculty

3a. **Research Completed**

26 review forms were received.

4a. **Findings**

There are six measurements under question four, ability to communicate effectively, that are included on the survey form. The responses were as follows:

<table>
<thead>
<tr>
<th>Quality</th>
<th>Exemplary</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of the writing style</td>
<td>38</td>
<td>46</td>
<td>15</td>
</tr>
<tr>
<td>Organization of the written dissertation/thesis</td>
<td>58</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Organization of the presentation</td>
<td>69</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Clarity of language usage</td>
<td>65</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Ability to answer questions</td>
<td>62</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Quality of slides</td>
<td>73</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>

5a. **Review**

Quality of the writing style at the time of thesis defense was the only measure not met every time. (It was met 85% of the time. Students were required to fix grammatical errors before thesis was accepted. Criteria has been met.

6a. **Actions**

Faculty advisors encouraged to review draft thesis for grammatical errors prior to defense.

7a. **Improvement**

This was the first use of the new questionnaire, which is a better assessment tool than the previous one.
1-4. Goal #4  **Ability to communicate effectively**

2b. Outcome Measure #2  Exit survey

3b. Research Completed  10 evaluation forms were received and reviewed.

4b. Findings  Based on a score 1=unacceptable, 2=poor 3=average, 4=good, and 5=excellent)

   Question # 6, Learned to improve my oral communication skills, mean = 4.2, standard deviation = 1.033
   Question #7, learned to improve my written communication skills, mean = 4.3, standard deviation = 0.949.

5b. Review  Based upon the above scores, the criteria has been exceeded.

6b. Actions  Use of ProSkills in the seminar course will be continued.

7b. Improvement
1-4. **Goal #4**  
**Ability to communicate effectively**

2d. **Outcome Measure #3**  
Seminar course oral presentation and critique by outside consultant.

3d. **Research Completed**  
The students received a training lecture on presenting professional presentations. The oral presentations by the seven graduate students who took this course were videotaped and evaluated. The videotapes and associated critiques were given to the respective students.

4d. **Findings**  
The mean scores in the various areas for the group of students were as follows:

<table>
<thead>
<tr>
<th>Subject Knowledge</th>
<th>Evidence of Preparation</th>
<th>Quality of Visuals</th>
<th>Adaptation to Audience</th>
<th>Style/Enthusiasm</th>
<th>Voice projection/control</th>
<th>Composure/eye contact</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Excellent = 18-20)</td>
<td>(Excellent = 14-16)</td>
<td>(Excel.=14-16, Avg.=11-13, Need to improve 8-10.)</td>
<td>(Excellent = 12, Average – 10, Need to improve = 8)</td>
<td>(Excellent = 12, Average – 10, Need to improve = 8)</td>
<td>(Excellent = 12, Average – 10, Need to improve = 8)</td>
<td>(Excellent = 12, Average – 10, Need to improve = 8)</td>
<td>88.3</td>
</tr>
<tr>
<td>18.3</td>
<td>14.2</td>
<td>12.3</td>
<td>10.7</td>
<td>11.4</td>
<td>11.0</td>
<td>10.2</td>
<td></td>
</tr>
</tbody>
</table>

The database for 900+ CSU engineering students over multiple years (undergraduate and graduate) has a mean score of 89.5. Since that database is predominantly American students, and the majority of students in the Masters program seminar course have English as a second language, the performance was extremely favorable.

5d. **Review**  
Based upon the above scores, this course is improving the oral presentation skills, and should be continued. With the videotape and critique provided to the students, it is expected that they will continue to improve their oral presentation skills before graduations.

6d. **Actions**  
Use of ProSkills in the seminar course will be continued.

7d. **Improvement**
**Engineering Program**

**Assessment of Student Academic Achievement Objectives**

This evaluation is to be completed by each member of the student’s **thesis** committee, upon completion of the defense. Return form to the department secretary. Please check the appropriate box in each row.

The objectives are to develop in the student:

<table>
<thead>
<tr>
<th>Objectives/Criteria for Evaluation</th>
<th>Exemplary</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A deeper, more general, and more fundamental understanding of the principles underlying a particular field of study, as well as those underlying related fields.</td>
<td>Student shows excellent understanding of fundamental principles directly related to the project.</td>
<td>Student displays good understanding of fundamentals directly related to project.</td>
<td>Understanding of fundamental principles directly related to the project is weak.</td>
</tr>
<tr>
<td>a. Depth of knowledge</td>
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<tr>
<td>b. Breadth of knowledge</td>
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<tr>
<td>2. A familiarity with advanced methods of analysis and synthesis that are more powerful and more generally applicable than those taught at the undergraduate level.</td>
<td>Student is competent in the most advanced techniques needed for research in the field. Student can synthesize and integrate results and relate them to the hypothesis.</td>
<td>Student is competent in experimental/analytical techniques needed for research in the field. Student can accept or reject hypotheses.</td>
<td>Student is competent in analytical techniques, with little understanding of the principles underlying the techniques. Student has difficulty in addressing the hypothesis.</td>
</tr>
<tr>
<td>3. The ability to independently read and understand the significance and limitations of the relevant literature.</td>
<td>Student actively searches all works directly and indirectly related to the project. Student can identify the strengths and limitations of various methods.</td>
<td>Student has read the literature related to project, and understands how project fits into the literature.</td>
<td>Student has read only some of the articles related to the project.</td>
</tr>
<tr>
<td>4. The ability to formulate, initiate, and complete new and innovative research projects that contribute to the advancement of the</td>
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<td>5. To communicate effectively in written and oral form.</td>
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<tr>
<td>----------------------------------------------------------</td>
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<tr>
<td>a. Quality of the writing style</td>
<td>Written sentences are complete and grammatical, and they flow together easily. Words are chosen for their precise meaning.</td>
<td>Writing is grammatically correct. Paragraphs and sentences may not flow together perfectly.</td>
<td>Writing contains grammatical errors.</td>
</tr>
<tr>
<td>b. Organization of the written dissertation</td>
<td>Dissertation is logically organized and easy to follow.</td>
<td>Dissertation organization is clear.</td>
<td>Dissertation is poorly organized.</td>
</tr>
<tr>
<td>c. Organization of the presentation</td>
<td>Presentation is clear, logical and organized. Listener can follow line of reasoning. Pacing is correct for the audience.</td>
<td>Listener can follow and understand the presentation.</td>
<td>Talk is poorly organized. Speaker jumps around from topic to topic.</td>
</tr>
<tr>
<td>d. Clarity of language usage</td>
<td>Speaker is comfortable in front of the group and can be heard by all.</td>
<td>Grammatical errors and use of slang are evident. Some sentences may be incomplete.</td>
<td>Speaker is difficult to understand or hear.</td>
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<tr>
<td>e. Ability to answer questions</td>
<td>Answered questions directly and clearly.</td>
<td>Student can answer questions, but with some difficulty.</td>
<td>Students had difficulty understanding questions and answering clearly.</td>
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<tr>
<td>f. Quality of slides</td>
<td>Slides enhance the presentation and are prepared in a professional manner.</td>
<td>Slides are adequate for the presentation.</td>
<td>Slides are inadequate (writing too small, too much or too little information per slide).</td>
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</tbody>
</table>
6. Do application-oriented research of an inter-disciplinary nature

<table>
<thead>
<tr>
<th>a. Application-oriented research</th>
<th>Research has practical applications that are clear.</th>
<th>Research may have practical applications.</th>
<th>The practical application of this work is completely unclear.</th>
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<tbody>
<tr>
<td>b. Interdisciplinary nature of research</td>
<td>Research required significant level of knowledge of and interaction with people from more than one discipline.</td>
<td>Research involved some level of work or interaction with more than one discipline.</td>
<td>Research was completely within one discipline.</td>
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</tbody>
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To be answered by the research advisor only:

Have any papers resulting from the dissertation work been accepted for publication in peer-reviewed journals?  

Yes  

No
Civil Engineering MS Program Survey

Cleveland State University

Civil & Environmental Engineering Department
MS Program Survey 2006

Please enter the following information:

Name

Program (CVE or ENH)

Graduation year

PART A: Student Academic Achievement Outcomes Assessment Questions. Your answer to these questions help us assess how well our programs are producing in you the intended academic outcomes.

(1=Unacceptable, 2=Poor, 3-Average, 4=Good, 5=Excellent, NB=No basis for judgement)

<table>
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<tr>
<th></th>
<th>Unacc.</th>
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<th>NB</th>
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