

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 27, 2005

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 a 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.

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. 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. Advanced engineering analysis and design tools to design practical systems
3. Access and use of literature in one's field
4. Access and use of literature in one's field

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**
- Five evaluation forms were received.
- 4a. Findings**
- For question 1, all respondents checked “Student understands principles behind advanced analysis and design tools”, which is classified as the Exemplary Level of Achievement.
- Sa. Review**
- All of the above evaluation criteria responses were classified as Exemplary Level of Achievement
Criteria has been met.
- 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 Project defense questionnaire for project committee faculty

3b. Research Completed

One received.

4b. Findings

For question 1, the respondents checked “Student understands principles behind advanced analysis and design tools”, which is classified as the Exemplary Level of Achievement.

5b. Review

Criteria has been exceeded, but sample size is too small to be statistically meaningful.

6b. Actions

After review by program faculty during 2004, the Environmental Engineering master project option was removed. It now has only thesis and non-thesis options, comparable to the Master in Civil Engineering program. Only the Engineering Mechanics program, which has minimal enrollment (and minimal cost to the college since the courses are all dual-listed with other programs) has the project option. Discussion on whether to continue the project option in that program will be held in 2005.

7b. Improvement

Due to the minimal number of students who will complete a project, as a result of the curriculum changes adopted, this will no longer be an outcome measure for this goal. It will not be included in future assessment reports.

- 1-1. Goal #1** **Knowledge of advanced engineering analysis and design tools**
- 2c. Outcome Measure #3** Exit survey
- 3c. Research Completed** 5 evaluations forms were received and reviewed.
- 4c. Findings** Based on a score of 1 (strongly agree) to 5 (strongly disagree)
- Knowledge of engineering analysis - 1.2
- Knowledge of engineering design tools- **1.6**
- 5c. Review** A score of 1-2 is excellent. Criteria has been exceeded.
 A score of 3 is average. Criteria has been met.
 A score of > 3 indicates a need for improvement.
- Based on the above, the criteria has been exceeded.
- 6c. Actions** None required. Restructured courses and non-thesis option in Environmental Engineering Masters will increase analysis and design content in that area. Exit survey will be reviewed and restructured to be a more effective assessment tool.
- 7c. Improvement**

- 1-1. **Goal #1** **Knowledge of advanced engineering analysis and design tools**
- 2d. **Outcome Measure #4** Classroom performance
- 3d. **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.
- 4d. **Findings**
Graduate gpa
- 5d. **Review**
Minimum 3.0 gpa for graduation
- 6d. **Actions**
Structured coursework and minimum gpa assures compliance
- 7d. **Improvement**
Environmental faculty reviewed all graduate courses and restructured them into 4 credit hours. Revised program with 4 credit hour courses and thesis and non-thesis options only was developed by the Environmental faculty, reviewed and approved by Environmental Engineering Committee, Department GAC committee, and College GAC committee in 2004. Rationale for revising the program included insufficient faculty manpower prohibiting the teaching of a sufficient breadth of elective courses, more uniform class size (in the past, numerous individual projects resulted in low enrollment electives being cancelled), improved research and presentation skills by requiring those interested in that area in doing a more involved thesis, rather than a project, and providing increased analysis and design coursework for students whose prior interest is in professional practice rather than research/academia.

- 1-2. Goal #2 Advanced engineering analysis and design tools to design practical systems
- 2a. Outcome Measure #1 Thesis defense questionnaire for thesis committee faculty
- 3a. Research Completed
- Five evaluation forms were received.
- 4a. Findings
- Three forms indicated that “Student has demonstrated use of these tools to design a system”.
Two forms indicated that “Student has used some analysis and design tools in their research.”
- 5a. Review
- 60 % indicated the Exemplary level of achievement.
40 % indicated the Satisfactory level of achievement.
- 6a. Actions
- The criteria was exceeded.
- 7a. Improvement
- This was the first use of the new questionnaire, which is a better assessment tool than the previous one.

1-2. Goal #2 Advanced engineering analysis and design tools to design Dractical systems

2b. Outcome Measure #2 Project presentation questionnaire for project committee faculty

3b. Research Completed

One received.

4b. Findings

For question 2, the respondent checked “Student has used some analysis and design tools in their research” which is classified as satisfactory.

5b. Review

The criteria has been met.

6b. Actions

After review by program faculty during 2004, the Environmental Engineering master project option was removed. It now has only thesis and non-thesis options, comparable to the Master in Civil Engineering program. Only the Engineering Mechanics program, which has minimal enrollment (and minimal cost to the college since the courses are all dual-listed with other programs) has the project option. Discussion on whether to continue the project option in that program will be held in 2005.

7b. Improvement

Due to the minimal number of students who will complete a project, as a result of the curriculum changes adopted, this will no longer be an outcome measure for this goal. It will not be included in future assessment reports.

- 1-2. Goal #2** **Advanced engineering analysis and design tools to design Dractical systems**
- 2c. Outcome Measure #3** Exit survey
- 3c. Research Completed** 5 evaluation forms were received and reviewed
- 4c. Findings** Based on a score of 1 (strongly agree) to 5 (strongly disagree)
- Learned how to use analysis & design tools: 1.4
- 5c. Review**
- A score of 1-2 is excellent. Criteria has been exceeded.
 A score of 3 is average. Criteria has been met.
 A score of > 3 indicates a need for improvement.
- Based on the above, the criteria has been exceeded.
- 6c. Actions** None required to meet criteria. Restructured courses and non-thesis option in Environmental Engineering Masters will increase analysis and design content in that area. Exit survey form will be reviewed and restructured to be a more effective assessment tool.
- 7c. Improvement**

- 1-2. Goal #2** **Advanced engineering analysis and design tools to design practical systems**
- 2d. Outcome Measure #4** Classroom performance
- 3d. 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.
- 4d. Findings**
- Graduate gpa
- 5d. Review**
- Minimum 3.0 gpa for graduation
- 6d. Actions**
- Structured coursework and minimum gpa assures compliance
- 7d. Improvement**
- Environmental faculty reviewed all graduate courses and restructured them into **4** credit hours. Syllabi for revised courses reviewed and approved by Environmental Engineering Committee, Department GAC committee, and College GAC committee in 2004. Elimination of project option and revised courses resulted in more analysis and design coursework for the students in the non-thesis option.

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

Five evaluation forms were received.

4a. Findings

For question **3**, one respondent checked “Student actively searches all works related to the project. Student can identify the strengths and limitations of various methods”, which is classified as the Exemplary Level of Achievement. The other respondents checked “Student has read the literature related to project, and understands how project fits into the literature”, which is classified as Satisfactory Level of Achievement.

5a. Review

Criteria has been met.

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.

1-3. Goal #3 Access and use of literature in one's field

2b. Outcome Measure #2 Project defense questionnaire for project committee faculty

3b. Research Completed

One received.

4b. Findings

For question 3, the respondents checked "Student has read the literature related to project, and understands how project fits into the literature", which is classified as the Satisfactory Level of Achievement.

5b. Review

Criteria has been met, but sample size is too small to be statistically meaningful.

6b. Actions

After review by program faculty during 2004, the Environmental Engineering master project option was removed. It now has only thesis and non-thesis options, comparable to the Master in Civil Engineering program. Only the Engineering Mechanics program, which has minimal enrollment (and minimal cost to the college since the courses are all dual-listed with other programs) has the project option. Discussion on whether to continue the project option in that program will be held in 2005.

7b. Improvement

Due to the minimal number of students who will complete a project, as a result of the curriculum changes adopted, this will no longer be an outcome measure for this goal. It will not be included in future assessment reports.

- 1-3. Goal #3 Access and use of literature in one's field**
- 2c. Outcome Measure #3** Exit survey
- 3c. Research Completed** 5 evaluation forms were received and reviewed
- 4c. Findings** Based on a score of 1 (strongly agree) to 5 (strongly disagree)
- Learned how to access literature in my field of study: 1.0
- Used the literature in my field of study (outside of texts): 1.0
- 5c. Review** A score of 1-2 is excellent. Criteria has been exceeded.
 A score of 3 is average. Criteria has been met.
 A score of > 3 indicates a need for improvement.
- Based on the above, the criteria has been exceeded.
- 6c. Actions** None required. New seminar course includes training in literature search, and using it in seminar presentation.
- 7c. Improvement**

1-4. Goal #4 Ability to communicate effectively

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

3a. Research Completed

Five evaluation forms were received.

4a. Findings

There are five questions on the form which deal with effective communication. The responses were as follows:

	Level of Achievement		
	Exemplary	Satisfactory	Unsatisfactory
Quality of the writing style	4		
Organization of the written dissertation/thesis	4		
Organization of the presentation	4		
Clarity of language usage	3	1	
Quality of slides			

5a. Review

Criteria has been exceeded.

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.

1-4. Goal #4 Ability to communicate effectively

2b. Outcome Measure #2 Project defense questionnaire for project committee faculty

3b. Research Completed

One received.

4b. Findings

There are five questions on the form which deal with effective communication. The response was as follows:

	Level of Achievement		
	Exemplary	Satisfactory	Unsatisfactory
Quality of the writing style		1	
Organization of the written dissertation/thesis		1	
Organization of the presentation		1	
Clarity of language usage		1	
Quality of slides		1	

5b. Review

Criteria has been met, but sample size is too small to be statistically meaningful.

6b. Actions

After review by program faculty during 2004, the Environmental Engineering master project option was removed. It now has only thesis and non-thesis options, comparable to the Master in Civil Engineering program. Only the Engineering Mechanics program, which has minimal enrollment (and minimal cost to the college since the courses are all dual-listed with other programs) has the project option. Discussion on whether to continue the project option in that program will be held in 2005.

7b. Improvement

Due to the minimal number of students who will complete a project, as a result of the curriculum changes adopted, this will no longer be an outcome measure for this goal. It will not be included in future assessment reports.

Environmental Engineering master students must complete an environmental seminar class, which requires the students to make several written and oral presentations. Hence, those who are not in the thesis option have some basis for evaluation of their oral presentation skills. However, students in the Civil and Engineering Mechanics Master Programs previously did not have a seminar course available.

With the significant number of students in the non-thesis option in the Civil and Engineering Mechanics programs, the department felt that it would be beneficial, both for teaching and assessment of oral communication skills, to add a seminar course to the civil engineering and engineering masters program.

A new seminar course for those programs was added, and started in Spring 2005. Initially taught as a special topics course, it was approved as a regular course by the Engineering College in May 2005. This course included a Proskills component, which incorporates training in professional presentation skills by Watson and Associates communications and management consulting firm. Following training, the course culminates in individual oral presentations by the students on a research topic. Their presentation is videotaped and critiqued by Mr. Watson, and each student is provided with the critique and a video of their presentation. The course is graded Satisfactory/Unsatisfactory basis, and it may be repeated.

(Repeated course credit hours are not applied towards the minimum credit hour requirements for the degree.)

Based upon their oral presentations, the students are evaluated on the subject knowledge, evidence of preparation, quality/use of visuals, adaptation to audience, style/enthusiasm, voice projection/control and composure/eye contact. The mean score of the seven students (all international) who took the course during Spring **2005**, for their oral presentations, was **84.3**, compared to a mean score of **88.2** for the **225** students in the Proskills database. (This database includes undergraduate and graduate, domestic and international students.)

- 1-4. **Goal #4** Ability to communicate effectively
- 2c. **Outcome Measure #3** Exit survey
- 3c. **Research Completed** 5 evaluation forms were received and reviewed.
- 4c. **Findings** Based on a score of 1 (strongly agree) to 5 (strongly disagree)
- Learned to improve my oral communication skills: 1.4
- Learned to improve my written communication skills: 1.4
- 5c. **Review** A score of 1-2 is excellent. Criteria has been exceeded.
 A score of 3 is average. Criteria has been met.
 A score of >3 indicates a need for improvement.
- Based upon the above, the criteria has been exceeded.
- 6c. **Actions** Use of ProSkills in the seminar course will be continued.
- 7c. **Improvement**