Program Assessment Report

Department: Civil & Environmental Engineering

Completed by: Paul Bosela
Steve Duffy

Program Names: Master of Science Civil Engineering
Master of Science Environmental Engineering
Master of Science Engineering Mechanics

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Introduction

Civil Engineers design and construct facilities necessary to sustain the quality of life, i.e., the civil infrastructure that allows society to function on a daily basis. The field is a broad discipline which encompasses structural engineering, environmental engineering, water resources engineering, transportation engineering, engineering mechanics, geotechnical engineering as well as construction issues associated with each of the aforementioned areas. The graduate program in civil engineering provides students with knowledge of advanced methods for analysis and design or for research and development. The technical areas just mentioned are grouped into three degree programs: a Masters of Science in Civil Engineering which include the structures/foundations, water resources and transportation arenas; a Masters of Science in Environmental Engineering which is a sub-discipline of Civil Engineering; and a Masters of Science in Engineering mechanics, which includes cross disciplinary coursework from Civil Engineering, Mechanical Engineering and Chemical Engineering. The degree programs all include both thesis and non-thesis options. Due to the current size of the graduate student population in each of the degree programs just mentioned and the attending statistical significance associated with the sample sizes, as well as their academic 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, responses from all three programs are grouped 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, and again in 2006. At the present time, there are no recommendations to update our goals, although the faculty 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 was presented to the Visiting Committee in 2006 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

7 evaluation forms were received.

4a. Findings

Question #1a Depth Of Knowledge:
43% checked exemplary, and the remaining 57% satisfactory.

Question #1b Breadth Of Knowledge:
29% checked exemplary, and the remaining 71% satisfactory.

Question #2 Familiarity With Advanced Methods Of Analysis And Synthesis:
57% exemplary, 43% satisfactory

5a. Review

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

6a. Actions

None required.

7a. Improvement

No actions were called for, therefore no improvements were implemented.

1-1. Goal #1 **<u>Knowledge of advanced engineering analysis and design tools</u>**

2b. Outcome Measure #2

Student exit survey

3b. Research Completed

6 student evaluations forms were received and reviewed.

4b. Findings

Findings were based on the following scoring system:

1 = unacceptable
2 = poor
3 = average
4 = good
5 = excellence

Question #1 Knowledge Of Advanced Analysis Tools:
Mean = 4.3, standard deviation = 1.63

Question #2 Knowledge Of Advanced Design Tools:
Mean = 4.17, standard deviation = 1.60

5b. Review

Based on the above scores, the criterion has been exceeded..

6b. Actions

None required.

7b. Improvement

No actions were called for, therefore no improvements were implemented.

1-1. Goal #1 <u>Knowledge of advanced engineering analysis and design tools</u>

2c. Outcome Measure #3

Classroom performance

3c. Research Completed

Faculty follow well-defined syllabi with specific engineering analysis and design topics defined. The faculty use exams to demonstrate knowledge gained by the students. The University graduate grading scale is utilized in all courses. Courses that 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 is required for graduation

6c. Actions

Structured coursework and minimum GPA assures compliance, thus no actions are required.

7c. Improvement

No actions were called for, therefore no improvements were implemented.

1-2. Goal #2 **<u>Advanced engineering analysis and design tools to design practical systems</u>**

2b. Outcome Measure #2

Exit survey

3b. Research Completed

6 evaluation forms were received and reviewed

4b. Findings

Findings were based on the following scoring system:

1 = unacceptable
2 = poor
3 = average
4 = good
5 = excellence

Question #3 Learned How To Use Analysis And Design Tools To Design Practical Systems:
Mean = 3.83, standard deviation = 1.47

5b. Review

Based on the above scores, the criterion has been exceeded.

6b. Actions

None required since criteria are met.

7b. Improvement

No actions were called for, therefore no improvements were implemented.

1-2. Goal #2 **<u>Advanced engineering analysis and design tools to design practical systems</u>**

2c. Outcome Measure #3

Classroom performance

3c. Research Completed

Faculty follow well-defined syllabi with specific engineering analysis and design topics defined. The faculty use exams to demonstrate knowledge gained by the students. The University graduate grading scale is utilized in all courses. Courses that 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 is required for graduation

6c. Actions

Structured coursework and minimum GPA assures compliance, thus no actions are required.

7c. Improvement

No actions were called for, therefore no improvements were implemented.

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

6 evaluation forms were received.

4a. Findings

Question #3 Ability To Independently Read And Understand The Significance And Limitations Of The Relevant Literature:

43% checked exemplary, and 57% satisfactory.

5a. Review

Criteria has been met.

6a. Actions

None required since criteria are met.

7a. Improvement

No actions were called for, therefore no improvements were implemented.

1-3. Goal #3 **<u>Access and use of literature in one's field</u>**

2b. Outcome Measure #2

Exit survey

3b. Research Completed

6 evaluation forms were received and reviewed

4b. Findings

Findings were based on the following scoring system:

1 = unacceptable
2 = poor
3 = average
4 = good
5 = excellence

Question #4 learned how to access the literature in my field of study:
the mean score was 4.83, the standard deviation was 0.41.

5b. Review

Based on the above scores, the criterion has been exceeded.

6b. Actions

None required.

7b. Improvement

No actions were called for, therefore no improvements were implemented.

1-4. Goal #4 **Ability to communicate effectively**

2a. Outcome Measure #1

Thesis defense questionnaire for thesis committee faculty

3a. Research Completed

6 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:

	Level of Achievement (%)		
	Exemplary	Satisfactory	Unsatisfactory
Quality of the writing style	29	71	
Organization of the written dissertation/thesis	29	71	
Organization of the presentation	14	86	
Clarity of language usage	14	72	14
Ability to answer questions	71	29	
Quality of slides	43	57	

5a. Review

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

No improvements were implemented.

1-4. Goal #4 **<u>Ability to communicate effectively</u>**

2b. Outcome Measure #2

Exit survey

3b. Research Completed

6 evaluation forms were received and reviewed.

4b. Findings

Findings were based on the following scoring system:

1 = unacceptable
2 = poor
3 = average
4 = good
5 = excellence

Question #6 Learned to improve my oral communication skills:
mean = 4.33, standard deviation = 1.03
Question #7 learned to improve my written communication skills:
mean = 4.5, standard deviation = 084.

5b. Review

Based upon the above scores, the criteria has been exceeded.

6b. Actions

None required since criteria are met.

7b. Improvement

No actions were called for, therefore no improvements were implemented.

1-4. Goal #4 **<u>Ability to communicate effectively</u>**

2d. Outcome Measure #3

Seminar course oral presentation.

3d. Research Completed

9 review forms were received.

4d. Findings

Grades were distributed as follows:

A:	1
-A:	2
+B:	1
B:	1
S:	4

5d. Review

In order to tell if this course is improving the oral presentation skills, grade comparisons from previous years are needed..

6d. Actions

Due to budget problems use of ProSkills in the seminar course was discontinued. The course assessment has been changed as follows:

Presentation (50%)
- Proper use of references/attribution
- Well organized
- Graphics clear and legible
- Language clear
- Speaking skills
- Kept within the time limit

Report (50%)
- Proper use of references/attribution
- Well organized
- Graphics (figures and table) clear and legible
- Language clear and appropriate for technical report
- Within length/page limit

7d. Improvement

No improvements were implemented.

Engineering Program **Student Name:** _____

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:	**Level of Achievement**		
Objectives/Criteria for Evaluation	**Exemplary**	**Satisfactory**	**Unsatisfactory**
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.			
a. Depth of knowledge	Student shows excellent understanding of fundamental principles directly related to the project.	Student displays good understanding of fundamentals directly related to project.	Understanding of fundamental principles directly related to the project is weak.
b. Breadth of knowledge	Student shows good understanding of related principles.	Knowledge of related subjects is adequate.	Knowledge of related subjects is weak.
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.	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.	Student is competent in experimental/analytical techniques needed for research in the field. Student can accept or reject hypotheses.	Student is competent in analytical techniques, with little understanding of the principles underlying the techniques. Student has difficulty in addressing the hypothesis.
3. The ability to independently read and understand the significance and limitations of the relevant literature.	Student actively searches all works directly and indirectly related to the project. Student can identify the strengths and limitations of various methods.	Student has read the literature related to project, and understands how project fits into the literature.	Student has read only some of the articles related to the project.
4. The ability to formulate, initiate, and complete new and innovative research projects that contribute to the advancement of the			

field.			
a. Impact on advancement of the field	Work has strong impact on the field.	Work has incremental impact on field.	Work has no impact on the field.
b. Adequacy of the scope of the research	Work has examined many facets of the problem.	Amount of work is adequate.	Amount of work done is inadequate.
c. Adequacy of the depth of the research	Work has probed deeply the principles behind the problem.	Work answers the basic questions of the problem.	Work only touched the surface of the problem.
d. Novelty of the research	Dissertation is an innovative idea from the student; student shows creativity in designing experiments and solving problems.	Student contributed originality to designing experiments and solving problems.	The student followed directions from his/her advisor.
5. To communicate effectively in written and oral form.			
a. Quality of the writing style	Written sentences are complete and grammatical, and they flow together easily. Words are chose for their precise meaning.	Writing is grammatically correct. Paragraphs and sentences may not flow together perfectly.	Writing contains grammatical errors.
b. Organization of the written dissertation	Dissertation is logically organized and easy to follow.	Dissertation organization is clear.	Dissertation is poorly organized.
c. Organization of the presentation	Presentation is clear, logical and organized. Listener can follow line of reasoning. Pacing is correct for the audience.	Listener can follow and understand the presentation.	Talk is poorly organized. Speaker jumps around from topic to topic.
d. Clarity of language usage	Speaker is comfortable in front of the group and can be heard by all.	Grammatical errors and use of slang are evident. Some sentences may be incomplete.	Speaker is difficult to understand or hear.
e. Ability to answer questions	Answered questions directly and clearly.	Student can answer questions, but with some difficulty.	Students had difficulty understanding questions and answering clearly.
f. Quality of slides	Slides enhance the presentation and are prepared in a professional manner.	Slides are adequate for the presentation.	Slides are inadequate (writing too small, too much or too little information per slide).

6. Do application-oriented research of an inter-disciplinary nature			
a. Application-oriented research	Research has practical applications that are clear.	Research may have practical applications.	The practical application of this work is completely unclear.
b. Interdisciplinary nature of research	Research required significant level of knowledge of and interaction with people from more than one discipline	Research involved some level of work or interaction with more than one discipline.	Research was completely within one discipline.

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

Cleveland State University

Civil & Environmental Engineering Department
MS Program Survey 2006

Please enter the following information:

Name
Program *(CVE or ENV)*
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)

	Unacc. 1	2	3	4	5	No basis NB
1. acquired a good knowledge of some advanced engineering analysis tools.	○	○	○	○	○	○
2. acquired a good knowledge of engineering design tools.	○	○	○	○	○	○
3. learned how to use analysis and design tools to design practical systems.	○	○	○	○	○	○
4. learned how to access the literature in my field of study.	○	○	○	○	○	○
5. used literature in my field of study (outside my texts).	○	○	○	○	○	○
6. learned to improve my oral communication skills.	○	○	○	○	○	○
7. learned to improve my written communication skills.	○	○	○	○	○	○

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