

Program Assessment Plan Graduate and Professional Programs

Program: Master of Science in Civil Engineering

Date: Revised August 26, 2010. Approved June 6, 2011. Effective June 21, 2011

I. Program's Assessment Procedures and Process

The assessment process of Civil Engineering graduate program consists of the following procedures:

- (1) Assessment Plan: graduate faculty to be familiar with approved graduate program assessment plan, goals and the method of assessment
- (2) Data collection: graduate faculty rate students' performance on assessed outcomes. The department also surveys students' evaluation of the program.
- (3) Data analysis: graduate program director analyzes data and reports to graduate faculty. Data include (a) the faculty's rating on students' final research paper/thesis and oral presentation; (b) the faculty's rating (*Exceeded Expectations, Met Expectations, Didn't Meet Expectations*) on each assessed outcome. Outcomes that have received *Didn't Meet Expectations* will be analyzed in more details to uncover the cause. The changes and trend of current year's ratings will be compared to those from the past. Results of student survey will be tabulated and analyzed.
- (4) Data review and action plan: analysis results are reported to graduate faculty and are discussed at annual graduate assessment meeting, where an action plan will be developed for program improvement.
- (5) Documentation: assessment data and review will be documented to produce the Annual Performance Report for reporting to the Graduate School and for department records.
- (6) Actions for program improvement: tasks are assigned to graduate faculty for implementing needed changes. Results of program improvement actions will be discussed at the annual meeting the following year.

II. Student Learning Benchmarks or Outcomes

A. *What do you want your students to demonstrate?*

Benchmarks for graduate programs are aligned with the *Goals of Graduate Learning* as defined by the Graduate Council. The objectives are as follows.

- To demonstrate breadth and depth of knowledge and skills appropriate to the civil engineering specialization as measured by successful completion of a final project and report and a final presentation. Students are expected to

demonstrate they possess the knowledge relevant to their research area and specialization through the use of quality literature in their final project and written report and their ability to respond to questions during the final presentation.

- To communicate clearly and effectively, as measured by successful completion or waiver of the technical writing requirement (ENG 491) and successful completion of a final project report and a final presentation. Students are expected to demonstrate acceptable writing style, organization, grammar and English usage in their reports; and thoroughness, cohesiveness, acceptable delivery style, quality visual aids in their presentations.
- To identify and analyze problems and issues appropriate to the civil engineering specialization as measured by successful completion of a final project. Students are expected to clearly state objectives, discuss results, draw conclusions, and offer recommendations in their project reports.
- To exhibit professional practices and ethics in the final project and report. Students are expected to apply professional standards in conducting their final project and to abide by ethics as measured by the following performance indicators: to cite references and sources properly; to collect, report and analyze data including experiment data and/or computer data honestly and follow through on approved methodology; to acknowledge contributions of others appropriately; to seek review and obtain prior approval if the research involves in human subjects or the use of animals; to complete applicable university and department required training.
- To apply appropriate concepts and methods to solve problems in a civil engineering specialization as measured by successful completion of the final project. Students are expected to demonstrate appropriate data analysis or comparative study, experiment design or computer analysis in their final project.

III. Performance Indicators or Assessments

A. *What do you use to measure student learning benchmarks or outcomes?*

- (1) A final research paper (CE 593) or a thesis (CE 599)
- (2) A final presentation

The civil engineering graduate program assessment form and rubrics are included.

B. *Criteria for Passing*

Met or exceeded expectations of the program through successful completion of the final project and a written report and passing of the final oral presentation.

C. *Where are the benchmarks or outcomes assessed in your program?*

At the end of the program (exit requirement), for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation.

Benchmark/ Outcome	Performance Indicator or Assessment	Criteria for Passing	Where Are the Benchmarks/Outcomes Assessed?
Demonstrate breadth and depth of knowledge and skills appropriate to the civil engineering specialization	(1) A final research paper (CE 593) or a thesis (CE 599) (2) A final presentation	Met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense.	At the end of the program (exit requirement) for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation.
Communicate clearly and effectively,	(1) A final research paper (CE 593) or a thesis (CE 599) (2) A final presentation	Met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense. C or better grade in ENG 491 or successful waiver of the course requirement.	When a waiver of the ENG 491 requirement is obtained or the course is passed with at least a C. At the end of the program (exit requirement) for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation.
Identify and analyze problems and issues appropriate to the civil engineering specialization	(1) A final research paper (CE 593) or a thesis (CE 599) (2) A final presentation	Met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense.	At the end of the program (exit requirement) for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation.
Exhibit professional practices and ethics	(1) A final research paper (CE 593) or a thesis (CE 599) (2) A final presentation	Met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense.	At the end of the program (exit requirement) for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation.
Apply appropriate concepts and methods to solve problems in a civil engineering specialization	(1) A final research paper (CE 593) or a thesis (CE 599) (2) A final presentation	Met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense	At the end of the program (exit requirement) for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation.

Civil Engineering Final Project Assessment

Student: _____

Title and Date: _____
Thesis or **Research Paper**

Faculty Evaluator: _____
 (Indicate if you are the Major Advisor/Committee Chair)

<i>Measurement of Objectives</i>	<i>Student Performance</i>					
	<i>Exceeded Expectations</i>		<i>Met Expectations</i>		<i>Didn't Meet Expectations</i>	
Objective 1. Demonstrate breadth and depth of knowledge and skills appropriate to specialization						
1a. Knowledge of relevant research on the subject	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
1b. Extensiveness, quality and variety of literature	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
Objective 2. Apply appropriate concepts and methods to solve problems						
2a. Methodology (experiment design, computer analysis method, data collection)	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
2b. Data analysis and/or comparative study	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
Objective 3. Identify and analyze problems and issues						
3a. Statement of objectives	5 \geq	>4.5	4.5 \geq	\geq 3	3 $>$	\geq 0
3b. Discussions, conclusions, recommendations	15 \geq	>12.5	12.5 \geq	\geq 9	9 $>$	\geq 0
Objective 4. Exhibit professional practices and ethics						
4a. Ethical research conducts (follow methodology in experiments, computer analysis, data collection)	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
4b. Citation of sources and use of references	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
Objective 5. Communicate clearly and effectively						
5a. Written Report						
Writing style, organization, grammar, English usage	10 \geq	>8.5	8.5 \geq	\geq 6	6 $>$	\geq 0
5b. Final Presentation						
5b1. Thoroughness, cohesiveness, delivery style, and quality of visual aids	5 \geq	>4.5	4.5 \geq	\geq 3	3 $>$	\geq 0
5b2. Ability to comprehend, respond to questions	5 \geq	>4.5	4.5 \geq	\geq 3	3 $>$	\geq 0
Available points in each category	100 \geq	>85.5	85.5 \geq	\geq 60	60 $>$	\geq 0
Student earned points in each category						
Total earned points from this evaluation report						

Individual Report by Faculty Evaluator

Final Report: __Acceptable __Acceptable with revisions __Unacceptable (< 54 points, Item 1-4, 5a)

Final Presentation: ___ Passed _____ Failed (< 6 points, Item 5b)

Committee Chair Report on All Reports

- Committee decision on student's work (total points from all reports divided by the number of reports):
 Exceeded expectations > 85.5 points Met Expectations: 60-85.5 points
 Didn't meet expectations < 60 points - which aspect failed? **Unacceptable Report (<54 points, Item 1-4, 5a)? Failed Presentation (<6 points, Item 5b)? Both Failed?**
- Committee recommended actions on student work and/or graduate program improvements:

Civil Engineering Final Project Assessment Rubrics

Measurement of Objectives	Student Performance		
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>	<i>Didn't Meet Expectations</i>
Objective 1. Demonstrate breadth and depth of knowledge and skills appropriate to specialization			
1a. Knowledge of relevant research on the subject	Excellent and thorough understanding of relevant literature and research, in-depth knowledge of researched subject.	Familiar with and adequate understanding of relevant literature and research, knowledgeable on researched subject.	Inadequate knowledge and misunderstanding of relevant literature and research, insufficient knowledge of researched subject.
1b. Extensiveness, quality and variety of literature	Reviewed literature is comprehensive and extensive, covering both theory and application. Majority are peer-reviewed publications.	Reviewed literature covers a variety of sources including theory and application. A number of literatures are peer-reviewed publications.	Reviewed literature is inadequate and is not related well to the researched subject. Little peer-reviewed publications.
Objective 2. Apply appropriate concepts and methods to solve problems			
2a. Methodology (experiment design, computer analysis method, data collection)	Rigorous experiment design and/or computer analysis method appropriate to the researched subject. Justify selected methodologies and protocols. Explain assumptions and reasoning fully.	Experiment design and/or computer analysis method are appropriate to the researched subject. Describe assumptions and justify chosen methodologies and protocols.	Experiment design and/or computer analysis are not appropriate to the researched subject. Inadequate justification on the chosen methodologies and protocols.
2b. Data analysis and/or comparative study	Data are fully analyzed with appropriate concepts and methods. Appropriate comparisons with a wide variety of relevant solutions. Apply statistical and/or sensitivity analysis, where applicable.	Data are analyzed using appropriate concepts and methods. Some comparisons with a few relevant solutions. Consider statistical and/or sensitivity analysis, where applicable.	Major problem with concepts and methods of data analysis. Little or no comparison with other relevant solutions.
Objective 3. Identify and analyze problems and issues			
3a. Statement of objectives	Research problem is clearly defined and significance shown.	Research problem is defined and significance indicated.	Research problem is not well defined and/or insignificant.

Measurement of Objectives	<i>Student Performance</i>		
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>	<i>Didn't Meet Expectations</i>
3b. Discussions, conclusions, recommendations	Results are evaluated correctly. Major alternatives are assessed thoughtfully. Result discussions are linked to research objectives and are related to other relevant work. Conclusions are clearly drawn from results. Future research is recommended. New research questions are suggested.	Results are evaluated and are mostly correct. There is assessment on alternatives. Result discussions are linked to research objectives, related to some other relevant work. Conclusions are drawn from results. Some but brief recommendations on future research and new research questions.	Results are evaluated, but have some major problems. Little or no assessment on alternatives. No linkage of results to research objectives. Weak or inappropriate connection between conclusions and results. No recommendations on future and new research questions.
Objective 4. Exhibit professional practices and ethics			
4a. Ethical research conduct (follow methodology in experiments, computer analysis, data collection)	Follow through diligently and honestly on approved methodology in conducting experiments, computer analysis, data collection, and reporting.	Follow through on the majority of approved methodology in conducting experiments, computer analysis, data collection, and reporting.	Not follow through on approved methodology in conducting experiments, computer analysis, data collection, and reporting.
4b. Citation of sources and use of references	All references are cited properly. Contributions of others are fully acknowledged	References are cited. Contributions of others are acknowledged.	The citation of references and acknowledgment are incomplete or missing.
Objective 5. Communicate clearly and effectively			
5a. Written Report			
Writing style, organization, grammar, English usage	Excellent organization, structure, presentation of the research. Excellent quality in text, figures, and English usage.	The presented research is well organized. Text and figures are well prepared. No major errors of English usage.	Lack of organization in the presented research. Major Improvements are needed on text, figures, English usage.
5b. Final Presentation			
5b1. Thoroughness, cohesiveness, delivery style, quality of visual aids	Very thorough and cohesive oral presentation. The presentation is of excellent quality and well prepared.	The oral presentation covers major aspects of the research. The presentation is of good quality and well prepared.	The oral presentation misses some important aspects of the research. Major improvement is needed with the presentation.
5b2. Ability to comprehend and respond to questions	Fully comprehend questions. Answer all questions correctly with explanations and elaborations.	Comprehend and answer majority of questions correctly. Need guidance with some questions.	Unable to comprehend or answer most questions.

Department of Civil Engineering Graduate Student Exit Survey

As part of the Department’s assessment process, we would like your feedback regarding the M.S. program in civil engineering. We will use the results to improve the program. Thank you for your assistance.

Indicate your specialization: Environmental Structural Transportation None

Circle your responses.

M.S. Program Component	Rating					
Initial advisement by the Graduate Program Director	Poor	Deficient	Satisfactory	Good	Excellent	
Advisement by your major advisor	Poor	Deficient	Satisfactory	Good	Excellent	
Communication from the Department	Poor	Deficient	Satisfactory	Good	Excellent	
Course scheduling	Poor	Deficient	Satisfactory	Good	Excellent	
CE course content (taught by CE faculty or call staff)	Inappropriate/irrelevant	Somewhat irrelevant		Somewhat relevant	Appropriate/relevant	
Non-CE course content * (taught by other departments)	Inappropriate/irrelevant	Somewhat irrelevant		Somewhat relevant	Appropriate/relevant	Not applicable
CE course rigor (taught by CE faculty or call staff)	Too easy	Somewhat easy	Appropriate	Somewhat hard	Too hard	
Non-CE course rigor * (taught by other departments)	Too easy	Somewhat easy	Appropriate	Somewhat hard	Too hard	Not applicable

Examples of non-CE courses for the purposes of this survey: ENG 491, ME 470 etc.

Please provide comments regarding your ratings or other aspects of the program or Department. Identify particular courses that you feel strongly about, either positively or negatively. Use the back if you need more space.