

Assessment Report
For
Civil Engineering Technology Program
B. S. Degree
Academic Year 2010 - 2011

Program Faculty:

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2010 - 2011 Recommendations

- 1) In utilizing graphic techniques to produce engineering documents (outcome 1), additional project should be included in DRFT 244 that includes developing plan and profile sheets.
- 2) Continue to require students to produce individual written lab reports.
- 3) In employing productivity software to solve technical problems (outcome 6), students in CET 305 utilize MS Solver to solve linear programming problems. This could be a second method opportunity to measure this outcome.
- 4) For planning and preparing design and construction documents, such as specifications, contracts, change orders, engineering drawings, and construction schedules (outcome 7), and performing standard analysis and design in at least three of the recognized technical specialties within civil engineering technology that are appropriate to the goals of the program (outcome 11), students need additional training in preparing specifications, contracts, and change orders. Additional assignments pertaining to this training should be included in Steel Design, and Highway Design classes.
- 5) For performing economic analyses and cost estimates related to design, construction, operations and maintenance of systems in the civil technical specialties (outcome 8), students need additional training in evaluating economic analysis. Additional assignments and instruction should be included pertaining to benefit/cost analysis and internal rate of return analysis.

2009 – 2010 Recommendations that was implemented in 2010 – 2011

- 1) Recommendation: For utilizing graphic techniques to produce engineering documents (outcome 1), for time should be spent instructing students to prepare plan and profile sheets. Implementation: For time was spent on instructing, but also an additional assignment should be included.
- 2) Recommendation: For conducting standardized field and laboratory testing on civil engineering materials (outcome 2), and selecting appropriate engineering materials and practices (outcome 9), students are required to produce individual lab reports of their findings. This applies to surveying, concrete design, and steel design courses. Implementation: This change has caused students to spend more time evaluating their results and students have realized that being better prepared going into the laboratory assignment was valuable.
- 3) Recommendation: For employing productivity software to solve technical problems (outcome 6), this outcome was measured in DRFT 244. The faculty feels that this outcome pertains more to software that is used to solve engineering problems and not to produce drafted information. The faculty feels this outcome would be better measured in

CET 220 by utilizing Microsoft Projects. Implementation: A project in CET 220 using Microsoft Projects was used as a way to measure this outcome.

- 4) Recommendation: For planning and preparing design and construction documents, such as specifications, contracts, change orders, engineering drawings, and construction schedules (outcome 7), this outcome would be better measured in IET 481 (Senior Project II). Using Microsoft Projects from CET 220 only addresses one portion of this outcome, construction schedules. Implementation: This outcome is now measured in Senior Project II, IET481; we will monitor this change to determine if this is a better place to measure this outcome.
- 5) Recommendation: For performing standard analysis and design in at least three of the recognized technical specialties within civil engineering technology that are appropriate to the goals of the program (outcome 11), students were having problems understanding their expectations. This outcome is measured in Senior Project II, IET481. Students are provided more structure in the class with lectures that addresses certain elements of this outcome. Implementation: More directed lectures helped in providing students with the understanding of the engineering design process, but more effort needs to be included in the students preparation in prior classes.

Civil Engineering Technology
 Program Outcomes
 2010 - 2011 Academic Year

Program Outcomes:

- 1) Utilizing graphic techniques to produce engineering documents;
- 2) Conducting standardized field and laboratory testing on civil engineering materials;
- 3) Utilizing modern surveying methods for land measurement and/or construction layout;
- 4) Determining forces and stresses in elementary structural systems;
- 5) Estimating material quantities for technical projects;
- 6) Employing productivity software to solve technical problems;
- 7) Planning and preparing design and construction documents, such as specifications, contracts, change orders, engineering drawings, and construction schedules;
- 8) Performing economic analyses and cost estimates related to design, construction, operations and maintenance of systems in the civil technical specialties;
- 9) Selecting appropriate engineering materials and practices;
- 10) Applying basic technical concepts to the solution of civil problems involving hydraulics, hydrology, geotechnics, structures, material behavior, transportation systems, and water and wastewater systems; and
- 11) Performing standard analysis and design in at least three of the recognized technical specialties within civil engineering technology that are appropriate to the goals of the program

Program Outcome Nos.	Where Measured	Evaluation of Measure	Conclusion
1	DRFT 244 - Plan View of Final Project	11 of 16 students in class are CET Majors. Grades on Final Project were: 1-A, 3-B, 2-C, 1-D, 2-F, and 2-No shows	Students met the outcome. To try to improve the students understanding an additional Plan and Profile Project will be included.
2	CET 411 - Lab on Density Testing	Nine students performed the density test, all scored above 80% on their individual lab report	Students met the outcome.
3	CET 181 – Reverse Curve Lab	8 students (3 teams) each constructed a reverse curve, 2 teams had minor errors 70%, 1 team very acceptable >90%.	Students met the outcome. Individual Lab reports prepared by the students caused the student's to be more attentive to the procedure.
4	CET 232 - Exam 2	10 students took the exam on April 1, 2010, Results 1 scored above 90%, 3 scored in the 60s, and 6 scored in the 50s. We reviewed the material and tested again on the 3 rd exam. These	Students met the outcome.

		results were 9 scored above 80%, and 1 scored in the 70s.	
5	CET 220 - Problem 10.1 in Homework	Five students completed homework problem on calculating concrete quantities. All scores exceeded 80% proficiency.	Students met the outcome.
6	CET 220 final Scheduling Project using MS Project	Four of five CET majors successfully met the goals of the assignment.	Students met the outcome
7	IET 481 –Senior Project	All ten students submitted some form of plan sheets. Students had difficulty with preparing specifications and contract documents.	Students need more training with preparing specifications, contract documents, and change orders. Additional training should take place in CET 220, with additional assignments in Steel Design and Highway Design.
8	CET 305 Final Exam Question 5 Cost Alternative Problem	Seven CET major took the exam, 3 students did well, 2 students did average, and 2 students did poor on question 5.	Students met the outcome. Need to provide additional training to the students.
9	CET 411 - Mix Design Lab Assignment	All the students (6) prepared concrete mix designs and a lab report describing their findings. All students scored >90% on their reports.	Students met the outcome. Having students prepare individual lab reports have had positive results, students are better prepared in laboratory activities.
10	IET 480 Selection of Alternatives	Eleven students were divided into three groups; each group prepared a proposal for a golf course on this campus. Each alternative was presented in an oral presentation and in a written report.	The students performed as requested. Three alternatives were presented; as such the outcome was met. In the future we need to present projects so students have motivation to evaluate different alternatives for the desired project
11	IET 481 - Final Drawing	Ten Students completed Senior Project II. Students made an oral and written presentation of their golf course design. Each student's portion of the design included a structural design, surveying, hydraulics and	Students met the outcome. The students need additional training in preparing plans and specifications for such a project. This training needs to occur prior to Senior

	hydrology of a drainage system throughout the course, and pavement design of the cart path. Students were required to work together so that the design was consistent with maps showing the overall layout of the course.	Project.
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2008-2009 Recommendations and Implementation of the Recommendation

- 1) Recommendation: In the previous year’s assessment (2006-2007) it was recommended that objectives be revised to be in line with ABET Criteria 2 program objectives. The program faculty conferred and decided to leave the program objectives as stated above. The basis of this conclusion is that ABET criteria is currently being re-evaluated and there is review by American Society of Civil Engineers (ASCE) personnel as to the requirements of professional engineers registration, Body of Knowledge. The faculty feels that as these reviews and recommendations from these reviews become finalized then revisions to these assessment outcomes will be re-evaluated.
- Implementation: In October we had an accreditation visit for the CET program. One of the results of the visit was to revised our program outcomes. The program outcomes were developed then reviewed and approved by the Advisory Board. The following are the revised Program Outcomes:

Old Program Outcomes	Revised Program Outcomes
1) Encourage students to master the knowledge, techniques, skills and modern tools used in the Civil Engineering profession	1) Utilizing graphic techniques to produce engineering documents;
2) Improve students’ ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology.	2) Conducting standardized field and laboratory testing on civil engineering materials;
3) Have students demonstrate the ability to conduct, analyze, and interpret experiments and apply experimental results to improve processes.	3) Utilizing modern surveying methods for land measurement and/or construction layout;
4) Encourage students to apply creativity in design of systems, components, or processes as appropriate.	4) Determining forces and stresses in elementary structural systems;
5) Improve student’s ability to function effectively in teams.	5) Estimating material quantities for technical projects;
6) Provide students with the tools to identify, analyze and solve technical	6) Employing productivity software to solve technical problems.

problems	
7) Improve student's ability to communicate effectively.	7) Planning and preparing design and construction documents, such as specifications, contracts, change orders, engineering drawings, and construction schedules
8) Have students recognize the need for, and encourage students to gain lifelong learning.	8) Performing economic analyses and cost estimates related to design, construction, operations and maintenance of systems in the civil technical specialties;
9) Encourage students to understand professional, ethical, and social responsibility.	9) Selecting appropriate engineering materials and practices;
10) Have students gain a respect for diversity and knowledge of contemporary professional, societal, and global issues.	10) Applying basic technical concepts to the solution of civil problems involving hydraulics, Hydrology, geotechnics, structures, material behavior, transportation systems, and water and wastewater systems; and
11) Encourage students to embrace the principals of quality, timeliness, and continuous improvement.	11) Performing standard analysis and design in at least three of the recognized technical specialties within civil engineering technology that are appropriate to the goals of the program.

- 2) Recommendation: In the selection of Senior Project a more rigorous writing component should be included in the project.
Implementation: The students were required to document in a format report their preliminary study.
- 3) Recommendation: Program Objective 8, recognize the need for students to pursue life long learning, is not being measured by graduate surveys. Another measure that is being considered is to measure graduates success on the Principles of Engineering Exam. For students to succeed they will need to demonstrate long term (4 to 8 years) learning. The concern to this measure is that no activities within the educational process, while at Northern, has any bearing on the student to perform well in this objective.
Implementation: This outcome has been revised, see recommendation 1, above.
- 4) Recommendation: To increase student's exposure to Engineering Ethics a period of study should be included in the Senior Project class. At that point in a student's academic preparation the student will be better suited for the material and concepts developed.
Implementation: This outcome has been eliminated based on the outcomes published ABET/TAC for Civil Engineering Technology
- 5) Recommendation: The Annual Assessment Report should be presented to CET Advisory Committee at their next meeting for review and comment.
Implementation: The Annual Assessment Report was present to the Advisory Board at their April 30, 2010 meeting. The Board reviewed the report made comments and agreed to findings and results of the report.
- 6) Recommendation: Since Senior Project is a significant measure of this assessment report, the Senior Project selection should involve the Program Faculty.
Implementation: both CET faculty members were involved in the selection of senior project.