



UNIVERSITY of WISCONSIN
GREEN BAY

Electrical Engineering Technology | 2017-2018 Assessment Report

1. Please give a brief overview of the assessment data you collected this year.

The following ABET Student Learning Outcomes were assessed for required courses in the Environmental Engineering Technology BS program. Assessment was performed in courses required by the major that are taught at UW-Green Bay by UW-Green Bay faculty. Each outcome was assessed once at the lower level and once at the higher level. The chart below shows which outcomes were assessed in specific courses. Results and discussion of continuous improvement follow. Samples of student work are available.

ABET Criterion 3 Student Learning Outcomes (time of graduation) with ours under the applicable one

- a. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly defined engineering technology activities
- b. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
- c. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
- d. An ability to design systems, components, or processes for broadly defined engineering technology problems appropriate to program educational outcomes
- e. An ability to function effectively as a member or leader on a technical team
- f. An ability to identify, analyze, and solve broadly defined engineering technology problems
- g. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature
- h. An understanding of the need for and an ability to engage in self-directed continuing professional development
- i. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
- j. A knowledge of the impact of engineering technology solutions in a societal and global context
- k. Commitment to quality, timeliness, and continuous improvement

Fall 17 and Spring 18 ET 400 Combined Assessment

ABET learning outcomes assessed: c, g, h, k

UWGB general education outcome assessed: Writing Emphasis (WE)

Rather than separate out electrical from environmental or mechanical engineering technology students, assessment was performed on all students with a single set of results.

ET 400 is the course assigned to the Engineering Technology internship. In addition to completing a minimum of a summer or semester long internship with a company in the appropriate field (electrical, environmental, mechanical engineering technology), each student will write a term paper documenting their experience and give an oral presentation at the end of the term. The course grade is based on evaluation by the internship supervisor, the written paper, and the presentation. ABET learning outcomes, specific assignments used to assess each one, and assessment rubrics are discussed below.

Criteria for the term paper are as follows:

Internship Experience Report:

At the end of the internship semester, each student will write a 12 to 20 page paper (double spaced) detailing their experience. The paper should follow the outline below and include all of the information in the outline.

1. Describe the company, what products it makes, what the markets are for the products.
2. Describe the manufacturing process. Include applicable graphics to explain.
3. Describe your position with the company including responsibilities.
4. Describe projects that you worked on including the goals of the projects, any experiments or design work applied to the project; methods for measurements and analysis of measurements taken; results of any experiments or design work; and how processes were improved as a result
5. Discuss skills attained relevant to both engineering technology and a future professional career
6. Describe any opportunities for additional training/professional development and what skills were learned

This paper will also be used to assess the Writing Emphasis requirement of the course

ABET outcome c states that the student will demonstrate: An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes. This outcome was assessed by both Prof. Patricia Terry and each student's internship supervisor. Prof. Terry obtained the internship supervisor's assessment via a phone conversation if an electronic copy of the evaluation was not completed. The assessment rubric and a summary of the results are given below.

Assessment Rubric for ABET c: Assessment by Prof. Terry (Assessed primarily from the paper)

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Describe the purpose of measurements/ experimentation in context of process	Description not adequate to explain what is being performed or why	Gives some information about the tests/ measurements (2) 9.1%	Adequately describes tests/Measurements and why they are performed 72.7% (16)	Comprehensive description of tests/measurements in the context of the overall process 18.2% (4)
Properly conducts tests and collects data	Fails to apply correct scientific method such that data is meaningless	Conducts tests with only minor errors and records inputs and outputs	Conducts tests using scientific methods and records inputs and outputs 77.7% (17)	Conducts tests using scientific methods and records data on all process parameters that might be affected 22.7% (5)
Analyze data and interpret results	Fails to apply appropriate models for analysis	Applies at least one model with no significant errors and interprets results based on this	Applies correct models to analyze data and interprets results specific to the tests 68.2% (15)	Applies all correct models to data analysis and interprets results in the context of the entire process 31.8% (7)
Apply analysis for process improvement	Makes incorrect changes to process	Makes process changes based on single model	Correctly applies analysis to process changes 45.5% (10)	Correctly applies analysis to process changes and documents improvement 54.5% (12)
Document process improvement	Fails to document results	Provides minimal documentation of process improvement (2) 9.1%	Document results of process improvement in a manner that allows replication 45.5% (10)	Documents results of process improvement in a manner that allows replication and suggests further tests/experiments 45.4% (10)

Assessment Rubric for ABET c: Summary of internship supervisor reports

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Describe the purpose of measurements/ experimentation in context of process	Description not adequate to explain what is being performed or why	Gives some information about the tests/ measurements	Adequately describes tests/ Measurements and why they are performed 45.5% (10)	Comprehensive description of tests/ measurements in the context of the overall process 54.5% (12)
Properly conducts tests and collects data	Fails to apply correct scientific method such that data is meaningless	Conducts tests with only minor errors and records inputs and outputs (1)4.5%	Conducts tests using scientific methods and records inputs and outputs (11) 50%	Conducts tests using scientific methods and records data on all process parameters that might be affected 45.5% (10)
Analyze data and interpret results	Fails to apply appropriate models for analysis	Applies at least one model with no significant errors and interprets results based on this	Applies correct models to analyze data and interprets results specific to the tests 36.4% (8)	Applies all correct models to data analysis and interprets results in the context of the entire process 63.6% (14)
Apply analysis for process improvement	Makes incorrect changes to process	Makes process changes based on single model (1)4.5%	Correctly applies analysis to process changes (10) 45.5%	Correctly applies analysis to process changes and documents improvement 50% (11)
Document process improvement	Fails to document results	Provides minimal documentation of process improvement	Document results of process improvement in a manner that allows replication 59.1% (13)	Documents results of process improvement in a manner that allows replication and suggests further tests/experiments 40.9% (9)

ABET outcome g states that the student will demonstrate: An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature

The term paper was used to assess the written and graphical communication components of g: with rubric and summary of results below. Assessment performed by Prof. Terry.

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Written articulation of experience	Fails to articulate experience at all	Text rambles, repeated reading needed to understand, key points not organized (1)4.5%	Articulates experience, but writing is somewhat difficult to follow (11) 50%	Articulates experience clearly and concisely 45.5% (10)
Written organization	Little to no structure or organization is used	Some structure and organization is used	Generally well organized, but some sections not clearly identified 40.9% (9)	Organized in a logical sequence to enhance readers' comprehension 59.1% (13)
Professionally written to audience (professor and supervisors)	Writing style is inappropriate for the audience and the assignment	Style is informal or inappropriate to audience (3) 13.7%	Usually uses professional, scientific writing style appropriate to audience 54.5% (12)	Uses excellent professional, scientific writing style to appropriate audience 31.8% (7)
Quality of written work	Work is not presented neatly; many spelling/ grammar errors (4) 18.2%	Work has more than 3 spelling or grammar errors per page; is somewhat messy 27.3% (6)	Work is presented neatly with few grammar or spelling errors 54.5% (12)	Work is presented neatly; grammar and spelling are correct 33% (1)
Use of graphics: tables/graphs/ figures	No graphics are used (1)4.5%	Graphics are presented, but flawed	Use of graphics is appropriate and usually in the correct format (6) 27.3%	Use of graphics is appropriate and all are in proper format 68.2% (15)

Assessment Rubric for ABET g (oral): Each student gave a 12-15 minute presentation of their work and answered audience questions. The ET 101 class was the audience.

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Oral articulation of experience	Fails to articulate experience at all	Speaker rambles, key points not organized	Articulates experience but somewhat difficult to follow (3) 13.6%	Articulates experience clearly and concisely 86.4% (19)
Presentation organization	Little to no structure or organization is used	Some structure and organization is used	Generally well organized 27.3% (6)	Organized in a logical sequence to enhance comprehension 72.7% (16)
Presentation quality	Student not prepared, presentation not appropriate	Style is informal or inappropriate to audience	Student mostly prepared; presentation is appropriate to audience 40.9% (9)	Student very well prepared, knowledgeable; presentation is appropriate to audience 59.1% (13)
Use of graphics: tables/graphs / figures	No graphics are used	Graphics are presented, but flawed	Use of graphics is appropriate and usually in the correct format 18.2% (4)	Use of graphics is appropriate and all are in proper format 81.8% (18)
Stays within time limits	Student goes significantly over time limit (more than 6 minutes) (2) 9.1%	Student goes a little over time limit (about 3-5 minutes) or significantly under 18.2% (4)	Student is within 2 minutes of time limit 54.5% (12)	Presentation exactly meets time requirement 18.2% (4)
Answers questions	Student unable or unwilling to answer questions	Student attempts to answer questions, but in a rambling, insufficient manner	Student answers questions in an acceptable manner 54.5% (12)	Student willingly and concisely answers all relevant questions 45.5% (10)

ABET outcome h states that the student will demonstrate: An understanding of the need for and an ability to engage in self-directed continuing professional development

This outcome will be assessed both by the internship supervisor through interaction with the student and by Professor Terry through the internship report.

Assessment Rubric for ABET h: Prof. Terry

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Student seeks professional development opportunities through internship	Shows no interest in opportunities offered	Participates in opportunities only when required	Takes advantage of opportunities offered during internship 50% (11)	Actively seeks opportunities through internship supervisor 50% (11)
Student seeks professional development opportunities outside of internship	Participates in no professional or extra-curricular organizations	Participates in activities when required by a class (5) 22.7%	Takes advantage of activities offered by faculty 68.2% (15)	Actively seeks opportunities within professional societies or campus activities 9.1% (2)
Has knowledge of professional societies	Fails to identify or join professional societies	Identifies professional societies (9) 40.9%	Joins professional society 59.1% (13)	Joins professional society and actively engages on local chapter

ABET outcome k states that the student will demonstrate a: Commitment to quality, timeliness, and continuous improvement.

This outcome will be assessed by the internship field supervisor and sent to Professor Terry.

Assessment Rubric for ABET k:

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Demonstrates reliability	Does not reliably come to work on agreed upon schedule and misses meetings	Misses more than once a month without an acceptable reason; occasionally misses meeting	Rarely misses work and gives appropriate notification; never misses meetings (5) 22.7%	Only misses work for acceptable reasons and notifies supervisor in a timely manner; never misses meetings 77.3% (17)
Demonstrates commitment to timeliness	Often fails to arrive on time to work or meetings	Is late to work more than once a week or is late to or meetings	Rarely arrives late for work or meetings 18.2% (4)	Always arrives to work or meetings on time 81.8% (18)
Demonstrates commitment to quality	Quality of work is unacceptable	Quality of work needs significant improvement	Quality meets expectations for a student intern 45.5% (10)	Quality significantly exceeds expectations for a student intern 54.5% (12)
Demonstrates commitment to improvement	Does not take direction well; ignores feedback	Sometimes takes direction well; sometimes open to feedback	Usually takes direction well; usually incorporates feedback into work 27.3% (6)	Always takes direction well; open to feedback and incorporates into work 72.7% (16)
Would you hire this student?	no	Possibly after graduation if significant growth occurs	Would consider for an open position. 13.6% (3)	Absolutely, with no reservations. 86.4% (19)

This course also meets the UW-Green Bay general education learning outcome for Writing Emphasis

Assessment Rubric for Writing Emphasis: Term paper is assessed by Prof. Terry

N = 22	Unsatisfactory	Developing	Satisfactory	Exemplary
Paper includes all required components	Only two or three components are covered and not all at adequate level	Most components are included and most are at adequate level (3) 13.6%	Paper includes all required components 45.5% (10)	Paper gives thorough description of all components 40.9% (9)
Paper is well organized	Paper is not organized at all	Paper has some organization, but inconsistent	Paper is organized according to the questions asked, but not well organized overall (8) 36.4%	Paper is organized according to topics and overall into an easy to follow flow of information 63.6% (14)
Correct grammar and spelling are used throughout	Grammar and spelling are poor – many errors per page (4) 18.2%	Grammar and spelling are marginally acceptable – 2 to 3 errors per page 27.3% (6)	Grammar and spelling are good – no more than one error per page 36.3% (8)	Grammar and spelling are near perfect – no more than 3 errors in entire paper 18.2% (4)
Tables and figures illustrate concepts	No tables or figures are provided (2) 9.1%	One figure or table is given – a map of area	Tables and figures illustrate some concepts 59.1% (13)	Tables and figures completely support the text 31.8% (7)

Continuous improvement:

ABET c: Students generally did fine with ABET learning outcome c. Again, lab classes help students develop these skills, especially ET specific labs. More emphasis on quality lab reports may shift some students from the satisfactory to the exemplary mark. Two students scored “developing,” but this was a much more representative pool than the first semester ET 400 ran. We need to make sure students have completed sufficient ET credits before doing an internship to make sure they know what is expected.

ABET g Written and graphical communication: As before, w students articulated their experiences in an organized paper, emphasis needs to be placed on correct grammar and punctuation. Faculty need to better emphasize the need for correct grammar and spelling and they should inform students of the Writing Center on campus to help students with these skills.

ABET g oral communication: Student presentations were for the most part very good. Almost one-third of students did need help staying within a set time limit. Perhaps a tutorial on presentation preparation would help with this. Presentations were well organized and students demonstrated knowledge of their companies and projects.

ABET h: UW-Green Bay students struggle a bit with continuing professional development. Most students carry a full academic load and work part time to pay tuition. This leaves little time for other activities. While students did take advantage of opportunities offered through employment and by faculty, many were not yet able to join professional societies. Time and expense were the biggest factors and these are difficult to overcome. Faculty will continue to encourage such activities and offer on campus activities.

ABET k: Internship supervisors gave high marks to all students, both through phone interview and written feedback. Many of the students (roughly 20) were hired by the companies that sponsored their internships. UW-Green bay students have the strong work ethic that this region is known for and tend, overall, to be reliable and hard working.

Writing Emphasis: As expected, students overall wrote well organized papers with required content, but grammar and spelling continue to be a challenge. We may need to consider a course specific to technical writing skills or, at least, spend some time in lower level courses emphasizing writing grammatically correct English. We also need to direct students to the campus Writing Center for help.

2. How will you use what you’ve learned from the data that was collected?

For each assessed outcome in the above report, Continuous Improvement was included to describe how the assessment will be used to improve student learning in subsequent semesters.