

College of Engineering and Engineering Technology

Department of Electrical Engineering

B.S. in Electrical Engineering

Assessment Plan

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Submitted to the University Assessment Panel by:

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1. Introduction

The Department of Electrical Engineering has recently updated its assessment process. It is based on a combination of direct and indirect assessment of students' outcomes and on a cycle of continuous improvement of the program courses. This process aims to satisfy not only NIU Assessment requirements, but also requirements from ABET. ABET is a nonprofit organization that accredits colleges and university programs in natural science, computing, engineering, and engineering technology.

2. Student Learning Outcomes (SLOs)

We strive for our students to learn skills that enable them to

- apply engineering, science, and mathematics principles to identify, formulate, and solve engineering problems;
- apply engineering design techniques to produce solutions that meet specified needs with consideration of public health, safety, and welfare, while accounting for global, cultural, social, environmental, and economic factors;
- effectively communicate with a wide range of audiences
- recognize ethical responsibilities in engineering situations and make informed judgments considering the impact of engineering solutions in our environment and society;
- work effectively on a team to establish goals, plan tasks, and meet objectives, while creating a collaborative and inclusive environment;
- develop and conduct experiments, analyze and interpret data, reaching conclusions based on engineering judgment;
- learn and apply new knowledge.

3. Program-by-Baccalaureate Student Learning Outcomes Matrix

Our program student learning outcomes align with the eight baccalaureate student learning outcomes defined in www.niu.edu/bacreview as shown in the matrix below.

Program Student Learning Outcome	Baccalaureate Student Learning Outcomes							
	A. Global inter-connections and inter-dependencies	B. Intercultural competencies	C. Analyze human life and natural world inter-connections	D. Critical, creative, and independent thought	E. Communicate clearly and effectively	F. Collaborate with others	G. Quantitative and qualitative reasoning	H. Apply knowledge/skills creatively
1. Application of engineering, science, and mathematical principles							S	S
2. Application of engineering design techniques			M	S			S	S
3. Effectively communicate	M	S			S	S		
4. Recognize ethical responsibilities	S	M	S					
5. Work effectively on a team	M	M			S	S		
6. Develop experiments and analyze data			M	M			S	S
7. Learn and apply new knowledge				M			M	M
Overall	M	M	M	M	M	S	S	S
Note. (S) indicates “strongly support”, (M) indicates moderately supports (M), or (blank) indicates doesn’t support.								

4. Curriculum Map

Course	Program Student Learning Outcomes						
	1. Application of engineering, science, and mathematical principles	2. Application of engineering design techniques	3. Effectively communicate	4. Recognize ethical responsibilities	5. Work effectively on a team	6. Develop experiments and analyze data	7. Learn and apply new knowledge
ENGL103			D				B
MATH229	B						
PHYS253	B						
UEET101		B		B			B
ENGL203			D				D
MATH230	D						
PHYS273	D						
CSCI240	B	B					
MATH232	P						
CHEM210	B				B	B	
ELE210	B	B			B	B	
ISYE335	B					B	
ELE250	B	B			B	B	
MATH336	D						
ELE340	D	D			B	D	
PHYS283	P						
COMS100			P				
ELE315	D	D					
ELE330	D	D			D	D	
ELE335	D	D					
ELE356	D	D			D	D	
ISYE220	B						
ELE360	P	D			D	D	
ELE370	P	D					
ELE380	P	D			D	D	

Course	Program Student Learning Outcomes						
	1. Application of engineering, science, and mathematical principles	2. Application of engineering design techniques	3. Effectively communicate	4. Recognize ethical responsibilities	5. Work effectively on a team	6. Develop experiments and analyze data	7. Learn and apply new knowledge
MEE209	B						
ELE395		D	D	D	D		D
ELE495	P	P	P	P	P	P	P
ELE496	P	P	P	P	P	P	P
<i>Note.</i> Course supports the outcome at the B=beginning, D=developing, or P=proficient level.							

5. Assessment Methods

The Department of Electrical Engineering Assessment process is based on a combination of direct and indirect assessment of students' outcomes and on a cycle of continuous improvement of the program courses.

Section 5.1 contains tables explaining how the direct and indirect assessments are performed and how they result in the assessment of SLOs.

Section 5.2 explains how the results of the direct and indirect assessments and the final SLOs' assessments are used for continuous improvement of our courses.

Section 5.3 contains flowcharts that summarize the whole Assessment Process.

5.1 Direct and Indirect Assessments and the Assessments of Student Learning Outcomes

Assessment Method	Explanation					
	Description	Student-Level Achievement ^a	Program-Level Target ^b	When Data Will be Collected	Person Responsible	SLOs Covered
Course Assessment Surveys of C.C.C.s (Indirect Method)	<p>Each course has several Course Core Competencies (C.C.C.) that are specific to the content being taught in the course.</p> <p>The C.C.C.s are listed in every course syllabus and are mapped into each of the programs SLO listed in Section 2.</p> <p>Students in every course are surveyed to assess their opinion about how well the course improved their understanding of each of the C.C.C.s.</p> <p>Students respond with “Strongly Agree”, “Agree”, “Disagree”, or “Strongly Disagree” to each C.C.C. question. Each answer is mapped into a 1-5 scale as follows: 5-“Strongly Agree” 4-“Agree” 2-“Disagree” 1-“Strongly Disagree” and the average of responses (the Survey Score for the C.C.C.) is computed.</p>	There is no student-level achievement for this assessment method.	A Survey Score of at least 3.5 is aimed for each C.C.C.	<p>Within the last 2 weeks for the course, every offering.</p> <p>Assessment Committee prepares questionnaires and administers them during class (or over the internet if class is online).</p>	Assessment Committee.	All of them.

Assessment Method	Explanation					
	Description	Student-Level Achievement ^a	Program-Level Target ^b	When Data Will be Collected	Person Responsible	SLOs Covered
Direct Assessment of C.C.C.s	<p>Students solve at least one assignment (homework, quizzes, exams) for each C.C.C. listed in the syllabus. Generally, there are many assignments for each C.C.C. since students are required to practice the skills being learned.</p> <p>At the end of the semester, the instructor computes how many students have reached the student-level achievement level for an assignment that assesses the C.C.C.</p> <p>The ratio of students that achieved the target level of performance is multiplied by 5.0, generating a score between 0.0 and 5.0. This is called the Activity Score for the C.C.C.</p>	A student is considered to have achieved the student-level target if he/she scores at least 60% of the assignment maximum score.	<p>An Activity Score of at least 3.5 is aimed for each C.C.C.</p> <p>(an Activity Score greater than 3.5 means that more than 70% of students have scored at least 60% of the assignment.)</p>	During the course of the semester.	Instructor	All of them.

Assessment Method	Explanation					
	Description	Student-Level Achievement ^a	Program-Level Target ^b	When Data Will be Collected	Person Responsible	SLOs Covered
Assessment of SLOs	<p>Each C.C.C., its Survey Score and its Activity Score are entered into a <u>Faculty Rubric</u>. In this rubric, each C.C.C. is mapped into each of the programs SLO listed in Section 2.</p> <p>Instructor decides weights for each C.C.C. Weights add to 1.0.</p> <p>The weighted average of Survey Scores are computed to produce the <u>Average Survey Score for the SLO</u>.</p> <p>The weighted average of Activity Scores are computed to produce the <u>Average Activity Score for the SLO</u>.</p>	There is no student-level achievement for this assessment method.	An Average Survey Score of at least 3.5 and an Average Activity Score of at least 3.5 is aimed for each SLO.	At the end of the semester.	Instructor	All of them.
<p><i>Note.</i> ^a Student-level target is the score or performance an individual student must demonstrate to say the student met the student learning outcome.</p> <p>^b Program-level target is the percent of all students that must demonstrate they meet the student learning outcome.</p>						