College of Engineering and Engineering Technology

Department of Engineering Technology

B.S. in Engineering Technology

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Submitted to University Assessment Panel

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Academic Degree Programs Assessment

Part I: Assessment Plan

1. Introduction

As technology in industry undergoes rapid changes and advances, all aspects of the education within the Department of Engineering Technology must also undergo a continual improvement process. As we have seen in industry, new advances in process and implementation must find their way to the manufacturing floor to produce goods in a more cost effective manner, using as few of our resources as possible. If this does not occur, regional industry will find themselves far behind the rest of the world. Technology education must align itself with the industry that hires its students. To produce students who are desirable in industry and who can make an impact at their companies from day one, we, as educators, must make sure our program reflects current industrial trends. In addition, we, as educators, need to ensure our students are graduating with the best possible skills to get them into industry and to succeed and grow once they are in industry. To accomplish this task, the NIU Department of Engineering Technology maintains a rigorous improvement plan. The cornerstone of this plan is the assessment tools used and the mode in which the faculty is involved in completing the assessment loop and ensuring proper alterations to the programs, courses, and laboratories are made. The assessment loop used by the Department of Engineering Technology is relatively straight forward; however, multiple forms of assessment, both direct and indirect are employed at various stages during the academic year. To complete the continuous assessment loop, the Department follows the following steps:

- Assess current objectives and outcomes for program and courses in a number of different modes,
- Compile all of the results from all constituencies of the Department,
- Share results with all faculty members in all emphases,
- Close the loop – faculty and chair use assessment materials to update objectives and outcomes for emphasis and courses,
- Assess graduated student job placement and feedback from the industry.

2. Student Learning Outcomes (SLOs)

The following student learning outcomes are used by the undergraduate programs in the Department. Graduates of the program will
1. Demonstrate well-balanced knowledge of the theory and practice in the areas of technology.
2. Seek and apply creative and analytical insight into the solution of engineering-type problems.
3. Utilize technical communications in both oral and written forms.
4. Utilize laboratory based skills and modern engineering equipment used in industry.
5. Demonstrate leadership and management abilities through teamwork and projects.

The above SLOs are the core abilities we want our students to achieve, and the department has developed a full assessment profile to determine, from the various constituent groups, if they have been, or to what extent they are, met.

3. Program-by-Baccalaureate Student Learning Outcomes Matrix

Table P-1 is a program-by-baccalaureate SLOs matrix. Our program SLOs support all eight baccalaureate SLOs.

Table P-1: Program-by-baccalaureate student learning outcomes matrix

Program Student Learning Outcome	Baccalaureate Student Learning Outcomes							
	A. Integrate knowledge of global interconnections and interdependencies	B. Exhibit intercultural competencies with people of diverse backgrounds and perspectives	C. Analyze issues that interconnect human life and the natural world	D. Demonstrate critical, creative, and independent thought	E. Communicate clearly and effectively	F. Collaborate with others to achieve specific goals	G. Use and combine appropriate quantitative and qualitative reasoning skills to address questions and solve problems	H. Synthesize knowledge and skills relevant to one's major or particular fields of study and apply them creatively to develop innovative outcomes
1. Demonstrate well-balanced knowledge of the theory and practice in the areas of technology.	M		M	M			S	S
2. Seek and apply creative and analytical insight into the solution of engineering-type problems.	M		M	M			S	S
3. Utilize technical communications in both oral and written forms.		M			S			
4. Utilize laboratory based skills and modern engineering equipment used in industry.							S	
5. Demonstrate leadership and management abilities through teamwork and projects.		S			M	S		
Overall	M	S	M	M	S	S	S	S

Note. Gauge whether each program outcome strongly supports (S), moderately supports (M), or doesn't support (leave blank) each baccalaureate learning outcome

4. Curriculum Map

Table P-2 is a curriculum map that illustrates core required courses that cover our five program SLOs at beginning (B), developing (D), and proficient (P) levels. TECH 477/478 sequence (Engineering Technology Senior Design Project I/II) and TECH 496 (Industrial Project Management) are the capstone courses in the program. We cover five program SLOs with at least one course at the beginning, developing, and proficient levels.

Table P-2: Curriculum map

Course		Program Student Learning Outcomes				
		1. Demonstrate well-balanced knowledge of the theory and practice in the areas of technology.	2. Seek and apply creative and analytical insight into the solution of engineering-type problems.	3. Utilize technical communications in both oral and written forms.	4. Utilize laboratory based skills and modern engineering equipment used in industry.	5. Demonstrate leadership and management abilities through teamwork and projects.
TECH 265	Basic Manufacturing Processes	B	B			
TECH 262	Machine Production Processes		B			
TECH 326	Fluid Power Technology			B	B	B
TECH 391	Industrial Quality Control	D		D		
TECH 393	Structure and Properties of Materials		D			
TECH 365	Metrology				D	
TECH 404	Supervision in Industry					D
TECH 477/478 (Capstone)	Engineering Technology Senior Design Project I/II	P	P	P	P	P
TECH 496 (Capstone)	Industrial Project Management	P		P		P
TECH 492	Manufacturing Distribution Applications		P			
TECH 415	Applied Industrial Experimental Analysis				P	
Note. Course supports the outcome at the B=beginning, D=developing, or P=proficient level.						

5. Assessment Methods

Table P-3 explains the methods used in direct and indirect assessments. For the direct assessments, we used course assignments, quizzes, labs, reports, and exams to evaluate student performance in the five SLOs. We set a
- **Student-level target** of "a student achieves Advanced (A), Proficient (B), or Satisfactory (C) levels in each of the assessments" and a
- **Program-level target** of "70% of students meet or exceed desired performance levels" in the core required courses.

For the indirect assessment, we used surveys given to 1) students in the core required courses, 2) graduating senior students, 3) students completing internship, 4) alumni, and 5) internship company supervisors to evaluate student achievement in the five SLOs. We set a
- **Program-level target** of "average responses meet or exceed 80%," which was 2.4 if three-point scales were used and 4.0 if five-point scales were used in the survey.

Table P-3: Explanations of assessment methods

Assessment Method	Explanation					
	Description	Student-Level Achievement [a]	Program-Level Target [b]	When Data Will be Collected	Person Responsible	SLOs Covered
Direct assessment						
Assignments, projects, quizzes, and exams	Each semester, the department faculty determine which of the SLOs each class will cover. Students are questioned as to the level of coverage of the outcomes in each class.	70% or above	70% of above	End of each semester	Department faculty	1,2,3,4,5
Capstone (senior projects) experience	During each semester, faculty work with the student teams and, thus, gain understanding into their knowledge and abilities during the year-long capstone experience. At the end of each semester, the faculty and industry representatives attend presentations of the project reports. During the presentations, faculty and industry representatives have a first-hand observation of how the students are meeting the objectives in the culminating course in their discipline.	70% or above	70% or above	End of each semester	Faculty coordinator of capstone projects course	1,2,3,4,5
Indirect assessment						
Student course survey	Each semester, the assessment coordinator surveys students in each class about how well they learned materials related to the SLOs.	-	Average 80% or above	End of summer	Assessment coordinator	1,2,3,4,5
Senior exit survey/interview	The Department administers exit survey/interviews to graduates through an independent source. The instrument examines aspects of the students' time at NIU and specifically in the Department, while questioning the general emphasis, advising, financial aid, and many other aspects. This instrument is important due to face-to-face presentation between a neutral party and the student (alone). The facilitator prompts students to expand on various issues and seeks examples.	-	Average 80% or above	End of each semester	Department chair	1,2,3,4,5

Assessment Method	Explanation					
	Description	Student-Level Achievement [a]	Program-Level Target [b]	When Data Will be Collected	Person Responsible	SLOs Covered
Internship survey (intern) Internship survey (employer)	Departmental students completing the Internship (TECH 409) course are required to complete an internship survey. This tool examines skills the student brings to the company and how the student is able to assimilate into the company setting. Two surveys are used, one for students and one for the student's company manager.	-	Average 80% or above	End of each semester	Internship instructor	1,2,3,4,5
Alumni survey	Assessment of the departmental alumni in all of the undergraduate emphases. Each year the university conducts an alumni survey for all of the graduates who have been out for one year; additional surveys are conducted on a rotating basis at five years and nine years after graduation. This survey looks at both programmatic objectives and alumni oriented questions such as employment and postgraduate education.	-	Average 80% or above	End of summer	Assessment coordinator	1,2,3,4,5
Note. [a] Student-level target is the score or performance an individual student must demonstrate to say the student met the student learning outcome. [b] Program-level target is the percent of all students that must demonstrate they meet the student learning outcome.						

Table P-4 maps the assessment methods to the SLOs. We performed formative direct assessment in the beginning- and developing-level courses and summative assessment in the proficient-level courses. Surveys are summative indirect assessments except for the student course surveys and internship surveys, which can be either formative or summative.

Table P-4: Assessment methods-by-outcomes matrix

Assessment Methods		Program Student Learning Outcomes				
		1. Demonstrate well-balanced knowledge of the theory and practice in the areas of technology.	2. Seek and apply creative and analytical insight into the solution of engineering-type problems.	3. Utilize technical communications in both oral and written forms.	4. Utilize laboratory based skills and modern engineering equipment used in industry.	5. Demonstrate leadership and management abilities through teamwork and projects.
Direct assessment						
Assignments, projects, quizzes, and exams						
Beginning	TECH 265	F, D	F, D			
	TECH 262		F, D			
	TECH 326			F, D	F, D	F, D
Developing	TECH 391	F, D		F, D		
	TECH 393		F, D			
	TECH 365				F, D	
	TECH 404					F, D
Proficient	TECH 477/478 (Capstone)	S, D	S, D	S, D	S, D	S, D
	TECH 496 (Capstone)	S, D		S, D		S, D
	TECH 492		S, D			
	TECH 415				S, D	
Indirect assessment						
Student course survey		F/S, I	F/S, I	F/S, I	F/S, I	F/S, I
Senior exit survey/interview		S, I	S, I	S, I	S, I	S, I
Internship survey (intern)		S, I	F/S, I	F/S, I	F/S, I	F/S, I
Alumni skill survey		S, I	S, I	S, I	S, I	S, I
Internship survey (employer)		S, I	S, I	S, I	S, I	S, I
Note. F=formative assessment, S=summative assessment, D=direct assessment, and I=indirect assessment. See the paragraph above for an explanation of each type of assessment.						