WICHITA STATE UNIVERSITY

Program Review Self-Study Template

Academic unit: Engineering Technology

College: Engineering

Date of last review N/A

Date of last accreditation report (if relevant) N/A

List all degrees described in this report (add lines as necessary)

Degree: BS Engineering Technology CIP* code: 15.00

Degree: _____ CIP code: _____

Degree: _____ CIP code: _____

*To look up, go to: Classification of Instructional Programs Website, http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55

Faculty of the academic unit (add lines as necessary)

Name	Signature
Kara McCluskey (Engineering Educator)	_____
Perlekar Tamtam (Engineering Educator)	_____
Taha Aldoss (Engineering Educator)	_____
Mahdir Hariri (Engineering Educator)	_____

Submitted by: Deepak Gupta (Director & Associate Professor) _____ Date ____

1. **Departmental purpose and relationship to the University mission (refer to instructions in the WSU Program Review document for more information on completing this section).**

a. University Mission:

The mission of Wichita State University is to be an essential educational, cultural, and economic driver for Kansas and the greater public good.

b. Program Mission (if more than one program, list each mission):

The mission of the BS in Engineering Technology program is to support economic development in the state of Kansas and beyond through innovative and experience based curriculum aligned with current and future industry needs.

c. The role of the program (s) and relationship to the University mission: Explain in 1-2 concise paragraphs.

The role of the BS in Engineering Technology (ET) program is to provide an undergraduate education to its students that will prepare the graduates to:

1. Identify, analyze, and solve broadly defined engineering technology problems in mechatronics, technology management, or environmental sustainability.
2. Engage in professional development activities through training, certification, or advance degree in engineering technology or related fields.
3. Demonstrate the commitment to address professional and ethical responsibilities including a respect for diversity.

The role of the ET program is consistent with the mission of the College of Engineering and Wichita State University. It ensures that the program's objectives are in alignment with the university's and college's mission of experiential learning. Thus there is an emphasis on case studies and real world problem solving in the education of our graduates. This experience includes two industry-based semester-long capstone design projects in the undergraduate programs. Organizations such as CNH Industrial, Advatek LLC, Textron Aviation, and Cargill have also sponsored projects.

d. Has the mission of the Program (s) changed since last review? ☐ Yes ☒ No
   i. If yes, describe in 1-2 concise paragraphs. If no, is there a need to change?

   It is the initial review report for this program.

e. Provide an overall description of your program (s) including a list of the measurable goals and objectives of the program (s) (both programmatic and learner centered). Have they changed since the last review?

☐ Yes ☒ No

If yes, describe the changes in a concise manner.

Undergraduate Programs

The BS in Engineering Technology program focuses on the design, hands-on engineering technology fundamentals, instrumentation, mathematics, science, and practical design principles needed to equip students for employment or further education. Engineering technologists bridge the gap between management and engineering operations while focusing on engineering applications. Currently, the BS in Engineering Technology program includes a minimum of 131 credit hours of required course work. The program is designed such that the students can complete their degree in 4 years. The program consists of general education, core areas in engineering, required courses in the engineering technology, and five 3-credit hour technical electives. The students also complete two industry-based senior design projects over the last two semesters of their study. The senior design projects are evaluated by industry and faculty.

The BS in Engineering Technology program's Educational Objectives (PEOs) are aimed to ensure that the graduates will have:

1. Identified, analyzed, and solved broadly defined engineering technology problems in mechatronics, technology management, or environmental sustainability.
2. Engaged in professional development activities through training, certification, or advance degree in engineering technology or related fields.
3. Demonstrated the commitment to address professional and ethical responsibilities including a respect for diversity.

Each semester students are required to meet with their advisors before they register for classes. During this consultation, the student's records file is available. Also at this time, lists of approved elective courses in humanities and fine arts, social and behavioral sciences, natural sciences, and in-department and out-of-department technical electives are available. Through the use of a computer-generated degree audit and other materials in the file, the advisor ensures that the student is obtaining appropriate credit in engineering design, mathematics, basic science, and humanities and social sciences.

Additionally, the director of the Engineering Technology program performs a graduation check of all seniors in the semester prior when the student is expected to graduate. The director uses a standardized check-sheet to ensure that a student will meet all graduation requirements before he/she graduates.

The Engineering Technology program undergoes continuous refinement with input from faculty, students, alumni, and the Industrial Advisory Board. The curriculum, lab development, and other educational opportunities are analyzed and structured to meet the PEOs of the programs.

Program goals

The enrollment and number of graduates for Engineering Technology program are expected to grow steadily. The goals for next three years are as follows.

FY	UG student enrollment (Fall census)	UG graduates
2015	75	10
2016	100	15
2017	115	20

2. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

Last 3 Years	Tenure/Tenure Track Faculty (Number)	Tenure/Tenure Track Faculty with Terminal Degree (Number)	Instructional FTE (#): TTF= Tenure/Tenure Track GTA=Grad teaching assist O=Other instructional FTE			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads – by FY
			TTF	GTA	O			
Year 1→ (FY 2013)					0.5	68	14	N/A
Year 2→ (FY 2014)					1.5	171	40	N/A
Year 3→ (FY 2015)	1	1	0.5		1.83	513	64	N/A
Total Number Instructional (FTE) – TTF+GTA+O						SCH/ FTE	Majors/ FTE	Grads/ FTE
					↓			
Year 1→ (FY 2013)					1.0	68	14	N/A
Year 2→ (FY 2014)					1.5	114	26	N/A
Year 3→ (FY 2015)					2.33	220	27	N/A

Scholarly			Number					No.	No. Grants	

Productivity	Number Journal Articles		Number Presentations		Conference Proceedings		Performances			Number of Exhibits		Creative Work		No. Books	Book Chaps.	Awarded or Submitted	$ Grant Value
	Ref	Non-Ref	Ref	Non-Ref	Ref	Non-Ref	*	**	***	Juried	****	Juried	Non-Juried				
Year 1 (FY13)																	
Year 2 (FY14)																	
Year 3 (FY15)	1		4		4											3 (1 award)	27,700

UG Program - BSET

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

*From the table on page 3, indicate number of faculty (and instructional FTE) teaching in the undergraduate program.

a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession plans, course evaluation data, etc.

BSET program consists of five permanent faculty members, two dedicated full time to Engineering Technology, one 50% shared with the Electrical Engineering and Computer Science Department, and two 50% shared with the Mechanical Engineering (ME) Department. The two faculty that are shared with ME, will start at the beginning of the Fall 2015 semester. These positions will focus on Mechatronics and Renewable Energy Technology concentrations and are expected to eliminate the need for adjunct instructors. During Fall 2014 semester, the program also used two adjunct instructors to cover courses in the program.

The five faculty members in the program have adequate expertise and experience in delivering the required curriculum. Through their service and professional development activities, the faculty bring a lot of examples to their classrooms and benefit the students.

The program supports the faculty by providing travel support for faculty who bring recognition to the program. Based on the faculty evaluations for the last two years, the faculty have consistently met the teaching requirements.

3. Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students. Complete this section for each program (if more than one). Attach updated program assessment plan (s) as an appendix (refer to instructions in the WSU Program Review document for more information).

a. For undergraduate programs, compare ACT scores of the majors with the University as a whole.

Last 3 Years	Total Majors - From fall semester			ACT – Fall Semester (mean for those reporting)		
	ET			ET		All University Students - FT
Year 1→ (2012)	14			19.0		23.0
Year 2→ (2013)	40			21.3		23.0
Year 3→ (2014)	64			N/A		N/A

KBOR data minima for UG programs: ACT≤20 will trigger program.

b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs.

N/A

c. Identify the principal learning outcomes (i.e., what skills does your Program expect students to graduate with). Provide aggregate data on how students are meeting those outcomes. Data should relate to the goals and objectives of the program as listed in 1e. Provide an analysis and evaluation of the data by learner outcome with proposed actions based on the results.

Each course in the Engineering Technology program has clearly identified learner outcomes communicated in the syllabus.

Undergraduate Programs

At the undergraduate level, the ABET criterion is used as part of assessment. Based upon the ABET accreditation process, the student learning outcomes are assessed by measuring and ensuring that each undergraduate student in the BS in Engineering Technology program has:

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 objectives;
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; and
k. a commitment to quality, timeliness, and continuous improvement.

In order to assess the full range of ABET learning outcomes; assessments were allocated to specific courses. The allocations were made such that each outcome was assessed in multiple courses and each core course assessed multiple outcomes (Table 1).

Table 1. Allocation of ABET a-k student outcomes to specific required courses for the BSET program

	Student Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
Core Courses (required for all the students)											
ENGT 302	x	x	x		x						
ENGT 401*			x	x	x	x	x	x	x		x
ENGT 402*				x	x	x	x	x	x	x	x
Concentration in Engineering Technology Management											
ENGT 440	x									x	
ENGT 441		x							x		
Concentration in Mechatronics Technology											
ENGT 303	x					x	x				
ENGT 320		x	x				x				
ENGT 497		x	x				x				
Concentration in Renewable Energy Technology											
ENGT 303	x					x	x				
ENGT 320		x	x				x				
ENGT 360							x			x	
ENGT 497		x	x				x				

**Senior design course*

Each course reported the assessment of specific learning outcomes using a standard format (Table 2). Table 2 shows that each learning outcome was assessed multiple times in multiple forms in this course. The performance is the ratio of points earned to total point available for the specific measure.

Table 2. Example of learning outcome assessment assigned to a specific course (ENGT 303)

Student Work Assessment Rubric for ABET outcome g

Apply written, oral, and graphical communication in both technical and non-technical environments as demonstrated in the final team project

Course: ENGT 303 Introduction to Fluids | Instructor: Kara McCluskey
Semester: Fall 2014 | Assignment: Final Project

	1 Highly Unsuccessful	2 Moderately Unsuccessful	3 Neither Successful nor Unsuccessful	4 Moderately Successful	5 Highly Successful	**Overall Score**
Total count:	*0.0*	*0.0*	*8.0*	*4.0*	*15.0*	***70% Average***
Suboutcome:	Final Report - written communication					
Suboutcome Count:			4		5	*4.1*
Performance Indicators for Suboutcome: (Specific qualifications associated with each rating)	The student demonstrates no research of topic. Reader gains no insights.	The student demonstrates minimal research of topic. Reader is confused or may be misinformed.	The student demonstrates a reasonable amount of research combined with knowledge gained from class to produce a general analysis of a significant topic. Reader gains few insights.	The student demonstrates a reasonable amount of research combined with knowledge gained from class to produce a basic analysis of a significant topic. Reader gains some insights.	The student combined all knowledge from class with significant research in the topic to produce an in-depth analysis of a significant topic. Reader gains important insights.	
Suboutcome:	Final Presentation - Oral communication					
Suboutcome Count:				4	5	*4.6*
Performance Indicators for Suboutcome: (Specific qualifications associated with each rating)	The presentation did not demostrate an ability to effectively communicate orally	The presentation was unorganized and unrehearsed. The speaker did not engage the audience at all.	The presentation was not well organized or rehearsed. Visual aids were not provided or were not meaningful. The speaker did not engage the audience.	The presentation had good organization, was rehearsed, and visual aids were provided for the audience. The speaker somewhat engaged the audience.	The presentation was well organized, well rehearsed, and had good visual aids for the audience. The speaker fully engaged the audience.	
Suboutcome:	Final Report and Presentation - graphical communication					
Suboutcome Count:			4		5	*4.1*
Performance Indicators for Suboutcome: (Specific qualifications associated with each rating)	The student did not use graphics in the report and presentation.	The student used graphics in the report and presentation but they were not used properly and added confusion to the report and/or presentation.	The student used graphics in both report and presentation but the graphics did not add to the quality of the report and/or presentation.	The student demonstrates a reasonable amount of effective use of graphics in both report and presentation.	The student demonstrates a highly effective use of graphics in both the report and presentation.	

Feedback Loop:

Results of evaluation processes for the student outcomes and other available information are systematically used as input in the continuous improvement of the program. The results of course assessments are summarized by respective assessment leads for the three concentrations and submitted to the program director at the end of each semester. The survey of graduating seniors and employers are submitted directly to the program director. After analysis of the results, the documents are submitted to the assessment coordinator for the college. Trend analysis are performed at the end

of each academic year and maintained by the program director and assessment coordinator for the college.

Criterion /Target for assessment

The target level for achievement is set at 70% for individual ABET outcomes as well as for the learning outcomes identified for the program. The target level is reviewed by the program curriculum committee periodically. The 70% value was chosen based upon the nature of the individual items used in courses as the basis for assessment. These are typically items that are very discriminating in terms of competency and thus do not include the easier elements that may makeup some elements of homework assignments or some test questions.

Tables 3a – 3k summarize the assessment of program learning objectives.

Table 3a. Summary results for Outcome a

Ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 302	Rubric measure of one assignment on application of Newtonian Laws	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		-	91% (11)
ENGT 303	Rubric measure of two design problems: hydraulic sizing and energy saving calculations	Every year				69% (9)	-
ENGT 440	Rubric measure of final project on application of Microsoft Project and other knowledge	Every year				100% (2)	-
Evaluation and Actions							
First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 83%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements: • Based on the results from direct assessments in ENGT 303, it is proposed to incorporate problem solving techniques and engineering process into the curriculum in the first 2 weeks of the course. Students will practice using the techniques in problems early in the semester and continue using the process throughout the semester.							

Table 3b. Summary results for Outcome b

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

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 302	Rubric measure of one homework and one test question on calculation of force components	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		-	82% (11)
ENGT 320	Rubric measure of one homework question on charge transfer and one test question on average current flow	Every year				-	79% (14)
ENGT 441	Rubric measure of project report on learning from three case studies	Every year				-	71% (7)
ENGT 497	Rubric measure of assignment on application of electrical machines	Every year				78% (9)	-

Evaluation and Actions

First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 78%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements:

• In Spring 2015, it was observed by the ENGT 302 course instructor that the students did not perform very well on with respect to calculus based problems. In response, an additional session was offered to review calculus fundamentals applicable to the course. As a result, their performance was significantly better on the final assessment of *Outcome b*.

• In Spring 2015, based on the observation by the ENGT 320 course instructor, this course was revised to include advanced calculus based problems. As a result, the students' performance was significantly better on the final assessment of *Outcome b*.

Table 3c. Summary results for Outcome c

Ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 302	Rubric measure of one assessment on lab report: statics of trusses	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		-	73% (11)
ENGT 320	Rubric measure of two labs: finding the difference between EMF and Voltage; and measurement of active, reactive power, apparent power, and power factor	Every year				-	71% (14)
ENGT 401	Rubric measure of two assessments on the final project: conduct, analyze, and interpret experiments; and apply experimental results to improve processes	Every semester				83% (5)	50% (2)
ENGT 497	Rubric measure of lab report on working of electrical machines	Every year				78% (9)	-
Evaluation and Actions							
First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 74%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements: • Based on the results from direct assessments in ENGT 320 (71% students with a score of ≥ 4) in Spring 2015, it is proposed to include new AC circuit labs using LabVolt equipment to improve students' ability to interpret results of the experiments. • In Spring 2015, in response to the assessment results for ENGT 401 (50%students with a score of ≥ 4), two guest speakers were invited to discuss data collection, statistical analysis, and six sigma techniques. The first guest speaker was the engineering technology director Dr. Gupta, who gave examples of data gathering methods and statistical analysis techniques. The second speaker was Mr. Randal Atkeisson from Textron Aviation and a black belt in Six Sigma, who spoke on six sigma techniques. Mr. Atkeisson also provided feedback on the group's mid-semester progress. The lessons covered during these presentations will be used in the future semesters as standard learning assignments.							

Table 3d. Summary results for Outcome d

Ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 401	Rubric measure of one assessment on the final project report: design systems, components, or processes	Every semester	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		80% (5)	100% (2)
ENGT 402	Rubric measure of one assessment on the final project report: design systems, components, or processes	Every semester				75% (4)	100% (4)
Evaluation and Actions							
First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 87%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.							

Table 3e. Summary results for Outcome e

Ability to function effectively as a member or leader on a technical team

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 302	Rubric measure of one assessment on final project report: function as a member or leader on a technical team	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		-	91% (11)
ENGT 401	Rubric measure of one assessment on final project report: function as a member or leader on a technical team	Every semester				60% (5)	50% (2)
ENGT 402	Rubric measure of one assessment on final project report: function as a member or leader on a technical team	Every semester				100% (4)	75% (4)

Evaluation and Actions

First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 81%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements:

• In Fall 2014, it was observed that two groups in the senior design class (ENGT 401) were struggling with functioning as a group to achieve the goals of the project (60% students with a score of ≥ 4). In response, more time was spent in the beginning of the semester on reviewing strategies the students can use to work better in a group setting. As a result, the same students who were now in ENGT 402 in the Spring 2015 semester performed much better (75% students with a score of ≥ 4).

• In Spring 2015, in response to the assessment results for ENGT 401 (50% students with a score of ≥ 4), additional time was spent discussing effective team work strategies. After groups were formed for the semester projects, teams discussed their individual strengths and weaknesses and how they could use the team member's strength to help the group. In future semesters, additional team building activities and team work strategies are being worked into the curriculum to improve the percentage of students scoring satisfactorily on *Outcome e*.

Table 3f. Summary results for Outcome f

Ability to identify, analyze, and solve broadly-defined engineering technology problems

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 303	Rubric measure of two test problems: application of energy equation and Bernoulli's principle	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		72% (9)	-
ENGT 401	Rubric measure of two assessments on final project report: problem statement; and analysis method and solution	Every semester				60% (5)	50% (2)
ENGT 402	Rubric measure of two assessments on final project report: problem statement; and analysis method and solution	Every semester				75% (4)	75% (4)

Evaluation and Actions

First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 69%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements:

• Based on the results from direct assessments, it is proposed to incorporate problem solving techniques and the engineering process into the curriculum in the first two weeks of classes in ENGT 303 and ENGT 401. Students will practice using the techniques in problems early in the semester and continue using the process throughout the semester.

Table 3g. Summary results for Outcome g

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

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 303	Rubric measure of written, graphical, and oral communication skills in final project report and presentation	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		70% (9)	-
ENGT 320	Rubric measure of written communication on two project reports	Every year				-	71% (14)
ENGT 360	Rubric measure of written, graphical, and oral communication skills in research paper 2 report and presentation	Every year				79% (9)	-
ENGT 401	Rubric measure of written, graphical, and oral communication skills in final project report and presentation	Every semester				87% (5)	60% (2)
ENGT 402	Rubric measure of written, graphical, and oral communication skills in final project report and presentation	Every semester				75% (4)	78% (4)
ENGT 497	Rubric measure of written, graphical, and oral communication skills in two project reports and presentations	Every year				89% (9)	-

Evaluation and Actions

First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 77%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements:

• Based on the results from direct assessments in ENGT 303 (70% students with a score of ≥ 4) in Spring 2015, a mid-semester project will be added to the curriculum to allow students to practice and improve their written, oral and graphical communication skills prior to the final project.

• In Fall 2014, ENGT 360 was taught in a blended format with only one hour of face-to-face time each week for a 16-week course. Based on the direct feedback by the students on Student Perception of Teaching Evaluation (SPTE) forms, it was observed that the students did not understand that a blended class required more work on their part outside of class time to complete the objectives (79% students with a score of ≥ 4)) of the course. The students were frustrated with the amount of time they were required to spend on projects and assignments outside of class time. Next time, if the course is taught in a blended format, time will be spent in the first class period explaining what a blended class is and how much time outside of class they will be expected to spend. It will also be reflected in the syllabus so students can refer back to it throughout the semester.

Table 3h. Summary results for Outcome h

Understanding of the need for and an ability to engage in self-directed continuing professional development

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 401	Rubric measure of assignment on continuing professional development plan	Every semester	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		80% (5)	60% (2)
ENGT 402	Rubric measure of assignment on continuing professional development plan	Every semester				75% (4)	75% (4)
Evaluation and Actions							
First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 75%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements: • In Spring 2015, in response to the assessment results for ENGT 401 (60% students with a score of ≥ 4)), a class period was dedicated to improve the student's knowledge in this area. The students brainstormed different avenues available to working professionals to continue professional development. The class discussed different licenses and certifications that are useful in their intended field of study. After discussing the need for life-long learning, the students researched certifications in their area and developed a 5-year learning plan for themselves. This activity will be used as standard assignment in the future semesters.							

Table 3i. Summary results for Outcome i

Understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 401	Rubric measure of one assessment on demonstration of professional and ethical responsibilities	Every semester	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		80% (5)	50% (2)
ENGT 402	Rubric measure of one assessment on demonstration of professional and ethical responsibilities	Every semester				100% (4)	100% (4)
ENGT 441	Rubric measure of progress on and quality of the final project report	Every year				-	86% (7)
Evaluation and Actions							
First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 86%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements: • In spring 2015, in response to the indirect input (provided by the ENGT 441 courses instructor in Spring 2014) on students' performance on topics related to *Outcome i*, new case studies were included to improve the students' understanding. As a result, their performance was significantly better on the assessment of outcome i (86% students with a score of ≥ 4)).							

Table 3j. Summary results for Outcome j

Knowledge of the impact of engineering technology solutions in a societal and global context

First 2-Year Evaluation Cycle				**Assessment Results**			
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**			
				Fa13	**Sp14**	**Fa14**	**Sp15**
ENGT 360	Rubric measure of two assessments: global and societal contest in research paper 2; and societal context in final project report	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	Period used to develop and refine assessments		67% (9)	-
ENGT 402	Rubric measure of global and societal context in final project	Every semester				75% (4)	75% (4)
ENGT 440	Rubric measure of final exam question on managers dependency on the culture	Every year				100% (2)	-
Evaluation and Actions							
First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the **extent of attainment of *Outcome a* as 74%**, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary. However, the faculty recommended the following improvements: • In Fall 2014, it was observed through the direct assessment that a few students struggled with how to choose a topic for a research paper focusing on the impact of engineering technology solutions in a societal and global context (67% students with a score of ≥ 4)). In response, in the future semesters, resources will be put on Blackboard giving students guidance on how to choose a research paper and how to decide if a source is legitimate.							

Table 3k. Summary results for Outcome k

Commitment to quality, timeliness, and continuous improvement

<table>
<tr><td colspan="4">First 2-Year Evaluation Cycle</td><td colspan="4">Assessment Results</td></tr>
<tr><td rowspan="2">Course</td><td rowspan="2">Assessment Method</td><td rowspan="2">Frequency</td><td rowspan="2">Performance Target</td><td colspan="4">Percent achieving ≥4 (sample size)</td></tr>
<tr><td>Fa13</td><td>Sp14</td><td>Fa14</td><td>Sp15</td></tr>
<tr><td>ENGT 401</td><td>Rubric measure of two assessments: project deadlines and quality of the final project report</td><td>Every semester</td><td rowspan="2">At least 70% of students will achieve a score of 4 or higher on a scale of 1-5</td><td colspan="2" rowspan="2">Period used to develop and refine assessments</td><td>90% (5)</td><td>60% (2)</td></tr>
<tr><td>ENGT 402</td><td>Rubric measure of two assessments: project deadlines and quality of the final project report</td><td>Every semester</td><td>75% (4)</td><td>75% (4)</td></tr>
<tr><td colspan="8">Evaluation and Actions</td></tr>
<tr><td colspan="8">First 2-Year Cycle: In summer 2015, the ET faculty computed the composite measurement of the extent of attainment of Outcome a as 78%, the weighted average of all assessment results during the 2-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.</td></tr>
</table>

d. Indicate whether the program is accredited by a specialty accrediting body including the next review date and concerns from the last review.

The Bachelor of Science in Engineering Technology program submitted the first ABET self-study report in Summer 2015. The ABET accreditation team is scheduled to visit in September 2015.

e. Provide a brief assessment of the overall quality of the academic program using the data from 3a – 3f and other information you may collect, including outstanding student work (e.g., outstanding scholarship, inductions into honor organizations, publications, special awards, academic scholarships, student recruitment and retention).

The undergraduate programs in Engineering Technology are regularly collecting data on learner outcomes. Core competency exams and satisfaction with core courses are assessed each year. Beginning in Spring 2015 all undergraduate students participate in at least one open house project presentation before they graduate.

Overall, the Engineering Technology program has a sound curriculum as evidenced by the data collected under assessment for the BSET program. There is a good assessment system for the undergraduate program. Most of the students also have coop/internships in their junior/senior year.

4. **Analyze the student need and employer demand for the program. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).**

a. Utilize the table below to provide data that demonstrates student need and demand for the program.

Undergraduate - BSET

Majors						Employment of Majors*						
Last 3 FYs – Su, Fl, and Sp	No. new applicants or declared majors	No. who enter or are admitted in the major	No. enrolled one year later	1 Year Attrition %	Total no. of grads	Average Salary	Employment % In state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	Projected growth from BLS**
Year 1→ (2013)	13	10			0							Current year only ↓
Year 2→ (2014)	37	13			0							
Year 3→ (2015)					7		43%				2	

Race/Ethnicity by Major***											Race/Ethnicity by Graduate***									
		NRA	H	AI/AN	A	B	NH/PI	C	MR	UNK	NRA	H	AI/AN	A	B	NH/PI	C	MR	UNK	

	Year 1→ (Fall 2012)	1	1	0	0	1	0	10	1	0	0	0	0	0	0	0	0	0	0	
	Year 2→ (Fall 2013)	7	7	1	2	2	0	19	0	2										
	Year 3→ (Fall 2014)																			

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: http://www.bls.gov/oco/ and view job outlook data and salary information (if the Program has information available from professional associations or alumni surveys, enter that data)

*** NRA=Non-resident alien; H=Hispanic; AI/AN=American Indian/ Alaskan Native; A=Asian; B=Black; NH/PI=Native Hawaiian/Pacific Islander; C=Caucasian; MR=Multi-race; UNK=Unknown

KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

Provide a brief assessment of student need and demand using the data from the table above. Include the most common types of positions, in terms of employment, graduates can expect to find.

The BSET program has graduated 7 students from the program. Two graduates entered into the Engineering Management master's program at WSU upon completion of their undergraduate program. Four graduates obtained full time employment in their major field of study, three in Kansas and one in Nebraska. One student returned to Saudi Arabia and obtained full time employment in his major field of study and one student has not yet obtained full time employment. Students obtained employment at Westar, Cargill, and General Electric.

5. **Analyze the cost of the program and service the Program provides to the discipline, other programs at the University, and beyond. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).**

Percentage of SCH Taken By (last 3 years)			
Fall Semester	Year 1	Year 2	Year 3
UG Majors	100	100	N/A
Gr Majors			
Non-Majors			

a. Provide a brief assessment of the cost and service the Program provides. Comment on percentage of SCH taken by majors and non-majors, nature of Program in terms of the service it provides to other University programs, faculty service to the institution, and beyond.

The program's cost per CH was $1,616 for FY 2013, $1,432 for FY 2014, and $619 for FY 2015. The program offered service to the college by teaching one course for Industrial and Manufacturing Engineering department in Spring 2014. Currently, all of the courses offered by the program were taken by ET students. In an effort to increase enrollment in program's courses, two courses will be cross-listed with IME so that students in Manufacturing Engineering program can take them as well.

The program has collaborated with other departments in the college in terms of the faculty composition. The program has one faculty shared with EECS department and two will be shared with ME starting Fall 2015.

6. **Report on the Program's goal (s) from the last review. List the goal (s), data that may have been collected to support the goal, and the outcome. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).**

(For Last 3 FYs)	Goal (s)	Assessment Data Analyzed	Outcome

N/A (first review)

7. **Summary and Recommendations**

a. Set forth a summary of the report including an overview evaluating the strengths and concerns. List recommendations for improvement of each Program (for departments with multiple programs) that have resulted from this report (relate recommendations back to information provided in any of the categories and to the goals and objectives of the program as listed in 1e). Identify three year goal (s) for the Program to be accomplished in time for the next review.

Strengths:

1. Most undergraduate students gain coop/internship experience.
2. Students have ready access to faculty.
3. There is a positive collegial atmosphere in the program.
4. Small class sizes allow more interaction with students.
5. Every undergraduate student has experience with two industry-based capstone design projects.

Weakness:

1. Shortage of laboratory space.
2. The students have limited access to the building and the laboratory in the Engineering building or Wallace Hall during weekends, which prevents students from doing work/projects during weekends.

Opportunities:

1. Capacity to handle more students.
2. As manufacturing becomes more sophisticated in local industry, the demand for mechatronics graduates may increase.
3. Both manufacturing and service organizations are implementing continuous improvement strategies which may make use of faculty research capabilities.

Threats:

1. A continued deterioration in the local economy can have a negative impact because of the program's close relationships with local organizations.

Plan/Goals

1. Development of continuous assessment measures leading to ABET accreditation for the program.
2. Online and/or hybrid models of course delivery in at least one concentration.
3. Lab and problem based learning as significant component of the pedagogical approach supporting experiential learning model proposed by WSU.

4. Initiate an engineering technology student organization.
5. Increase undergraduate enrollment and graduation through the program.
6. Increase applied research output for the program.
7. Develop collaborative programs with other departments/programs at WSU.