WICHITA STATE UNIVERSITY

Program Review Self-Study Template

Academic unit: Engineering Technology

College: Engineering

Date of last review ?

Date of last accreditation report (if relevant) August 31, 2016

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
Gary Brooking	
Kara McCluskey	
Konstantinos Mykoniatis	
Perlekar Tamtam	
Lincoln Schroeder	

Submitted by: Gary Brooking (Director) Date _____

(name and title)

In yellow highlighted areas, data will be provided

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 Wichita State University Engineering Technology program will provide students with the highest quality education needed to succeed in the global marketplace.

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.

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?
   The Program Mission Statement has been changed to reflect the same mission statement that appears on the website and ABET documentation.

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

☒ Yes ☐ No

If yes, describe the changes in a concise manner.

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. The department's BS in Engineering Technology program includes 120 credit hours of required course work and offers four different concentrations; Civil Engineering Technology, Cybersecurity, Mechatronics and Engineering Technology Management. The program is designed such that the students can complete their degree in 4 years. The program consists of general education, required courses in engineering technology and other engineering disciplines, as well as

technical electives. The students also complete two experiential-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 either their faculty advisor, academic advisor or both before they register for classes. During this consultation, the student's records file is accessed and discussed. 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, 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 department 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.

2. Describe the quality of the program/certificate as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates, and scholarly/creative activity (refer to instructions in the WSU Program Review document for more information on completing this section).

Complete the table below and utilize data tables 1-7 provided by the Office of Planning Analysis (covering SCH by FY and fall census day, instructional faculty; instructional FTE employed; program majors; and degree production).

Scholarly Productivity	Number Journal Articles		Number Presentations		Number Conference Proceedings		Performances			Number of Exhibits		Creative Work		No. Books	No. Book Chaps.	No. Grants Awarded or Submitted	$ Grant Value
	Ref	Non-Ref	Ref	Non-Ref	Ref	Non-Ref	*	**	***	Juried	****	Juried	Non-Juried				
2015					1											3	67,576
2016				2	1											6	72,430
2017				5												8	65,576

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection.

- Provide a brief assessment of the quality of the faculty/staff using the data from the table above and tables 1-7 from the Office of Planning Analysis 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.

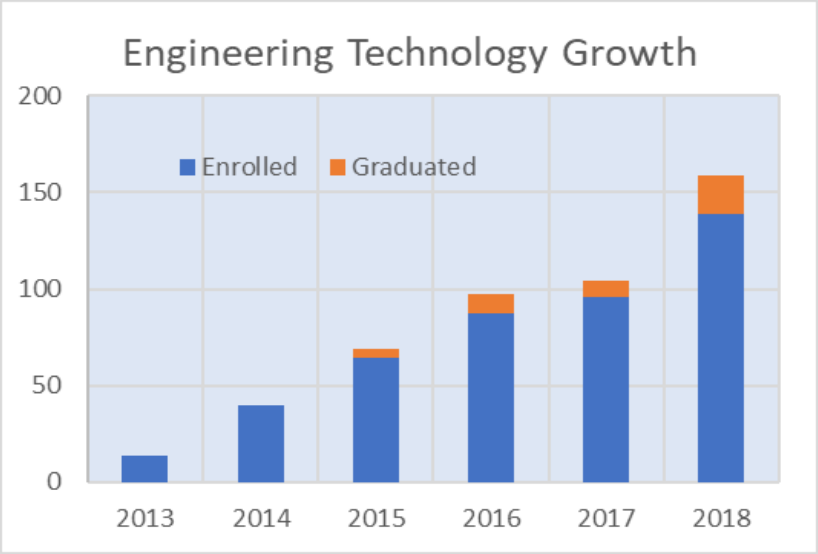


Figure 2.1: Number of Engineering Technology students and graduates

As shown in Figure 2.1 below, the Engineering Technology program undergraduate enrollment has grown steadily. From the start (2013) there were 14 students enrolled in the program, whereas it has grown to 138 students by Fall 2017. Additionally, the Engineering Technology program has realized its first graduates, 7 in 2015, 14 in 2016 and 11 in 2017.

The Engineering Technology program consists of six permanent non-tenure faculty members, three dedicated full time to Engineering Technology, one 50% shared with the Electrical Engineering and Computer Science Department, one 50% shared with the College of Engineering (COE) Department and one 50% shared with the Mechanical Engineering Department which is currently vacant. Due to the growth in the student enrollment and addition of new tracks, two of these faculty have been hired in the past year. We have had one faculty retire at the end of 2017 and this position is in the process of being filled.

The Engineering Technology program is undergraduate with non-tenure faculty, and thus the program is teaching focused with no expectation on research. The five faculty members in the program have adequate expertise and experience in delivering the required curriculum. All faculty have attended the KEEN Integrating Curriculum with Entrepreneurial-Mindset (ICE) workshop and are using material developed through this workshop in their classes. Through their service and professional development activities, the faculty bring many practical examples to their classrooms, which benefit the students.
Fulltime faculty load is considered as teaching four three credit hour classes per semester with no more that three preparations and no expectation of service. All staff currently participate in service which includes student advising, recruiting events, industry visits and program awareness event and the full-time load is then defined as three four credit hour classes per semester with additional service activities.
The effectiveness of the recruiting and program awareness activities can be seen in the substantial growth of the program.

The department supports the faculty by providing travel support for faculty who bring recognition to the department. Faculty are encouraged to attend KEEN and other workshop that will enhance their teaching skills. Based on the faculty evaluations for the last two years, the faculty have consistently met the teaching requirements.

3. **Academic Program/Certificate: Analyze the quality of the program as assessed by its curriculum and impact on students 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.
The university has maintained an average ACT score of approximately 23 since 2012. The program started with an average ACT score of 19 as reported by 3 of 9 individuals in the program. The ACT average increased to 21.3 the very next year and then has a steady increase to 23.2 as reported in 2016, which is slightly higher than WSU average ACT score. The sample size has also increased to 26 of 75 individuals as of 2016.

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 in the table below. 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.

In the following table provide program level information. You may add an appendix to provide more explanation/details. Definitions:
Learning Outcomes: Learning outcomes are statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program (e.g., graduates will demonstrate advanced writing ability).
Assessment Tool: One or more tools to identify, collect, and prepare data to evaluate the achievement of learning outcomes (e.g., a writing project evaluated by a rubric).
Criterion/Target: Percentage of program students expected to achieve the desired outcome for demonstrating program effectiveness (e.g., 90% of the students will demonstrate satisfactory performance on a writing project).
Result: Actual achievement on each learning outcome measurement (e.g., 95%).
Analysis: Determines the extent to which learning outcomes are being achieved and leads to decisions and actions to improve the program. The analysis and evaluation should align with specific learning outcome and consider whether the measurement and/or criteria/target remain a valid indicator of the learning outcome as well as whether the learning outcomes need to be revised.

Table 3.1: Learning Outcomes Overview

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/ Criteria (desired program level achievement)	Results	Analysis
a) An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities	Project assignment rubrics from ENGT 302, 303, 308, 440, 510.	Mean of 70% across all students in courses assessed	2015-83% 2016-88% 2017-76%	Satisfactory. Slight drop should be addressed with changes of new courses ENGT201, 312, 313
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	Project assignment rubrics from ENGT 302, 320, 441, 497	Mean of 70% across all students in courses assessed	2015-78% 2016-79% 2017-71%	Low scores in ENGT302. The course has been replaced with modified ENGT201
c) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes	Project assignment rubrics from ENGT 302, 303, 308, 320, 401, 497	Mean of 70% across all students in courses assessed	2015-74% 2016-80% 2017-76%	Low scores in ENGT302. The course has been replaced with modified ENGT201
d) An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives	Capstone rubrics from ENGT 401, 402	Mean of 70% across all students in courses assessed	2015-87% 2016-92% 2017-86%	Learning outcome is being achieved
e) An ability to function effectively as a member or leader on a technical team	Individual and team assignment rubrics from ENGT 302, 303, 308, 401, 402	Mean of 70% across all students in courses assessed	2015-81% 2016-86% 2017-78%	Satisfactory. Low scores in ENGT302. The course has been replaced with modified ENGT201
f) An ability to identify, analyze, and solve broadly-defined engineering technology problems	Project assignment rubrics from ENGT 303, 401, 402, 510	Mean of 70% across all students in courses assessed	2015-70% 2016-90% 2017-81%	ENGT303 now replaced by ENGT510 with better scores
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	Project assignment rubrics from ENGT 303, 320, 360, 401, 402, 497	Mean of 70% across all students in courses assessed	2015-77% 2016-86% 2017-77%	Satisfactory scores across courses. Need to consider further training and practice in earlier classes.
h) An understanding of the need for and an ability to engage in self-directed continuing professional development	Capstone rubrics from ENGT 401, 402	Mean of 70% across all students in courses assessed	2015-75% 2016-87% 2017-88%	Learning outcome is being achieved
i) An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity	Project assignment rubrics from ENGT 401, 402, 441	Mean of 70% across all students in courses assessed	2015-86% 2016-94% 2017-80%	Learning outcome is being achieved
j) A knowledge of the impact of engineering technology solutions in a societal and global context	Project assignment rubrics from ENGT 360, 402, 440	Mean of 70% across all students in courses assessed	2015-74% 2016-88% 2017-84%	Learning outcome is being achieved
k) A commitment to quality, timeliness, and continuous improvement	Project assignment rubrics from ENGT 303, 308, 401, 402	Mean of 70% across all students in courses assessed	2015-78% 2016-87% 2017-79%	Learning outcome is being achieved. Needs to be enhanced in capstone ENGT401.

Results: The Engineering Technology program assesses the majority of its learning outcomes from the required courses in its curriculum. In addition, each track has additional course to measure outcomes. The program utilizes learning outcomes that are defined by ABET, the accrediting body for engineering technology programs. The faculty have mapped specific learning outcomes from specific required ENGT courses to the ABET defined program outcomes, as shown in the Table 3.1 above. Not all learning outcomes are assessed in each required course, however, most of the learning outcomes are assessed in at least two of the courses. The faculty have also determined an acceptable threshold for each learning outcome is a mean attainment of 70% across all students for the metric being measured, across all courses assessed for each learning outcome. Metrics consist of specific exam/quiz questions, specific criteria from rubrics for oral presentations, lab reports or term projects. The overall collective results are shown in the table above and, as shown in the table above, the attainment threshold level of 70% is being met for all learning outcomes across 2015 to 2017.

Analysis: Collectively, all learning outcomes are being met across the required courses in the Engineering Technology curriculum. Given these are ABET defined learning outcomes, the learning outcomes in the table above will continue to be assessed.

d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification examination results (if applicable), employer surveys or other such data that indicate student satisfaction with the program and whether students are learning the curriculum (for learner outcomes, data should relate to the outcomes of the program as listed in 3c).

In the first year of the program, only 1 out of 3 students were highly satisfied with the curriculum (3 being the total reporting number). In the years of 2015 and 2016 the program had 72.7% and 83.3%. These ratings matched and then exceeded the average ratings applied to the college itself. In 2017, the program had a 64.7% satisfaction rating. This lower number is likely due to the growing student enrollment and the complication of hiring appropriate staff to teach effective classes, which is in the process of being corrected.
The five year rolling averages are considerably lower due to the initial year and are not effective measures due to the young age of the department.

Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Name of Exam	Program Result	National Comparison±
1				
2				
3				

e. Provide aggregate data on how the goals of the *WSU General Education Program* and *KBOR 2020 Foundation Skills* are assessed in undergraduate programs (optional for graduate programs).

Outcomes:	Results	
	Majors	Non-Majors
○ Have acquired knowledge in the arts, humanities, and natural and social sciences ○ Think critically and independently ○ Write and speak effectively ○ Employ analytical reasoning and problem solving techniques		

Note: Not all programs evaluate every goal/skill. Programs may choose to use assessment rubrics for this purpose. Sample forms available at: http://www.aacu.org/value/rubrics/

f. For programs/departments with concurrent enrollment courses (per KBOR policy), provide the assessment of such courses over the last three years (disaggregated by each year) that assures grading standards (e.g., papers, portfolios, quizzes, labs, etc.) course management, instructional delivery, and content meet or exceed those in regular on-campus sections.
Provide information here: N/A

g. Indicate whether the program is accredited by a specialty accrediting body including the next review date and concerns from the last review.
Provide information here:
The program is accredited by Accreditation Board for Engineering and Technology (ABET) through the Engineering Technology Accreditation Commission (ETAC). The next review date will be by January 31, 2020.

h. Provide the process the department uses to assure assignment of credit hours (per WSU policy 2.18) to all courses has been reviewed over the last three years.
Provide information here:
All faculty utilize a standardized Wichita State University syllabus, and all syllabi contain the required language defining the definition of a credit hour appropriate the type of the course.

i. Provide a brief assessment of the overall quality of the academic program using the data from 3a – 3e 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).

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 3.2: Allocation of ABET a-k student outcomes to specific required courses for the BSET program

Key: I – Introduced; R – Reinforced; E - Emphasized

	Student Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
Core Courses (required for all Students)											
ENGT201						I		I		I	I
ENGT312	I	I	I		I						
ENGT354		R	R								
ENGT401			E	R	E	E	R	R	R		R
ENGT402				E	E	E	E	E	E	E	E
Concentration in Civil Engineering Technology											
ENGT370											
ENGT320		R	R				I				
ENGT323		R				R					

ENGT334		I	I				I			I	
ENGT492		R			R	R	R				
ENGT510	R					R					
ENGT600						R				R	
ENGT610		E			R	R	E			R	
ENGT620				I				R		R	
Concentration in Cybersecurity											
ENGT501	I	R									
ENGT601	R		R			R					
ENGT611				I			I		R	I	
ENGT612						R			R	R	
Concentration in Engineering Technology Management											
ENGT441	R					R				I	
ENGT664	E		R				I		R	R	
Concentration in Mechatronics											
ENGT320		I	I				I				
ENGT323		I				I					
ENGT313											
ENGT334		R	R				R			I	
ENGT497		R	R				R				
ENGT361	R	R		I		R					
ENGT348	R	R		R	R	R		R			
ENGT410	R	R		R				R			R
ENGT411	R			R							

Each course reported the assessment of specific learning outcomes using a standard format, Table 3.2. Table 3.2 shows that each learning outcome was assessed multiple times in multiple forms in this program. The performance is the ratio of points earned to total point available for the specific measure.

Table 3.3 An example of learning outcome assessment assigned to a specific course (ENGT 360). Similar assessments are available for each course each semester.

Student Work Assessment Rubric for ABET 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

Course:	ENGT 360 Renewable Energy Technology	Instructor:	Kara McCluskey
Semester:	Fall 2016	Assignment:	Research Paper 2

	1 Highly Unsuccessful	2 Moderately Unsuccessful	3 Neither Successful nor Unsuccessful	4 Moderately Successful	5 Highly Successful	Overall
Total count:	*1.0*	*5.0*	*1.0*	*14.0*	*12.0*	*79%*
Suboutcome:	1. Research Report – written communication					
Suboutcome Count:		2		5	4	*4.0*
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:	2. Research Presentation – Oral communication					
Suboutcome Count:	1	1	1	4	4	*3.8*
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	The presentation had good organization, was rehearsed, and visual aids were provided for the audience. The speaker somewhat engaged the	The presentation was well organized, well rehearsed, and had good visual aids for the audience. The speaker fully engaged the audience.	
Suboutcome:	3. Research Report and Presentation – graphical communication					
Suboutcome Count:		2		5	4	*4.0*
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 department 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 3.4a – 3.4k summarize the assessment of program learning objectives.

Table 3.4a. 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

Three Year Evaluation Cycle				**Assessment Results**					
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**					
				Fa14	**Sp15**	**Fa15**	**Sp16**	**Fa16**	**Sp17**
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	-	91% (11)	-	86% (22)	-	75% (20)
ENGT 303	Rubric measure of two design problems: hydraulic sizing and energy saving	Every year		69% (9)	-	94% (8)	-	79% (14)	-
ENGT 308	Rubric measure of one assignment on stresses and deformation	Every year		-	-	-	-	83% (6)	-
ENGT 440	Rubric measure of application of Microsoft Project and other knowledge	Every year		100% (2)	-	88% (8)	-	-	-
ENGT 510	Rubric measure of one project of solar power generation for residential loads	Every year		-	-	-	-	-	74% (19)
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 81%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4b. 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

Three Year Evaluation Cycle				Assessment Results					
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**					
				Fa14	**Sp15**	**Fa15**	**Sp16**	**Fa16**	**Sp17**
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	-	82% (11)	-	78% (20)	-	58% (19)
ENGT 320	Rubric measure of one homework question on charge transfer and one test question on average current flow	Every year		-	79% (14)	-	81% (13)	-	77% (30)
ENGT 441	Rubric measure of project report on learning from three case studies	Every year		-	71% (7)	-	80% (5)	-	-
ENGT 497	Rubric measure of assignment on application of electrical machines	Every year		78% (9)	-	77% (13)	-	75% (16)	-
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 75%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4c. 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

Three Year Evaluation Cycle				Assessment Results					
Course	**Assessment Method**	**Frequency**	**Performance Target**	**Percent achieving ≥4 (sample size)**					
				Fa14	**Sp15**	**Fa15**	**Sp16**	**Fa16**	**Sp17**
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	-	73% (11)	-	72% (20)	-	65% (34)
ENGT 303	Rubric measure of one assessment on P-1 pump selection	Every year		-	-	-	-	86% (14)	-
ENGT 308	Rubric measure of final test question on selection of bearings	Every year		-	-	-	-	83% (6)	-
ENGT 320	Rubric measure of two labs: finding the difference between EMF and Voltage; and measurement of active, reactive power, apparent power, and PF	Every year		-	71% (14)	-	88% (13)	-	83% (30)
ENGT 401	Rubric measure of 2 assessments on the final project: conduct, analyze, & interpret experiments; apply experimental results to improve processes	Every semester		83% (5)	50% (2)	78% (9)	79% (7)	75% (16)	73% (22)
ENGT 497	Rubric measure of lab report on working of electrical machines	Every year		78% (9)	-	85% (13)	-	81% (16)	-
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 77%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4d. Summary results for Outcome d

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

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
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	80% (5)	100% (2)	78% (9)	100% (7)	88% (8)	91% (11)
ENGT 402	Rubric measure of one assessment on the final project report: design systems, components, or processes	Every semester		75% (4)	100% (4)	100% (3)	100% (7)	86% (7)	78% (9)
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 88%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4e. Summary results for Outcome e

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

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
ENGT 302	Rubric measure of 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	-	91% (11)	-	85% (20)	-	75% (20)
ENGT 303	Rubric measure of homework question on reaction forces on fluid systems	Every year		-	-	-	-	79% (14)	-
ENGT 308	Rubric measure of test question on buckling failure	Every year		-	-	-	-	83% (6)	-
ENGT 401	Rubric measure of assessment on final project report: function as a member or leader on a technical team	Every semester		60% (5)	50% (2)	83% (9)	71% (7)	75% (16)	77% (22)
ENGT 402	Rubric measure of assessment on final project report: function as a member or leader on a technical team	Every semester		100% (4)	75% (4)	100% (3)	100% (7)	86% (14)	78% (18)
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 81%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4f. Summary results for Outcome f

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

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
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	72% (9)	-	94% (7)	-	-	-
ENGT 401	Rubric measure of two assessments on final project report: problem statement; analysis method and solution	Every semester		60% (5)	50% (2)	78% (9)	100% (7)	71% (14)	76% (21)
ENGT 402	Rubric measure of two assessments on final project report: problem statement; analysis method and solution	Every semester		75% (4)	75% (4)	100% (3)	86% (7)	86% (14)	89% (18)
ENGT 510	Rubric measure of one project of solar power generation for residential loads	Every year		-	-	-	-	-	84% (19)
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 81%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4g. 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

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
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	70% (9)	-	88% (8)	-	-	-
ENGT 320	Rubric measure of written communication on two project reports	Every year		-	71% (14)	-	77% (13)	-	77% (30)
ENGT 360	Rubric measure of written, graphical, and oral communication skills in research paper 2 report and presentation	Every year		79% (9)	-	93% (15)	-	79% (33)	-
ENGT 401	Rubric measure of written, graphical, and oral communication skills in final project report and presentation	Every semester		87% (5)	60% (2)	89% (9)	81% (7)	71% (24)	70% (33)
ENGT 402	Rubric measure of written, graphical, and oral communication skills in final project report and presentation	Every semester		75% (4)	78% (4)	100% (3)	86% (7)	90% (21)	81% (27)
ENGT 497	Rubric measure of written, graphical, and oral communication skills in two project reports and presentations	Every year		89% (9)	-	85% (13)	-	75% (16)	-
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 79%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4h. Summary results for Outcome h

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

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
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	80% (5)	60% (2)	94% (9)	79% (7)	75% (16)	100% (11)
ENGT 402	Rubric measure of assignment on continuing professional development plan	Every semester		75% (4)	75% (4)	83% (3)	86% (7)	86% (14)	100% (9)
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 85%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4i. Summary results for Outcome i

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

Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
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	80% (5)	50% (2)	100% (9)	86% (7)	75% (8)	82% (11)
ENGT 402	Rubric measure of one assessment on demonstration of professional and ethical responsibilities	Every semester		100% (4)	100% (4)	100% (3)	100% (7)	86% (7)	78% (9)
ENGT 441	Rubric measure of progress on and quality of the final project report	Every year		-	86% (7)	-	80% (5)	-	-
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 86%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4j. Summary results for Outcome j

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

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
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	67% (9)	-	80% (15)	-	82% (22)	-
ENGT 402	Rubric measure of global and societal context in final project	Every semester		75% (4)	75% (4)	100% (3)	100% (7)	100% (7)	78% (9)
ENGT 440	Rubric measure of final exam question on managers dependency on the culture	Every year		100% (2)	-	88% (8)	-	-	-
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 83%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

Table 3.4k. Summary results for Outcome k

Commitment to quality, timeliness, and continuous improvement

Three Year Evaluation Cycle				Assessment Results					
Course	Assessment Method	Frequency	Performance Target	Percent achieving ≥4 (sample size)					
				Fa14	Sp15	Fa15	Sp16	Fa16	Sp17
ENGT 303	Rubric measure of two assessments: project deadlines and quality of the final project report	Every year	At least 70% of students will achieve a score of 4 or higher on a scale of 1-5	-	-	-	-	79% (14)	-
ENGT 308	Rubric measure of homework question on combined stresses	Every year		-	-	-	-	83% (6)	-
ENGT 401	Rubric measure of two assessments: project deadlines and quality of the final project report	Every semester		90% (5)	60% (2)	83% (9)	86% (7)	75% (16)	77% (22)
ENGT 402	Rubric measure of two assessments: project deadlines and quality of the final project report	Every semester		75% (4)	75% (4)	100% (3)	86% (7)	86% (14)	78% (18)
Evaluation and Actions									
Three Year Cycle: In fall 2017, the ET faculty computed the **extent of attainment of *Outcome a* as 80%**, the weighted average of all assessment results during the 3-year evaluation period. Extents of attainment of at least 70% indicate achievement of the outcome. Therefore, no required action was deemed necessary.									

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

a. The program has seen a steady increase of applicants from 13 in 2013 to 58 in 2017 as can be seen from Figure 2.1. A large majority of the applicants are admitted each year (2015: 38 of 42, 2016: 43 of 50, 2017: 52 of 58). The average rate of students who are counted from admitted to census day averages 40%. The five year rolling average of URM students is 18.4% for freshmen/sophomore and 17.6% for Juniors and Seniors. These numbers are fairly close to university wide URM representation, but significantly higher than the URM of the college division. URM of Engineering Technology freshmen/sophomores is 72% higher than the college and junior/senior is 64% higher than the college. URM representation in our degree conferred students is significantly higher than both the university average and college average for the prior two years. 21.4% and 18.2% URM degree conferred students in comparison to the university at 15.1% and 14.1% as well as the college at 8.8% and 7.2% respectively.

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

Employment of Majors*							
	Average Salary	Employ-ment % In state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or profes-sional educa-tion	Projected growth from BLS** Current year only. ↓
Year 1							
Year 2							
Year 3							Between 5%-9% growth from 2017 - 2026

* 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)

- Provide a brief assessment of student need and demand using the data from tables 11-15 from the Office of Planning and Analysis and from the table above. Include the most common types of positions, in terms of employment graduates can expect to find.

Provide assessment here:

As shown in Figure 2.1, the Engineering Technology program enrollment has significantly increased from 14 in 2013 to 138 in 2017. The program has had 7 graduates in 2015, 14 in 2016 and 14 in 2017. However, due to the small number of students who have graduated from this new program we do not have a sufficient sample size to assess the employment demand.

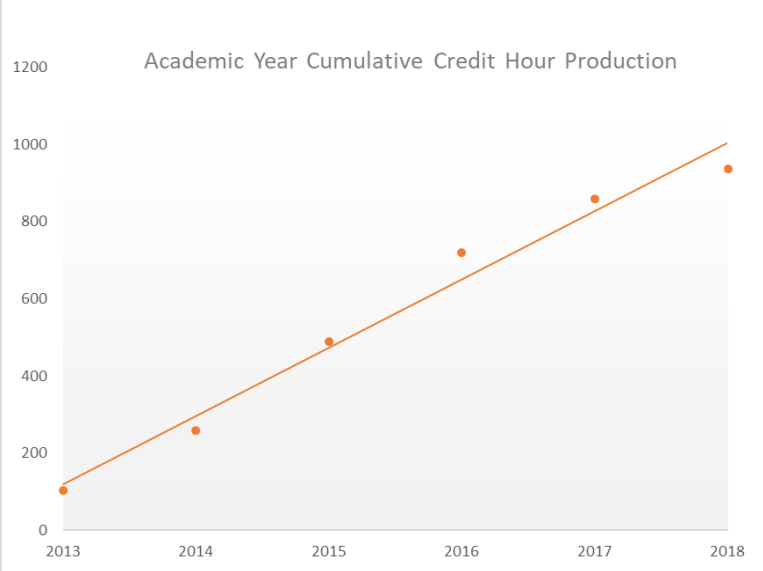
Students have been employed as Mechatronics Engineers, Environmental Engineering Technicians

5. **Analyze the service the Program/certificate 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).**

a. Provide a brief assessment of the 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.

Provide assessment here:

Figure 5.1 Academic Year Cumulative Student Credit Hour taken by major



The SCH taken by majors has continued to grow and is shown in Figure 5.1. In addition a number of Engineering Technology students are still listed under 309901 Engineering Other as the new majors and tracks were not listed. This will add to the numbers shown.
The faculty of the Engineering Technology program provides service to the program, departments of the College of Engineering, the University, and outside the University. Our faculty continues to provide outstanding service to the department, college, university and wider community. Summary of the services provided are as follows:
Kara McKluskey

Type	Committee	Role	Dates
C	USD 259 CTE Advisory Board	Member	Aug 13 - present
C	Salina Area Technical College	Member	Dec 13 - present
C	Engineering Floor Faculty Representative	Member	Nov 13 – present
C	WSU Service Learning Advisory Board	Member	Oct. 15 - present
D	Learning Enhancement Strategic Planning Committee	Member	Jan 13 - present
D	Diversity Strategic Planning Committee	Member	Jan 13 - present
C	Sustainability Committee	Member	Nov 15 – present
D	Engineering Tech ABET Committee		Jan 14 - present
D	ENGT ABET Committee	Member	Jan 14 - present
D	ENGT / ME Engineering Educator Search Committee	Member	Jan 14 – Jan 15

C	USD 266 Engineering Pathway Advisory Board	Member	Apr 15 – present
D / C	HCC Recruiting and Road Show	Member	Sep 15
D / C	BCC Recruiting and Class Visit	Member	October 15
U	WSU Service Learning Advisory Board	Member	Oct 15 – present
U	Sustainability Committee	Member	Nov 15 – present
U	Green Group Faculty Advisor	Advisor	Aug 16 – present
C	Advisory Board Member – Butler Community College (BCC)	Member	Oct 16 – present

- Clearwater 4th grade students' stations and tour of EECS Engineering Open House. An an event for over **80** 4th grade students from Clearwater KS.
- Distinguished Scholarship Invitational (DSI) judge
- Maize South PLTW Tour of EEB.
- Butler CC Early College Academy Recruiting Event.
- Maize Complete Campus Event.
- Lunch and Learns for NW High Schools:
  i. TEC Systems Group to attend NW HS to discuss the industry side of mechatronics followed by a discussion of the mechatronics program at WSU with over **20** students. 3/14/17.
  ii. Spirit to attend Derby HS to discuss the industry side of mechatronics followed by a discussion of the mechatronics program at WSU with over **25** students. 3/15/17.
  iii. Textron to attend East HS to discuss the industry side of mechatronics followed by a discussion of the mechatronics program at WSU with over **25** students. 3/19/17.
- Shocker Mindstorms trial day.
- Butler Community College Visit to Engineering Concepts Class.
- Attended Wichita Mini Maker Fair to promote ET program to approximately **30** prospective students.
- Directed Solar Energy summer camp for 6th – 8th grade students.
- Attended Wichita Area Technical College Open House to talk to approximately **10** prospective transfer students.
- Butler Community College Recruiting Visit.
- Shockers Honors Scholars Banquet.
- Majors and Minors Fair.
- Hutchinson Community College Road Show.
- Maize South High School Recruiting Event.
- Met with faculty and students at Seward County Community College to discuss articulation agreements.
- Andover Middle School Water Filtration Collaboration.
- Wallace Invitational Scholarships in Engineering (WISE) judge.
- Maize Central Elementary School Renewable Energy Event.

Dr Brooking received the College of Engineering's Dwane and Velma Wallace Faculty Service Award. Through Dr. Brooking's extensive service activities, he has significantly enhanced the visibility of the College of Engineering across WSU and outside of WSU. From his arrival, he became involved in national organizations related to innovation, including participating in the VentureWell OPEN innovation conference and the Biomedical Engineering Society IDEA innovation workshop. Active involvement in these organizations introduced WSU to Dr. Doug Melton from the Kern Engineering Entrepreneurship Network (KEEN), a network of engineering colleges and universities who engage in implementing the

entrepreneurial mindset and innovation in their curriculums. Through Dr. Brooking's initial interaction with Dr. Melton from KEEN and the College of Engineering's follow up efforts, our College of Engineering is now a member of KEEN. Dr. Brooking was also involved with the College of Engineering's involvement in VentureWell's Pathways to Innovation, where he has served as a faculty mentor to WSU students who have been selected to also participate in this innovation program. Dr. Brooking has mentored 4 of these student groups, known as University Innovation Fellows. Dr. Brooking also participated in a NSF funded I-Corp grant awarded to the BME Department, which involved Dr. Hakansson as the PI, Dr. Chris Broberg from the Center for Entrepreneurship and a BME student, Mr. Brandon Bartlett. This NSF grant allowed this team to vet and further develop a product that emanated from a Capstone Design class. Dr. Brooking's involvement in this NSF grant paved the way for him to mentor several student groups as they were awarded Shocker I-Corp funds from WSU Ventures to enhance their products, which also emanated from Capstone Design projects. As a result of Dr. Brookings vast involvement and service related to innovation within and outside WSU, he was selected as a Coleman Foundation Faculty Fellow, where he interacts with others across WSU involved in innovation as well as introducing entrepreneurship in curriculums. He also has a passion to engage students in innovation and develop the entrepreneurial mindset, as well as provide exposure to professional careers. He has committed significant effort and time to increase the number of health-related sponsors in the Capstone Design course who serve as sponsors and clinical sites for our Capstone Design students to perform their projects, as well as increase the diversity of the sponsors (e.g., dentistry, medical, veterinary, physical therapy, orthopedics, prosthetics, etc.). He has also expanded the experiences to be more real-world by now involving business and entrepreneurship students in the Capstone Design teams, as well as requiring the teams to submit their capstone projects and products to external competitions for innovation and funding, including the WSU Shocker New Venture Competition, and Shocker I-Corp. Several Capstone Design teams have won awards for their designs in these competitions.

Dr. Brooking also provides service to advising and mentoring students of all ages. He has mentored elementary and middle school students in robotics, serves as faculty advisor for the BMES student chapter, the UIF student groups, Shocker Startup, and was one of the faculty advisors for Engineers Without Borders. He also serves as a judge for many WSU activities, including the Wallace Scholarship competition, the Distinguished Scholar Invitational, the Koch Innovation Challenge, and Lego Mindstorms.

Finally, consistent with the goals of WSU, the Engineering Technology program offers a unique experiential, applied learning opportunity to its students. The faculty have also increased substantially the number of hands-on experiential learning activities in the specific Bioengineering coursework and all faculty have been through the KEEN faculty development workshop. These experiential learning activities have typically taken place in the various labs, but also occur in the classroom, may be research projects in the courses, presentations, and also include projects out in the community with community partners to address real community problems. To provide these experiential learning opportunities to the students, adequate resources are necessary to provide for equipment, supplies, teaching assistants, travel, and the cost of time to perform these valuable activities for the students.

6. Report on the Program's/certificate'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

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.

Provide assessment here:

The strengths of the Engineering Technology program center around the student centered, applied learning focus. The faculty strive to become exemplar teachers, taking every opportunity to infuse hands-on, applied learning as well as develop critical entrepreneurial mindset in students. The program prides itself in being closely aligned to industry, both through students' engagement like internships and co-ops as well as through engagement through site visits and industry support. The program has a strong focus on transfer students and as significant means of recruitment and have developed numerous "2+2" agreements with local colleges like WSU Tech (formerly WATC), Butler CC, Hutchinson CC, Pratt CC, as well as Siri Lanka Institute of Technology. The program has been reduced to 120 credit hours for all tracks, while still maintaining opportunities for transfer students to make use of relevant skills developed prior to transfer.

The concerns of the Engineering Technology program included the excessive use of adjunct faculty that was not constructive for developing appropriate skill enhancement through course sequences. In addition, as a new program, there have been multiple changes in courses and sequences, further disrupting the stead building of skill sets. Another concern has been the perception of the Engineering Technology program as having lower math and thus academic standards. This has recently been addressed by include College Calculus I and II as required math classes.

The three-year goals for the Engineering Technology program to be completed by the next review include:

1) Develop a stackable certificate based program to allow:
    a. ET students a range of customizable skills to complete their degree
    b. Students from other majors to add skill sets to complement their major
    c. Allow current workforce opportunities to enhance their skill set (this could be through smaller badge versions of the certificate)

2) Develop a new Applied Computing Program with will house the Cybersecurity track and certificates as well as develop four new applied computing certificates. The new program will be accredited by ABET CAC.
3) Bring both Engineering Technology and Applied Computing program together into one new Department
4) Increase enrollment through student focused options including transfer students