NYIT Annual Program Assessment Report

Name of Program: Electrical and Computer Engineering Technology
Year of assessment report: 2016-2017
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I-Annual Program Learning Assessement:

1-Review Statement of Program Learning Goals

1-1 Student Outcomes

The following table shows the 2016-2017 a-k ABET student (or program)outcomes blended with program criteria as defined by ABET-ETAC for electrical and computer engineering technology programs:

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; Specifically, the application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of computer systems and associated software systems; The ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of computer systems and networks; The application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of electrical/electronic systems; The ability to utilize differential and integral calculus, as a minimum, to characterize the performance of electrical/electronic systems;
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; specifically, The application of electric circuits, computer programming, associated software applications, analog and digital electronics, microcomputers, operating systems, local area networks, and engineering standards to the building, testing, operation, and maintenance of computer systems and associated software systems; The application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of

	electrical/electronic(s) systems;
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; Specifically the ability to analyze, design, and implement hardware and software computer systems; the ability to analyze, design, and implement one or more of the following: control systems, instrumentation systems, communications systems, computer systems, or power systems;
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; specifically, the ability to apply project management techniques to computer systems and to electrical/electronic(s) systems;

Figure 1- ABET Student Outcomes 2016-2017

1-2 Curricular Matrix

The matrix in Figure 2 shows which course(s) from the curriculum are strongly connected (marked with a check mark) to a specific student outcome.

	a	b	c	d	e	f	g	h	i	j	k
ETEC 110	√		√		√		√				√
ETEC 120			√		√	√					√
ETEC 131	√		√		√						
ETEC 231						√					
ETEC 310	√				√						
ETEC 410	√	√	√	√							
ETEC 420				√		√					
ETEC 490/ MTEC 210	√			√							
ETEC 495						√		√		√	√
CTEC 204	√						√				
CTEC 206	√			√			√				
CTEC 216	√	√	√			√					√
CTEC 235	√					√					
CTEC 241	√	√		√							
CTEC 247	√					√					
ITEC 335	√					√		√			
CTEC 350				√		√					
CTEC 430		√					√				
CTEC 471	√				√			√			√
IENG 240		√				√					
IENG 251		√				√					√
IENG 400								√	√	√	

Figure 2: Matrix of relationships between courses and student outcomes (updated)

1-3 **Which program learning outcomes will be assessed for the planned academic year?**

Starting Fall 2015, the ECET department began an assessment cycle of two years as elaborated in the 2014-2015 assessment plan. Figure 1 shows the assessed student outcome for the current academic year.

Semester	Assessed Student Outcomes
Fall 2016	e, h, j
Spring 2017	f, g, k

Figure 3: Assessed student outcome for the 2016-2017 academic year

2. What measuring instruments were used for the assessment?

The student outcome assessment in place for the program to ensure continuous improvement is based on a process which includes direct and indirect assessment measures. Our direct method is based on Faculty Course Assessment Reports (FCARs) which are submitted by the faculty for each course at the end of each semester.

The EGMU rubric that we use is shown in Figure 4.

EGMU	Rubric	Score
E-Excellent	□ Fully demonstrates/accomplishes the attributes and behavior in the rubric	3
G-Good	□ Mostly demonstrates/accomplishes the attributes and behavior in the rubric	2
M-Minimal	□ Minimally demonstrates/accomplishes the attributes and behavior in the rubric	1
U-Unsatisfactory	□ Does not demonstrate/accomplish the attributes and behavior in the rubric	0

Figure 4: EGMU Rubric

The table in Figure 5 shows a list of courses that have been selected to measure specific student outcomes.

ABET Program Outcomes	ABET a-k	Strategies/Actions	Assessment Methods
An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities;	a	* Include adequate course learning outcomes (CLOs) in the curriculum courses * Use of engineering application oriented software * Project experiences with real life examples	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: CTEC 204, CTEC 216, CTEC 235, CTEC 243, ETEC 310 and IENG 240
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	b	* Curriculum requirement of courses in mathematics, physics, chemistry, ECET and engineering management *Establishment of adequate course learning outcomes (CLOs) in the curriculum courses	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: CTEC 241, CTEC 247, ETEC 410, CTEC 471, ETEC 240, IENG 240, IENG 251

An ability to conduct standard tests and measurements; to conduct, analyze and interpret experiments; and to apply experimental results to improve processes;	c	Project laboratory experience emphasizing: - system analysis and system design problems, - teamwork, and - communication (oral and written form)	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: CTEC 216, ETEC 110, ETEC 131, ETEC 310 and ETEC 420
An ability to design systems, components or processes for broadly-defined engineering technology problems that are appropriate to program educational objectives	d	Project Laboratory experience emphasizing the design of electrical / computer systems and related technology processes	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: CTEC 206, CTEC 335, ETEC 410 and CTEC 471
An ability to function effectively as a member or leader on a technical team	e	Project Laboratory work experience that emphasizes joint tasks, team work and communication	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: ETEC 120, ETEC 131, ETEC 310, IENG 251, CTEC 235 and CTEC 335

An ability to identify, analyze, and solve broadly-defined engineering technology problems	f	Project Laboratory work and seminar project experience with specific design requirements	* Student required to work on a substantial, one semester duration, design project according to defined specifications *Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: ETEC 231, ETEC 410, ETEC 495, ETEC 430 and CTEC 471
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	g	* Ability to search and fetch technical info for courses involving programming or for the design of systems * Project Laboratory work experience requiring analysis and design of systems that include pre-lab collection of information, teamwork and communication	* Work on design projects requiring technical literature *Work on a non-technical but scientific paper requiring scientific literature *Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: ETEC 110, ETEC 310, ETEC 495, CTEC 430, CTEC 471, IENG 400, CTEC 241, CTEC 350

An understanding of the need for and an ability to engage in self-directed continuing professional development	h	* Engage students in a self-directed effort to write technical and non-technical but scientific papers, and designing electrical and computer engineering systems and processes	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: ETEC 495, IENG 400, CTEC 460, CTEC 471
An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity	i	Emphasized in the Ethics and Global Issues course as well as in the Seminar Project course	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: ETEC 495, IENG 400
A knowledge of the impact of engineering technology solutions in a societal and global context	j	Emphasized in the Ethics and Global Issues course	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: IENG 400
A commitment to quality, timeliness and continuous improvement	k	* Curriculum requirement of courses in ECET *Include adequate Course Learning Outcomes (CLOs) in the curriculum courses	* Collection of Faculty Course Assessment Reports (FCARs) * Selected courses of which LOs are strongly connected to this PO: ETEC 495, IENG 251, CTEC 235, CTEC 241

Figure 5: Student Outcomes, Strategies and Actions for Assessment

3-Analysis of Student outcomes Assessment:

Using our FCAR system, data from courses, that have a strong connection to the selected student outcomes , was compounded to determine the student outcomes scores which are compared to our benchmark value of 1.5 (Grade C). Figure 6 shows the resulting analysis.

ECET - Student Outcomes Assessment (e,h,j,f,g,k)

2016-2017

Course	e					f				
	E	G	M	U	BM	E	G	M	U	BM
ETEC-120-M01	14	3	2	1	***2.50***	16	9	23	4	***1.71***
ETEC 110-M01	18	12	8	0	***2.18***	25	12	14	5	***2.02***
CTEC-350-M01						6	2	0	1	***2.44***
CTEC-235-M01										
ETEC 495-M01						2	6	0	0	***2.25***
CTEC-206-M01										
CTEC-216-M01						19	8	4	1	***2.41***
IENG-400-M01										
CTEC 241-M01						25	43	29	4	***1.88***
CTEC 471-M01	7	8	3	2	***2.00***					
CTEC 335-M01						13	15	5	3	***2.06***
ETEC 410-M01						13	15	11	0	***2.05***
ETCS 105-M01						6	3	8	9	***1.23***
IENG 251										
IENG 240						15	4	5	4	***2.07***
	39	23	13	3		125	113	94	27	
Subtotals				78					359	
Benchmark				**2.26**					**1.94**	
EGMU %	50%	29%	17%	4%		35%	31%	26%	8%	
E&G / All %	**79%**			**4%**		**66%**			**8%**	

Course	g					h				
	E	G	M	U	BM	E	G	M	U	BM
ETEC-120-M01										
ETEC 110-M01	15	0	2	2	***2.20***					
CTEC-350-M01										
CTEC-235-M01						5	5	4	1	***1.93***
ETEC 495-M01						4	3	0	1	***2.25***
CTEC-206-M01	5	10	5	4	***1.67***					
CTEC-216-M01										
IENG-400-M01	32	27	11	2	***2.24***					
CTEC 241-M01										
CTEC 471-M01						8	8	4	1	***2.10***
CTEC 335-M01						6	9	0	3	***2.00***
ETEC 410-M01										
ETCS 105-M01						12	6	4	4	***2.00***
IENG 251										
IENG 240										
	52	37	18	8		35	31	12	10	
Subtotals				115					88	
Benchmark				**2.16**					**2.03**	
EGMU %	45%	32%	16%	7%		40%	35%	14%	11%	
E&G / All %	**77%**			**7%**		**75%**			**11%**	

Course	j					k				
	E	G	M	U	BM	E	G	M	U	BM
ETEC-120-M01										
ETEC 110-M01										
CTEC-350-M01										
CTEC-235-M01										
ETEC 495-M01	2	3	3	0	***1.88***					
CTEC-206-M01										
CTEC-216-M01						23	5	3	1	***2.56***
IENG-400-M01	25	18	11	0	***2.26***					
CTEC 241-M01										
CTEC 471-M01						6	8	4	2	***1.90***
CTEC 335-M01										
ETEC 410-M01										
ETCS 105-M01	15	19	9	9	***1.77***					
IENG 251						23	9	27	7	***1.73***
IENG 240										
	42	40	23	9		52	22	34	10	
Subtotals				114					118	
Benchmark				**2.01**					**1.98**	
EGMU %	37%	35%	20%	8%		44%	19%	29%	8%	
E&G / All %	**72%**			**8%**		**63%**			**8%**	

Figure 6: Collected data and benchmark scores

A compounded score for each student outcome is shown in figure 7.

Summary - Aggregated per SO	Benchmark
e	2.26
f	1.94
g	2.16
h	2.03
j	2.01
k	1.98

Figure 7: Student outcome scores

4-Interpretation of Results

Our focus this year is to evaluate the ability of the student to be able to solve engineering technology problems, work as a member or leader of a technical team, communicate effectively, have a broad understanding of professional and ethical issues and show commitment to continuous improvement. All scores for the selected student outcomes are higher than 1.93 (out of 3) which is relatively a grade B-. This is well above our benchmark score of 1.5. Our goal is to raise the benchmark score to a decent B and to the exception of student outcome f , it looks like we are on target . The ability to identify, analyze and solve broadly –defined engineering technology problems (f) needs to be improved.

5-Improvements

The student outcome "f" needs to be improved. This will require more involvement from faculty and more commitment from students. In courses where design of systems and components are major goals, more practice in design process should help the student.
Our program is offering tutoring in critical courses however the attendance is far below expectation for reasons that have to be elucidated. In general ,students seem to do better with their senior project designs which usually requires a full semester to complete; this means that the time constraint imposed to do the work in other courses where design and implementation are in force, might be a factor that lowered the score for student outcome 'f'. This problem will be addressed during our faculty meeting , prior to AY17-18

II- Summary of Improvements Made in response to assessment Results in the past few years

Year of Assessment Results	Name of Program Learning Goal	Improvements Implemented Based on Assessment Results	Impact of Improvements
AY 13-14	Global Competency	Global competency criteria were assessed and improved A student: • **Collaborat**es effectively with team members towards optimal progress on the chosen project. • **Values** alternative perspectives and encourages participation among all team members • **Remains non-**	Global Competency criteria application improves the life and performance of a graduate from our program.

		judgmental when disagreeing with others/seeks conflict resolution • **Addresses** the impact of the design in an environmental, economic and societal context. • **Evaluates** and judges a situation using facts and a professional code of ethics • **Uses** personal value system to support actions, but understands the importance of using professional ethical standards for corporate decisions	
AY 14-15	Written Communication	All term papers, laboratory and senior design reports were expected to be well written and have a professional layout.	The score for the student outcome "g" (ability to apply written …communication in technical and non technical environment..) was a decent 2.2 out of 3.
AY 15-16	Improve current curriculum	-The course ***ECON 101 Basics Economics*** was dropped and replaced by Electives in Sciences or Liberal Arts. This curriculum includes already ***IENG 240 Engineering Economics***	Continuous improvement of Program as expected by ABET.

		and consequently the course ECON 101 was at some point redundant. -The Course *CHEM 107 Engineering Chemistry* was dropped because our benchmark study of identical programs in the US has shown that very few offer any course in Chemistry. Instead, we will offer the course ***Introduction to Statistics*** , a topic often emphasized as a requirement in engineering Technology. -A new course ***Embedded Systems and Internet of Things*** *is now included in the curriculum* *-Also some course contents were improved*	

III-Faculty Engagement in the Current Annual Report:
Faculty were fully cooperative to provide course assessment data to complete this report. Furthermore, the ECET program is expecting an ABET-ETAC review for reaccreditation during Fall 2017. Faculty are expected to prepare course portfolios and student outcomes binders . Samples of student work are collected through the whole year and proof of course assessment is expected. Faculty are fully involved in this process. A program self study has already been submitted to ABET and all the faculty and school administration are very cooperative to help in this process.

IV- Annual Program Achievement Goals:
First year retention rates : 90% . Most students who leave this program usually switch majors.
Six-year graduation rates: 90%
Average time to degree completion: 4-5 years
Student satisfaction survey results: Good . Based on a review of all critical SIRs through

recent years.
Employer satisfaction results: (*)
% pursuing an advanced degree : (*)
% of job placement: (*)

(*)Not available at this time. We are working on this data for the ABET visit.

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