SOUTHEASTERN LOUISIANA UNIVERSITY | Department of Industrial & Engineering Technology

Engineering Technology Master Curriculum Assessment

Program Educational Objectives (PEOs)

1. Graduates will achieve professional knowledge, skill and competence in their particular concentration in Engineering Technology.
2. Graduates will learn to communicate effectively in a professional environment.
3. Graduates will understand the ethical and societal impact of engineering practices.
4. Graduates will understand the need for professionalism in their respective field of employment or business.
5. Graduates will demonstrate job preparedness and specific background training in their respective concentration in Engineering Technology.

Student Outcomes (SOs) New

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline;

   1.1 Uses appropriate tools to collect and analyze data
   1.2 Follows scientific approach to solve broadly defined engineering problems

2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;

   2.1 Uses appropriate methods and/or software to design components and systems
   2.2 Uses evidence-based approach to validate design and analysis
   2.3 Uses simulation software to test prototypes

3. an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature

   3.1 Writes reports and applies proper guidelines (cover page, introduction, method, results, analysis, uses complete and grammatically correct sentences)
   3.2 Communicates confidently and professionally in front of audience (proper appearance, faces the audience, responds to audience questions)
   3.3 Uses technology and modern techniques to communicate technical information (Moodle, Power-points, computers, projectors, charts, tables, illustrations)

4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes

   4.1 Uses advanced software to interpret data (e.g. Excel, MATLAB, SolidWorks, COMSOL, etc)
   4.2 Ability to use equipment and/or methods to perform tests common in the field
   4.3 Ability to make improvements to a design on the basis of experimentation

5. an ability to function effectively as a member or leader on a technical team.

   5.1 Demonstrates traits conducive to team work (punctuality, flexibility, participation, respectfulness)
   5.2 Recognizes participant roles in a team setting and fulfills appropriate roles to ensure team success.
   5.3 Recognizes the ethical and societal responsibility in systems' design and implementation

Table I. Mapping PEOs to SOs

	PEO[1]	PEO[2]	PEO[3]	PEO[4]	PEO[5]
SO[1]	✓				✓
SO[2]	✓				✓
SO[3]		✓		✓	✓
SO[4]	✓				
SO[5]		✓	✓	✓	

Student Outcomes (SOs) Old

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.

Table II. Mapping Old and New SOs

	SO[1] *[a,b,f]*	SO[2] *[d]*	SO[3] *[g]*	SO[4] *[c,k]*	SO[5] *[e,i]*
SO[a]	✓				
SO[b]	✓				
SO[c]				✓	
SO[d]		✓			
SO[e]					✓
SO[f]	✓				
SO[g]			✓		
SO[h]	~~NOT USED~~	~~NOT USED~~	~~NOT USED~~	~~NOT USED~~	~~NOT USED~~
SO[i]					✓
SO[j]					✓
SO[k]				✓	

Mapping Courses to Students' Outcomes

Table III. Mapping Performance Indicators to ET Courses

	SO[1]	SO[2]	SO[3]	SO[4]	SO[5]
COMMON					
ET 100			3.3		5.2 5.3
ET 111		2.1 2.2 2.3	3.1 3.2 3.3		
ET 202	1.1 1.2				
ET 205	1.1 1.2				
ET 212	1.1 1.2		3.1 3.2		
ET 213	1.1	2.1 2.2	3.1	4.2 4.3	5.1 5.2
ET 241	1.1 1.2			4.2 4.3	
ET 305				4.2 4.3	5.1 5.2
ET 490			3.2 3.3		5.3
ET 492	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3		
ET 493	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	5.1 5.2
ET 494	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	5.1 5.2
OSHE 111			3.1 3.2 3.3		
IT 407	1.1			4.2	
COMPUTER					
ET 215	1.2	2.1 2.2 2.3			
ET 221	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	
ET 225	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	
ET 226/ET 325		2.1 2.2 2.3		4.2 4.3	
ET 320	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	
ET 410	1.1 1.2			4.1 4.2	
ET 425		2.1 2.2 2.3		4.1 4.2 4.3	
CONSTRUCTION					
ET 132	1.1 1.2		3.1 3.2 3.3		5.1 5.2
ET 231	1.1 1.2			4.1 4.2 4.3	5.1 5.2
ET 232	1.1 1.2			4.1 4.2 4.3	5.1 5.2
ET 234/ET 334	1.1 1.2	2.1 2.2 2.3			
ET 244			3.1 3.2 3.3		5.1 5.2

ET 271	1.1 1.2				
ET 331	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	5.1 5.2
ET 332	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	5.1 5.2
ET 336	1.1 1.2	2.1 2.2 2.3			
ET 441	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	5.1 5.2
ET 443	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	
ET 448	1.1 1.2			4.1	
ELECTRICAL ENERGY					
ET 214	1.1	2.1 2.2	3.1	4.2 4.3	5.1 5.2
ET 341	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	
ET 361/ET 362	1.1 1.2		3.1 3.2 3.3		
ET 363	1.1 1.2		3.1 3.2 3.3	4.1 4.2 4.3	
ET 365	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	
ET 421					
ET 431	1.1 1.2		3.1 3.2 3.3		
ET 433	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	
MECHANICAL					
ET 283	1.1 1.2	2.1 2.2 2.3			
ET 371	1.1 1.2				
ET 375	1.1 1.2				
ET 376	1.1 1.2			4.2	
ET 381	1.1 1.2	2.1 2.2 2.3			
ET 385	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	5.1 5.2
ET 386		2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	
ET 478	1.1 1.2			4.2	
MECHATRONICS					
ET 322		2.1 2.3		4.1 4.2 4.3	
ET 422		2.1 2.2 2.3		4.1 4.2 4.3	
ET 488	1.1 1.2	2.1 2.3		4.1	

Performance Indicator Assessed (AY 2018- AY 2019)

Performance Indicator Assessment planned (AY 2020 – AY 2022)

New Courses

TIMELINE

There are two timetables for the material collection:

1. Assessment Plan (Current) (Table IV)
2. Assessment Plan (Future) (Table V)

Table IV. Assessment Plan (current)

Semester	Course	Concentration	SO measured	Specific Performance Indicators
Fall 2018	ET 132	CONSTRUCTION	1	1.1 1.2
Fall 2018	ET 492	ALL	2	2.1 2.2 2.3
Fall 2018	ET 493	ALL	3 & 5	3.1 3.2 3.3 5.1 5.2
Spring 2019	ET 320	COMPUTER	1	1.1 1.2
Spring 2019	ET 336	CONSTRUCTION	2	2.2 2.3
Spring 2019	ET 385	MECHANICAL	2 4	2.1 2.2 2.3 4.1
Spring 2019	ET 425	COMPUTER	2 & 4	2.1 2.2 2.3 4.3
Fall 2019	ET 241	ALL	1	1.1 1.2
Fall 2019	ET 305	ALL	4	4.2 4.3
Fall 2019	ET 332	CONSTRUCTION	2 & 4	2.1 4.2
Fall 2019	ET 376	MECHANICAL	4	4.2
Fall 2019	ET 386	MECHANICAL	4	4.3
Fall 2019	ET 410	COMPUTER	4	4.1 4.2
Fall 2019	ET 433	ELECTRICAL ENERGY	1 & 4	1.2 4.3
Fall 2019	ET 494	ALL	3 & 5	3.1 3.2 3.3 5.1 5.2
Spring 2020	ET 100	ALL	5	5.3
Spring 2020	ET 213	ALL	3 & 5	3.1 5.1 5.2
Spring 2020	ET 283	MECHANICAL	1	1.1 1.2
Spring 2020	ET 363	ELECTRICAL ENERGY	4	4.1 4.2
Spring 2020	ET 365	ELECTRICAL ENERGY	1 & 2	1.1 2.1 2.2 2.3
Spring 2020	ET 441	CONSTRUCTION	4	4.1 4.3

Table V. Assessment Plan (Future)

Semester	Course	Concentration	SO measured	Specific Performance Indicators
Spring 2021	ET 371	MECHANICAL	1	1.1 1.2
Fall 2021	ET 225	COMPUTER	1	1.1 1.2
Spring 2021	ET 334	CONSTRUCTION	2	2.1 2.2 2.3
Fall 2021	ET 215	COMPUTER	2	2.1 2.2 2.3
Spring 2021	OSHE 111	ALL	3	3.1 3.2 3.3
Fall 2021	ET 493	ALL	3	3.1 3.2 3.3
Spring 2022	ET 214	ELECTRICAL ENERGY	4	4.2 4.3
Fall 2022	ET 322	MECHATRONICS	4	4.1 4.2 4.3
Spring 2022	ET 494	ALL	5	3.1 3.2 3.3
Fall 2022	ET 490	ALL	5	5.3
Fall 2022	ET 381	MECHANICAL	2	2.1 2.2 2.3
Spring 2022	ET 422	MECHATRONICS	2	2.1 2.2 2.3

This proposed assessment plan starting CY 2021 will synchronize the ABET and SACS assessments. SOs will be divided into two groups (1, 2, and 3 in group I, 4 and 5 in another group II). Each SO will be assessed in two separate courses over two separate semesters. Group I will be assessed in Spring 2021 and Fall 2021. Group II will be assessed in Spring 2022 and Fall 2022.

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Collection Rotation

Table VI. Collection of Samples (Fall 2019)

	SO[1]	SO[2]	SO[3]	SO[4]	SO[5]	Collection
COMMON						
ET 100			3.3		5.2 5.3	FALL 2019
ET 202	1.1 1.2					FALL 2019
ET 205	1.1 1.2					FALL 2019
ET 212	1.1 1.2		3.1 3.2			FALL 2019
ET 241	1.1 1.2			4.2 4.3		FALL 2019
ET 492	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3			FALL 2019
ET 493	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	5.1 5.2	FALL 2019
ET 494	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.2 4.3	5.1 5.2	FALL 2019
COMPUTER						
ET 215		2.1 2.2 2.3		4.1 4.2 4.3		FALL 2019
ET 225	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3		FALL 2019
ET 410	1.1 1.2			4.1 4.2		FALL 2019
CONSTRUCTION						
ET 132	1.1 1.2		3.1 3.3		5.1 5.2	FALL 2019
ET 232	1.1 1.2			4.2 4.3	5.1 5.2	FALL 2019
ET 234	1.2	2.1 2.2				FALL 2019
ET 244			3.1 3.3		5.1 5.2	FALL 2019
ET 332	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	5.1 5.2	FALL 2019
ELECTRICAL ENERGY						
ET 431	1.1 1.2		3.1 3.2 3.3			FALL 2019
ET 433	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1 4.3		FALL 2019
MECHANICAL						
ET 375	1.1 1.2					FALL 2019
ET 376	1.1 1.2			4.2		FALL 2019
ET 381	1.1 1.2	2.1 2.2				FALL 2019
ET 386		2.1 2.2 2.3	3.1	4.1 4.2 4.3		FALL 2019

Table VII. Collection of Samples (Spring 2020)

	SO[1]	SO[2]	SO[3]	SO[4]	SO[5]	Collection
COMMON						
ET 111		2.1 2.2 2.3	3.1 3.2 3.3			SPRING 2020
ET 213	1.1	2.1 2.2	3.1	4.2 4.3	5.1 5.2	SPRING 2020
ET 305				4.2 4.3	5.1 5.2	SPRING 2020
COMPUTER						
ET 221	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3		SPRING 2020
ET 226		2.1 2.2 2.3		4.2 4.3		SPRING 2020
ET 320	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3		SPRING 2020
ET 425		2.1 2.2 2.3		4.1 4.2 4.3		SPRING 2020
CONSTRUCTION						
ET 231	1.1 1.2			4.2 4.3	5.1 5.2	SPRING 2020
ET 271	1.1 1.2					SPRING 2020
ET 331	1.1 1.2	2.1 2.2 2.3		4.1 4.2 4.3	5.1 5.2	SPRING 2020
ET 336	1.2	2.2 2.3				SPRING 2020
ET 441	1.1 1.2	2.1 2.2 2.3		4.1 4.3	5.1 5.2	SPRING 2020
ET 443	1.2	2.2	3.1	4.2		SPRING 2020
ELECTRICAL ENERGY						
ET 361	1.1 1.2		3.1 3.2 3.3			SPRING 2020
ET 363	1.1 1.2		3.1 3.2 3.3	4.1 4.2		SPRING 2020
ET 365	1.1 1.2	2.1 2.2 2.3	3.1 3.2 3.3	4.1		SPRING 2020
MECHANICAL						
ET 283	1.1 1.2	2.1 2.2				SPRING 2020
ET 371	1.1 1.2					SPRING 2020
ET 385	1.1 1.2	2.1 2.2 2.3		4.1 4.2	5.1 5.2	SPRING 2020
ET 478	1.1 1.2			4.2		SPRING 2020

Table VIII. Mapping Course Assessments to Concentrations and Semesters

Student Outcomes	Perf. Ind.	Common Course				Computer ET				Construction ET				Electrical Energy ET				Mechanical ET			
		F18	S19	F19	S20	F18	S19	F19	S20	F18	S19	F19	S20	F18	S19	F19	S20	F18	S19	F19	S20
SO[1]	1.1			241			320			132						433					283
	1.2			241			320			132						433					283
SO[2]	2.1	492					425					332					365		385		
	2.2	492					425				336						365		385		
	2.3	492					425				336						365		385		
SO[3]	3.1	493		494	213																
	3.2	493		494																	
	3.3	493		494																	
SO[4]	4.1							410					441				363		385		
	4.2			305				410				332					363			376	
	4.3			305			425						441			433				386	
SO[5]	5.1	493		494	213																
	5.2	493		494	213																
	5.3				100																

Engineering Technology Rubrics for Assessing ABET Student Outcomes

[1] to [5]

Rubrics for Assessing Students Outcomes

Rubric 1 – for assessing Student Outcome [1]:

[1]. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline

1.1. Uses appropriate tools to collect and analyze data

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to use tools and analyze data in the Computer Engineering Technology concentration; for example, oscilloscopes, multimeters, computers, protoboards, microprocessors, etc.	Student fails to use tools nor analyze data in computer engineering technology.	Student identifies tools, but struggles to use them or to analyze data.	Student correctly uses tools to collect data and analyze it, but makes minor mistakes during the process.	Student shows proficiency and familiarity with tools and uses them effectively to collect and analyze data in computer engineering technology.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to use tools and analyze data in the Construction Engineering Technology concentration; for example, concrete mixers, surveying tools. For example, surveying equipment, materials samples, measuring tools, standards and references.	Student fails to use tools nor analyze data in construction engineering technology.	Student identifies tools, but struggles to use them or to analyze data.	Student correctly uses tools to collect data and analyze it, but makes minor mistakes during the process.	Student shows proficiency and familiarity with tools and uses them effectively to collect and analyze data in construction engineering technology.	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student demonstrates an ability to use tools and analyze data in the Electrical Energy Engineering Technology concentration; for example, power electronics, oscilloscopes, protoboards, signal generators, multimeters, energy conversion devices, etc.	Student fails to use tools nor analyze data in electrical energy engineering technology.	Student identifies tools, but struggles to use them or to analyze data.	Student correctly uses tools to collect data and analyze it, but makes minor mistakes during the process.	Student shows proficiency and familiarity with tools and uses them effectively to collect and analyze data in electrical energy engineering technology.	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).
Mechanical ET	d. Student demonstrates an ability to use tools and analyze data in the Mechanical Engineering Technology concentration; for example, measuring resistance in pipes, specific heat, and stresses developed in components under loading.	Student fails to use tools nor analyze data in mechanical engineering technology.	Student identifies tools, but struggles to use them or to analyze data.	Student correctly uses tools to collect data and analyze it, but makes minor mistakes during the process.	Student shows proficiency and familiarity with tools and uses them effectively to collect and analyze data in mechanical engineering technology.	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

1.2. Follows scientific approach to solve broadly defined engineering problems

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to select and apply scientific and mathematical knowledge, to solve broadly defined computer technology problems; for example, ohm's law, electric loops, control theory, etc.	Student fails to apply any scientific approach to solve typical problems in computer technology.	Student identifies scientific methods, but struggles to apply them to solve problems in computer engineering technology.	Student demonstrates an ability to apply scientific methods in computer engineering technology, but occasionally commits minor mistakes while applying them.	Student displays a clear and consistent knowledge of scientific methods typical in computer engineering technology and applies them correctly to solve problems in the field.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to select and apply scientific and mathematical knowledge, to solve broadly defined construction technology problems; for example, equilibrium of forces, stress analysis, analysis of simple beams and trusses, etc.	Student fails to apply any scientific approach to solve typical problems in construction technology.	Student identifies scientific methods, but struggles to apply them to solve problems in construction engineering technology.	Student demonstrates an ability to apply scientific methods in construction engineering technology, but occasionally commits minor mistakes while applying them.	Student displays a clear and consistent knowledge of scientific methods typical in construction engineering technology and applies them correctly to solve problems in the field.	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student an ability to select and apply scientific and mathematical knowledge, to solve broadly defined electrical energy technology problems; for example, the design and analysis of energy conversion devices.	Student fails to apply any scientific approach to solve typical problems in electrical energy engineering technology.	Student identifies scientific methods, but struggles to apply them to solve problems in electrical energy engineering technology.	Student demonstrates an ability to apply scientific methods in electrical energy engineering technology, but occasionally commits minor mistakes while applying them.	Student displays a clear and consistent knowledge of scientific methods typical in electrical energy engineering technology and applies them correctly to solve problems in the field.	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).
Mechanical ET	d. Student demonstrates an ability to select and apply scientific and mathematical knowledge, to solve broadly defined mechanical technology problems; for example, the principles of solid and fluid mechanics, machine design, thermodynamics, and heat transfer.	Student fails to apply any scientific approach to solve typical problems in mechanical engineering technology.	Student identifies scientific methods, but struggles to apply them to solve problems in mechanical engineering technology.	Student demonstrates an ability to apply scientific methods in mechanical technology, but occasionally commits minor mistakes while applying them.	Student displays a clear and consistent knowledge of scientific methods typical in mechanical engineering technology and applies them correctly to solve problems in the field.	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

Rubric 2 – for assessing Student Outcome [2]:

[2]. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;

2.1. Uses appropriate methods to design components and systems

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to use methods to design components and systems appropriate to the discipline; for example: coding, PLC, IoT, embedded systems, interfacing, Input/Output, etc	Student fails to use methods to design components or systems typical in computer engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems, components and/or processes relevant in computer engineering technology, but occasionally commits mistakes that display a lack of clarity in understanding.	Student displays a clear and consistent knowledge of the design process, whether of systems, components, or processes in computer engineering technology.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to use methods to design components and systems appropriate to the discipline; for example: the design and analysis of steel structures.	Student fails to use methods to design components or systems typical in construction engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems and components typical in construction engineering, but occasionally commits minor mistakes.	Student displays a clear and consistent knowledge of the design materials and processes used in construction technology.	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student demonstrates an ability to use methods to design components and systems appropriate to the discipline; for example: the design and analysis of energy conversion devices.	Student fails to use methods to design components or systems typical in electrical energy engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems and components typical in electrical energy engineering technology, but occasionally commits minor mistakes.	Student displays a clear and consistent knowledge of the materials and processes used in electrical energy engineering technology.	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).
Mechanical ET	d. Student demonstrates an ability to use methods to design components and systems appropriate to the discipline; for example: design and analysis of machine elements and mechanisms.	Student fails to use methods to design components or systems typical in mechanical engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems and components typical in mechanical engineering technology, but occasionally commits minor mistakes.	Student displays a clear and consistent knowledge of the materials and processes used in mechanical engineering technology.	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

2.2. Uses evidence-based approach to validate design and analysis

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to follow evidence-based approaches common in computer engineering technology to validate design and analysis of components, systems and processes appropriate to the discipline; example: using KVL. KCL, Ohms law to validate voltages and current in electric loops.	Student fails to understand evidence-based approaches, or properly apply them.	Student understands the concept of evidence-based approaches, but struggles to apply them to validate design and analysis	Student demonstrates an ability to use evidence-based approaches to validate design and carryout analysis relevant in computer engineering technology, but occasionally commits mistakes that display a lack of clarity in understanding.	Student displays a clear and consistent knowledge of applying evidence-based approaches to validate designs and carryout analysis of systems, components, or processes in computer engineering technology.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to follow evidence-based approaches common in construction engineering technology to validate design and analysis of components, systems and processes appropriate to the discipline; including checking against industry codes and standards, using suitable modeling and/or testing	Student fails to understand evidence-based approaches, or properly apply them.	Student understands the concept of evidence-based approaches, but struggles to apply them to validate design and analysis	Student demonstrates an ability to use evidence-based approaches to validate design and carryout analysis relevant in construction engineering technology, but occasionally commits mistakes that display a lack of clarity in understanding.	Student displays a clear and consistent knowledge of applying evidence-based approaches to validate designs and carryout analysis of systems, components, or processes in construction engineering technology.	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student demonstrates an ability to follow evidence-based approaches common in electrical energy engineering technology to validate design and analysis of components, systems and processes appropriate to the discipline; For example, using basics of electrical circuits and electronics to validate some complex circuits such as voltage regulators	Student fails to understand evidence-based approaches, or properly apply them.	Student understands the concept of evidence-based approaches, but struggles to apply them to validate design and analysis	Student demonstrates an ability to use evidence-based approaches to validate design and carryout analysis relevant in electrical energy engineering technology, but occasionally commits mistakes that display a lack of clarity in understanding.	Student displays a clear and consistent knowledge of applying evidence-based approaches to validate designs and carryout analysis of systems, components, or processes in electrical energy engineering technology.	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).

Mechanical ET	**d.** Student demonstrates an ability to follow evidence-based approaches common in mechanical engineering technology to validate design and analysis of components, systems and processes appropriate to the discipline; for example, analysis of doping of semiconductors using diffusion or calculating roll force and torque in a flat rolling operation, Calculating the stresses on a component for different loading conditions using theoretical calculations and SolidWorks FE simulation and design the component accordingly.	Student fails to understand evidence-based approaches, or properly apply them.	Student understands the concept of evidence-based approaches, but struggles to apply them to validate design and analysis	Student demonstrates an ability to use evidence-based approaches to validate design and carryout analysis relevant in mechanical engineering technology, but occasionally commits mistakes that display a lack of clarity in understanding.	Student displays a clear and consistent knowledge of applying evidence-based approaches to validate designs and carryout analysis of systems, components, or processes in mechanical engineering technology.	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

2.3. Uses software to design components, systems and/or simulate and test prototypes

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to design components and systems and/or simulate and test prototypes using software common in computer engineering technology: C, C++, Python, etc;	Student fails to understand the design process, or properly identify components and processes typical in computer engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems, components and/or processes relevant in computer engineering technology, but occasionally commits mistakes that display a lack of clarity in understanding.	Student displays a clear and consistent knowledge of the design process, whether of systems, components, or processes in computer engineering technology.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to design components and systems and/or simulate and test prototypes using software common in construction engineering technology: Primavera, Microsoft Project, etc;.	Student fails to understand the design process, or properly identify components and processes typical in construction engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems and components typical in construction engineering, but occasionally commits minor mistakes.	Student displays a clear and consistent knowledge of the design materials and processes used in construction technology.	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student demonstrates an ability to design components and systems and/or simulate and test prototypes using software common in electrical energy engineering technology: SPICE, Multisim, Homer, etc;	Student fails to understand the design process, or properly identify components and processes typical in electrical energy engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems and components typical in electrical energy engineering technology, but occasionally commits minor mistakes.	Student displays a clear and consistent knowledge of the materials and processes used in electrical energy engineering technology.	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).
Mechanical ET	d. Student demonstrates an ability to design components and systems and/or simulate and test prototypes using software common in mechanical engineering technology: Working Model 2D, COMSOL, SolidWorks, etc;	Student fails to understand the design process, or properly identify components and processes typical in mechanical engineering technology.	Student understands the concept of designing systems, components, and/or processes to a limited extent, and strives to achieve a firmer grasp of the subject matter.	Student demonstrates an ability to design systems and components typical in mechanical engineering technology, but occasionally commits minor mistakes.	Student displays a clear and consistent knowledge of the materials and processes used in mechanical engineering technology.	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

Rubric 3 – for assessing Student Outcome [3]:

[3]. an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;

3.1. Writes reports and applies proper guidelines (cover page, introduction, method, results, analysis, uses complete and grammatically correct sentences)

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
All Concentrations	Student demonstrates ability to effectively and clearly express thoughts in written presentations, examples: technical reports, field experience observations, etc	Student fails to effectively and clearly express thoughts in written communications.	Student expresses thoughts in writing, but fails to make an effective argument or repetitively makes grammatical mistakes and/or uses wrong sentence structure.	Student expresses thoughts in writing, but makes minor mistakes and/or struggles to articulate effective sentences and present ideas clearly.	Student demonstrates a consistent pattern of communicating effectively in writing and uses complete and effective sentences to articulate ideas clearly	At least 70% of students in all concentrations are expected to meet or exceed the criteria (Levels 3 and 4).

3.2. Communicates technical information orally in front of audience in a confident and professional manner

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
All Concentrations	Student demonstrates ability to effectively and clearly express thoughts in oral presentations while showing confidence and professional manner; for example, proper appearance, faces the audience, responds to audience questions, etc	Student fails to effectively and clearly express thoughts in oral communications and/or shows lack of professionalism in appearance, or lacks interest in presentation	Student expresses thoughts orally, but fails to make an effective presentation, for example, unclear voice, in organized ideas, or not directly facing audience.	Student expresses thoughts orally, organizes the ideas, but shoes a lack of confidence.	Student demonstrates a consistent pattern of communicating orally effectively with organized ideas and high level of confidence in front of audience	At least 70% of students in all concentrations are expected to meet or exceed the criteria (Levels 3 and 4).

3.3. Uses technology and modern techniques to communicate technical information

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
All Concentrations	Student demonstrates ability to effectively use modern techniques and methods to clearly communicate and express thoughts in written and oral presentations; for example, Moodle, power points, projector, computer, charts, tables, illustrations, etc.	Student fails to use modern technology and visual aids to prepare, edit, or present technical information	Student is able to use modern technology and visual aids but produces inconsistent technical reports that are not coherent and/or hard to understand	Student is able to use modern technology and visual aids to prepare, edit, or present technical information in an effective and meaningful manner	Student shows proficiency in using modern technology and visual aids to prepare, edit, or present technical information in an effective and meaningful manner	At least 70% of students in all concentrations are expected to meet or exceed the criteria (Levels 3 and 4).

Rubric 4 – for assessing Student Outcome [4]:

[4]. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes;

4.1. Uses advanced software to interpret data and results

	Performance Indicator	Below Expectations - 1	Progressing to Criteria – 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to identify and use software packages that are appropriate for the computer engineering technology discipline to present results in a meaningful way; for example, Excel, Word, Project, AutoCAD, MATLAB, R stats, or develop own code for data acquisition/analysis/debugging, etc)	Student fails to identify and/or to use software to present and interpret results common in the discipline. Also, can't write code to save his life.	Student is able to load data and use only very basic functions of software but the outcome is poor, unclear, and doesn't present/interpret the data effectively. Also able to acquire data but fails to interpret its meaning.	Student demonstrates good mastery of software and its common functions to interpret results and produces meaningful results and interprets it clearly and effectively with minor mistakes. Also able to acquire data and demonstrates proper understanding of its meaning.	Student professionally uses software or combinations of software packages and/or advanced functions to present data and analyze results meaningfully and effectively. Also demonstrates ability to use a proper interpretation of data for debugging and process improvement.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to identify and use software packages that are appropriate for the construction engineering technology discipline to present results in a meaningful way; for example, Microsoft Excel, Microsoft Project, Primavera and AutoCAD.	Student fails to identify and/or to use software to present and interpret results common in the discipline.	Student uses software to interpret result but the outcome is poor, unclear, and doesn't present the data effectively	Student uses software to interpret results and produces meaningful results and interprets it clearly and effectively with minor mistakes	Student uses the software professionally to present data and analyze results meaningfully and effectively	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student demonstrates an ability to identify and use software packages that are appropriate for the electrical energy engineering technology discipline to present results in a meaningful way; for example, Use MATLAB to validate the simulation results coming from projects. Use Excel to present results in a meaning way.	Student fails to identify and/or to use software to present and interpret results common in the discipline.	Student uses software to interpret result but the outcome is poor, unclear, and doesn't present the data effectively	Student uses software to interpret results and produces meaningful results and interprets it clearly and effectively with minor mistakes	Student uses the software professionally to present data and analyze results meaningfully and effectively	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).

Mechanical ET	d. Student demonstrates an ability to identify and use software packages that are appropriate for the mechanical engineering technology discipline to present results in a meaningful way; for example, Excel, Word, Project, AutoCAD, Solidworks, WorkingModel, COMSOL, MATLAB, etc) [H]	Student fails to identify and/or to use software to present and interpret results common in the discipline.	Student uses software to interpret result but the outcome is poor, unclear, and doesn't present the data effectively	Student uses software to interpret results and produces meaningful results and interprets it clearly and effectively with minor mistakes	Student uses the software professionally to present data and analyze results meaningfully and effectively	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

4.2. Ability to use equipment and/or methods to perform tests common in the field

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to conduct standard tests and measurements; using equipment and/or methods that are typically used in computer engineering technology; for example, electrical measurements, electrical wiring codes and specifications, etc.	Student fails to use equipment and/or fails to follow correct experimental procedure to perform tests	Student shows weakness in using equipment and methods and follows correct experimental procedure but produces poor results	Student knows how to use equipment and methods and understands standard procedures to conduct tests common in the field	Student displays a clear pattern of understanding the use of equipment and methods and follows procedures to perform tests confidently	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to conduct standard tests and measurements; using equipment and/or methods that are typically used in construction engineering technology; for example, supervised field practice in the layout of construction projects, etc.	Student fails to use equipment and/or fails to follow correct experimental procedure to perform tests	Student shows weakness in using equipment and methods and follows correct experimental procedure but produces poor results	Student knows how to use equipment and methods and understands standard procedures to conduct tests common in the field	Student displays a clear pattern of understanding the use of equipment and methods and follows procedures to perform tests confidently	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).

Elect. Energy ET	c. Student demonstrates an ability to conduct standard tests and measurements; using equipment and/or methods that are typically used in electrical energy engineering technology; for example, finding optimal location for installation of solar panels using common tests, measuring voltage output of photovoltaic panels, etc.	Student fails to use equipment and/or fails to follow correct experimental procedure to perform tests	Student shows weakness in using equipment and methods and follows correct experimental procedure but produces poor results	Student knows how to use equipment and methods and understands standard procedures to conduct tests common in the field	Student displays a clear pattern of understanding the use of equipment and methods and follows procedures to perform tests confidently	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).
Mechanical ET	d. Student demonstrates an ability to conduct standard tests and measurements; using equipment and/or methods that are typically used in mechanical engineering technology; for example, advanced analyses of engineering materials.	Student fails to use equipment and/or fails to follow correct experimental procedure to perform tests	Student shows weakness in using equipment and methods and follows correct experimental procedure but produces poor results	Student knows how to use equipment and methods and understands standard procedures to conduct tests common in the field	Student displays a clear pattern of understanding the use of equipment and methods and follows procedures to perform tests confidently	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

4.3. Ability to make improvements to a design on the basis of experimentation

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
Computer ET	a. Student demonstrates an ability to conduct standard tests and experimentation common in the computer engineering technology, then analyze and interpret the data, and make necessary improvements; for example, program debugging, electrical measurements to modify resistance values, or voltage through PWM, etc.	Student fails to follow correct experimental procedures, or make proper measurements, or analyze and interpret results, or apply results to improve processes.	Student understands standard procedures and experimental conditions of tests, but displays difficulty in analyzing and interpreting data, and/or using results to improve processes.	Student understands standard procedures and measurements, conducts experiments correctly, and analyzes and interprets data correctly most of the time, but occasionally fails to do so.	Student displays a clear pattern of understanding procedures and tests, analyzes and interprets data confidently, and uses results obtained to improve technological processes.	At least 70% of students in CpET are expected to meet or exceed the criteria (Levels 3 and 4).
Construction ET	b. Student demonstrates an ability to conduct standard tests and experimentation common in the construction engineering technology, then analyze and interpret the data, and make necessary improvements; for example, design and analysis of steel beams, frames, columns, critical path analysis, learning program evaluation and review techniques (PERM).	Student fails to follow correct experimental procedures, or make proper measurements, or analyze and interpret results, or apply results to improve processes.	Student understands standard procedures and experimental conditions of tests, but displays difficulty in analyzing and interpreting data, and/or using results to improve processes.	Student understands standard procedures and measurements, conducts experiments correctly, and analyzes and interprets data correctly most of the time, but occasionally commits minor errors in the process.	Student displays a clear pattern of understanding procedures and tests, analyzes and interprets data confidently, and uses results obtained to improve technological processes.	At least 70% of students in CnET are expected to meet or exceed the criteria (Levels 3 and 4).
Elect. Energy ET	c. Student demonstrates an ability to conduct standard tests and experimentation common in the electrical energy engineering technology, then analyze and interpret the data, and make necessary improvements; for example, design some basic projects and circuits for renewable sources such as wind turbine, photocell, and solar cells.	Student fails to follow correct experimental procedures, or make proper measurements, or analyze and interpret results, or apply results to improve processes.	Student understands standard procedures and experimental conditions of tests, but displays difficulty in analyzing and interpreting data, and/or using results to improve processes.	Student understands standard procedures and measurements, conducts experiments correctly, and analyzes and interprets data correctly most of the time, but occasionally commits minor errors in the process.	Student displays a clear pattern of understanding procedures and tests, analyzes and interprets data confidently, and uses results obtained to improve processes involving electrical energy engineering technology	At least 70% of students in EET are expected to meet or exceed the criteria (Levels 3 and 4).

Mechanical ET	d. Student demonstrates an ability to conduct standard tests and experimentation common in the mechanical engineering technology, then analyzes and interprets the data, and makes necessary improvements; for example, using design parameters to determine the minimum diameter of steel wires supporting a tower, using simulation SW to determine the best system parameters (mass, stiffness, damping, capacitance, resistance, inductance, temperature, added heat, … etc) based on the performance characteristics and plots (time constant, rise time, overshoot, steady state time, steady state error, etc).	Student fails to follow correct experimental procedures, or make proper measurements, or analyze and interpret results, or apply results to improve processes.	Student understands standard procedures and experimental conditions of tests, but displays difficulty in analyzing and interpreting data, and/or using results to improve processes.	Student understands standard procedures and measurements, conducts experiments correctly, and analyzes and interprets data correctly most of the time, but occasionally commits minor errors in the process.	Student displays a clear pattern of understanding procedures and tests, analyzes and interprets data confidently, and uses results obtained to improve processes involving mechanical engineering technology.	At least 70% of students in MET are expected to meet or exceed the criteria (Levels 3 and 4).

Rubric 5 – for assessing Student Outcome [5]:

[5]. an ability to function effectively as a member or leader on a technical team

5.1. Demonstrate traits conducive to team work (punctuality, flexibility, participation, respectfulness)

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
All Concentrations	Student shows qualities that promote constructive team work; for example, punctuality, flexibility, participation, appreciation, and respect	Student lacks being punctual, flexible, or respectful to the team members	Student shows acceptable, but overall poor punctuality, flexibility, appreciation or respect to the team members	Student functions coherently with the rest of the team members and shows good qualities with the exception of only minor and mild incidents	Student demonstrates a consistent pattern of qualities that are conductive to team work and functions coherently and comfortably with the team members	At least 70% of students in all concentrations are expected to meet or exceed the criteria (Levels 3 and 4).

5.2. Recognizes participant roles in a team setting and fulfills appropriate roles to ensure team success.

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
All Concentrations	Student demonstrates ability to effectively participate and function as a team member, to fulfill the assigned duties and to meaningfully contribute to the overall success of the team	Student fails to function effectively as a member of a technical team	Student functions as part of a technical team, but has difficulty in demonstrating effectiveness.	Student functions effectively as member of a technical team, but occasionally fails to maintain effectiveness.	Student demonstrates a consistent pattern of effectiveness as part of a technical team.	At least 70% of students in all concentrations are expected to meet or exceed the criteria (Levels 3 and 4).

5.3. Recognizes the ethical and societal responsibility in systems' design and implementation.

	Performance Indicator	Below Expectations - 1	Progressing to Criteria - 2	Meets Criteria - 3	Exceeds Criteria - 4	Score
All Concentrations	Student understands the responsibility that rests on professionals and the ethical and societal impact of their decisions	Student fails to establish a connection between technical design decisions and their ethical and societal impact. Student doesn't include evidence from recent incidents.	Student includes evidence of failed systems and/or projects but cannot establish scientific and logical connections between the technical and design decisions and their ethical and societal impact.	Student demonstrates a knowledge of the role of professionals and the ethical and societal impact supported by evidence from recent incidents and providing logical and scientific connections .	Students demonstrate appropriate comprehension of the role of professionals and the ethical and societal impact of the profession. Students are able to appropriately relate, reason, and critique evidence from recent engineering failures or incidents using technical terminology and scientific method approach.	At least 70% of students in all concentrations are expected to meet or exceed the criteria (Levels 3 and 4).