ABET
SELF-STUDY REPORT

for the

Associate of Science
Electronics Engineering Technology

at

Fairmont State University

Fairmont, West Virginia

Spring 2019

CONFIDENTIAL

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Program Self-Study Report
for
ETAC of ABET
Accreditation or Reaccreditation

BACKGROUND INFORMATION

A. Contact Information

List name, mailing address, telephone number, fax number, and e-mail address for the primary pre-visit contact person for the program.

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B. Program History

Include the year implemented and the date of the last general review. Summarize major program changes with an emphasis on changes occurring since the last general review.

Historical Perspective

A review of university academic catalogs reveals the current Electronics Engineering Technology, Associate of Science in Engineering Technology (A.S) program, evolved into a stand-alone academic program 1976. Prior to that, the then Division of Technology offered a core curriculum with specializations/concentrations in various fields of study. The evolution of this program over the years was in response to perceived needs and trends in local industry and higher education. A chronology of the changes is in *Table 1*. The original program remained unaltered until 1976 when it was changed from an area of concentration to the Electronics Engineering Technology *program.* (see *Table 2*). Other than modifications to general studies, curriculum changes during that time, there were minimal course changes resulting in a fluctuation of credit hour.

Historical Review of Program Electronics Engineering Technology, ASET				
Year	**Program Title**	**Degree**	**Hours Required**	**Changes**
1976-1978	Electrical - Electronic Technology	BS/AS	69-72	General Education/Required Related Courses/Concentration
1978-80	Electronics Technology	BS/AS	69-72	General Studies/Required Related Courses/Technology Core/Concentration
1980-84	Electronics Technology	BS/AS	67	General Studies/Required Related Courses/Technology/Technology Core/Concentration
1984-86	Electronics Engineering Technology	BS/AS	67	Course organization changed to General Requirements and Electronics concentration
1986-88	Electronics Engineering Technology	BS/AS	67	General Requirements/ Requirements-Electronics
1988-90	Electronics Engineering Technology	BS/AS	67	General Studies/Requirements-Electronics
1990-1994	Electronics Engineering Technology	BS/AS	69	TAC/ABET Accredited General Studies Requirement/Requirements-Electronics
1994-2000	Electronics Engineering Technology	BS/AS	67	TAC/ABET Accredited General Studies Requirement/Requirements-Electronics
2000-2001	Electronics Engineering Technology	BS/AS	67	TAC/ABET Accredited General Studies Requirement/Requirements-Electronics
2001-2003	Electronics Engineering Technology	BS/AS	67	TAC/ABET Accredited General Studies Requirement/Requirements-Electronics
2003-2005	Electronics Engineering Technology	BS/AS	67	TAC/ABET Accredited Liberal Studies Requirement/Requirements-Electronics
2005-2013	Electronics Engineering Technology	BS/AS	68	TAC/ABET Accredited Liberal Studies Requirement/Requirements-Electronics
2013-2014	Electronics Engineering Technology	BS/AS	60	New Curriculum. Reduction to 60 hours with 10 hours of General Studies
2016 - 2017	Electronics Engineering Technology	BS/AS	60	Updated curriculum to reflect changes in technology

Table 1

Program Changes after Last General Review

ABET's last general review of the Electronics Engineering Technology program was November 10-12, 2007. Since that visit, there has been one program revision resulting in major curriculum modifications. In 2012-2013 the program proposed and received approval to make changes that met mandates of the Higher Education Policy Commission, the university, and recommendations of the Industrial Advisory Committee (*see Table 3*). The proposal was designed to align the Electronics Engineering Technology program with the current 60 hour degree requirement and newly approved general studies curriculum. Other changes were based on results of the program's Continuous Improvement Plan.

1976 Program Curriculum			
Program Title:	Electrical/Electronic Engineering Technology		
Program Degree:	AS		
Required Credits:	69 Semester Hours		
Required Related Courses:			**Credits**
General Requirements			
English	104	Written English	3
	108	Written English	3
	109	Tech Report Writing	3
Soc. Stu.		Econ, Geography, Hist, Pol Sci, Sociology	3
Physics	101, 102	Intro to Physics	8
Math	101	Applied Technical Math I	3
	102	Applied Technical Math II	3
Business	309	Industrial Organization and Mgmt.	3
EDP	100	Introduction Electronic Data Processing	3
Required Related Courses:			
Tech	103	Basic Electricity	3
	112	Basic Electronics	4
	121	Drafting	3
	170	Statics	3
	182	Materials and Processes of Ind	3
	190	Industrial Orientation	1
	193	Personnel Prob. & Labor Rel	3
	194	Personnel Administration	3
	270	Strength of Materials	3
Concentration:			
Tech	203	Electrical Measurements	4
	210	Intro. To Computer Elec.	2
	206	Electrical Machinery	4
	315	Industrial Electronics & Controls II	2
	415	Electrical Maintenance	2
		Total Course Related Hours	**69**

Table 2

2012/13 Program Curriculum			
Program Title: Electronics Engineering Technology			
Program Degree: AS			
Program Changes: Extensive Modifications **&** Program Categories Consolidated into One - ***Required Courses***			
Required Credits: 68 Semester Hours			
			Credits
Required Courses			
COMM	2200	Intro to Human Communication	3
COMP	1101	Applied Technical Programming	3
DRFT	1100	Engineering Graphics	3
ECON	2200	Introductions to Economics	3
ENGL	1104	Written English I	3
ENGL	1109	Tech Report Writing	3
ELEC	1100	Circuit Analysis I	3
	2200	Electronic Shop Practices	3
	2210	Circuit Analysis II	3
	2215	Basic Transistors	3
	2220	Linear Electronics	3
	2230	Digital Electronics	3
	2240	Industrial Electronics	3
	2250	AC-DC Machinery and Controls	3
	2260	Communications Systems	3
	2270	Microcomputer Systems	3
	2280	Programmable Controllers	3
MATH	1101	Applied Technical Math I	3
	1102	Applied Technical Math II	3
PHYS	1101	Introduction to Physics I	4
	1102	Introduction to Physics II	4
SFTY	1100	Safety & Environmental Comp. of Industry	3
TECH	2290	Engineering Analysis I	4
		Total Course Hours	**68**

Table 3

2013/14 Program Curriculum			
Program Title: Electronics Engineering Technology			
Program Degree: AS			
Program Changes: Extensive Modifications **&** Program Categories Consolidated into One - ***Required Courses***			
Required Credits: 59-60 Semester Hours			
			Credits
Required Courses			
COMM	2202	Communications in the World of Work	3
COMP	1101	Applied Technical Programming	3
ENGL	1104	Written English I	3
ENGL	1108	Written English II	3
ELEC	1100	Circuit Analysis I	3
	2200	Electronic Shop Practices	3
	2210	Circuit Analysis II	3
	2225	Linear Devices	3
	2230	Digital Electronics	3
	2240	Industrial Electronics	3
	2250	AC-DC Machinery and Controls	3
	2260	Communications Systems	3
	2270	Microcomputer Systems	3
	2280	Programmable Controllers	3
MATH	1185	Applied Calculus I	3
PHYS	1101	Introduction to Physics I	4
TECH	1108	Engineering Graphics	3
HLTH	Elective		2-3
Free	Elective		3
		Total Course Hours	**59-60**

Table 4

2016 – 2017 Program Curriculum			
Program Title:	Electronics Engineering Technology		
Program Degree:	AS		
Program Changes:	Extensive Modifications - ***Required Courses***		
Required Credits:	60 Semester Hours		
Required Courses			**Credits**
COMM	2202	Communication in the World of Work	3
COMP	1110 or 1120	Programming (Python or C+)	3
ENGL	1101	Written English I	3
	1103	Tech Report Writing	3
ELEC	1100	Circuit Analysis I	3
	1120	AC/DC Electronic Analysis	3
	2210	Circuit Analysis II	3
	2225	Electronic Devices	3
	2230	Digital Electronics	3
	2240	Industrial Electronics	3
	2250	AC-DC Machinery and Controls	3
	2280	Programmable Controllers	3
MATH	1510/1530 (per ACT Score)	Applied Technical Math 1	3
	1520/1540 (per ACT Score)	Applied Technical Math 2	3
	2501 or TECH 2290	Calculus 1	4
	2502 or TECH 3300	Calculus 2	4
PHYS	1101	Intro to Physics 1	4
	1102	Intro to Physics 2	4
Elective	Gen Studies Elective	Category 10 (list in Catalog)	2
		Total Course Hours	**60**

Table 5

C. Options

List and describe any options, tracks, concentrations, etc. included in the program.

The Associates of Science in Electronics Engineering Technology does not have any options, tracks or concentrations. Students who come into the program with prior college credits are advised depending on the academic interests.

D. Program Delivery Modes

Describe the delivery modes used by this program, e.g., days, evenings, weekends, cooperative education, traditional lecture/laboratory, off-campus, distance education, web-based, etc.

The Electronics Engineering Technology program is delivered primarily through day, afternoon, and evening course offerings on the main campus at 1201 Locust Avenue, Fairmont, WV.

The program's course material is delivered via lecture, laboratory, experiential, and Blackboard methodologies. Even though course material development and delivery is at the discretion of the professor, all faculty must post course information (syllabi) and grades to Blackboard.

E. Program Locations

Include all locations where the program or a portion of the program is regularly offered (this would also include dual degrees, international partnerships, etc.).

The Electronics Engineering Technology program is located on the main campus of Fairmont State University. Most of the program courses are offered in the Engineering Technology building.

F. Public Disclosure

Provide information concerning all the places where the Program Education Objectives (PEOs), Student Outcomes (SOs), annual student enrollment and graduation data are made accessible to the public. This information should be easily found on either the program or institutional website so please provide the URLs.

All program information can be found at the following program website:

https://www.fairmontstate.edu/collegeofscitech/academics/electronics-engineering-technology

G. Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions Taken to Address Them

Summarize the Deficiencies, Weaknesses, or Concerns remaining from the most recent ABET Final Statement. Describe the actions taken to address them, including effective dates of actions, if applicable. If this is an initial accreditation, state it is an initial accreditation.

Findings in meeting provisions of the ABET criteria or policies are described below.

Program Concerns

1. Electronics Engineering Faculty Weakness:
2. Classroom usage/availability Weakness:

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1. In 2014 another faculty member was added (Thomas M. McLaughlin) to the Electronics Engineering Technology program along with the current faculty member, Professor Larry Allen to satisfy this weakness. Also, in 2015, another faculty member was hired (Musat Crihalmeanu) to take the place of retiring Professor Mr. Larry Allen.

2. Previous Findings and Criteria: Criterion 7, Facilities, states, "Classrooms, offices, laboratories, and associated equipment must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning." There is currently an effort to distribute space between Fairmont State University and Pierpont Community College. The final allocation of space could be a rigid proportional distribution that does not take into consideration the needs of the programs at both institutions. The final allocation of space should support attainment of student outcomes and provide an atmosphere conducive to learning. This finding remains a Concern until the program provides adequate classrooms, offices and laboratories to support attainment of the student outcomes.

   Due Process Response: A memorandum from the Provost was provided stating that the University expects to reallocate space to the College of Science and Technology upon completion of the Advanced Technology Center in 2015.

   Status after Due Process: The Concern remains until adequate space has been allocated to the program to support the attainment of the student outcomes.

   RESPONSE: Fairmont State University currently shares space with Pierpont Community & Technical College. Upon completion of Pierpont Community and Technical College new off-site Advanced Technology Center, additional space will become available for the Engineering Technology programs.

   The Pierpont C&TC Advanced Technology Center was completed in 2017. Most of the freed space has been reallocated to the Department of Technology.

GENERAL CRITERIA

CRITERION 1. STUDENTS

For the sections below, attach in supplemental information any written policies that apply or provide a link to an appropriate page on the institution's website.

A. Student Admissions

Summarize the requirements and process for accepting new students into the program.

Admission Requirements

Students seeking admission to Fairmont State University must be of the age of compulsory attendance in the state of West Virginia and file an application for admission. Application and supporting credentials must be on file at least two weeks prior to the opening of a semester or term. All credentials submitted in support of an application for admission become the property of the University and will not be returned to the student. Any student admitted upon the basis of false credentials will be subject to immediate dismissal from the University.

The application for admission must specify the student's desired degree or program objective. Admission to Fairmont State University does not guarantee admission to specific programs, which may be restricted due to limitations of staff, physical facilities, and space available for experiential training. The standards and procedures for admission to limited-enrollment programs are presented later in this section.

Students who fail to register during the semester or term for which they have been admitted, must file another application in order to gain admission at a later date.

Fairmont State University Admission Requirements

REQUIRED FORMS AND CREDENTIALS

All students applying for admission to Fairmont State University degree programs are required to complete and submit the following forms and credentials:

1) Application for Admission
2) Official high school transcript sent by high school or high school equivalency diploma (not required for transfer students having a 2.0 grade point average and at least 24 hours of completed coursework)
3) Official ACT or SAT scores (not required for students who graduated high school more than 5 years prior to enrollment term or for transfer students having a 2.0 average and at least 24 hours of completed coursework)

4) Transcript of home-schooled students to include classes taken, credit hours and grades earned, graduation date and signature of the home school provider (may be submitted in lieu of a high school equivalency transcript, however the high school equivalency transcript may be required for financial aid and scholarships)
5) Official college transcripts, if applicable
6) Immunization Records including measles, mumps, & rubella (MMR) (if born after January 1, 1957)
7) Permanent Resident Card, if applicable

ADMISSION REQUIREMENTS

Admission to degree programs is open to graduates of approved high schools who have a 2.0 high school GPA (or received a high school equivalency transcript) and a minimum composite score of 18 on the ACT or 870 on the SAT (combination of Critical Reading and Math scores if test was taken prior to March 2016) or a 950 SAT (total score on tests taken March 2016 and after). Students with at least a 3.0 high school GPA and SAT or ACT composite test scores will be admitted regardless of the test scores. Applicants must also satisfy the following minimum high school unit requirements.

REQUIRED UNITS (Years)

- 4 English (including English 12 CR and courses in grammar, composition, and literature)
- 3 Social Studies (including U.S. studies/history)
- 4 Mathematics (three units must be Algebra I and higher or Math I or higher; Transitional Math for Seniors will also be accepted). Courses designed as "support courses", such as Math I Lab or Math I Support, that provide extra instructional time but no additional content shall not be acceptable as meeting the required 4 mathematic course core requirements.
- 3 Science (all courses to be college preparatory laboratory science, preferably including units from biology, chemistry, and physics)
- 1 Arts
- 2 World Language (two units of the same world language; sign language is also acceptable)

Fairmont State University may admit by exception students who do not meet the basic admissions standards.

B. Evaluating Student Performance

Summarize the process by which overall student academic performance is evaluated and student progress towards graduation is monitored. Include information on how the program ensures and documents that students are meeting course prerequisites and how the situation is addressed when a prerequisite has not been met.

ASSESSMENT OF STUDENT ACADEMIC ACHIEVEMENT

Fairmont State University employs a variety of assessment processes to inform students of progress in courses and clinical experience and toward degrees, to analyze programs in order to make appropriate curricular changes, and to determine institutional effectiveness. The university follows policies of the Higher Learning Commission of the North Central Association of Colleges and Schools, the WV Higher Education Policy Commission, policies of specific academic and professional accrediting bodies, and its own governing board.

In addition to regular course examinations and presentations, assessments used include field tests of proficiency in the major; electronic portfolios; capstone projects; internships; clinical practice reviews; and juried performances. Some programs, such as nursing and teacher education, also require nationally normed entrance and exit examinations. All degree programs analyze and review their effectiveness every five years, reporting this information to the WVHEPC and the Fairmont State University Board of Governors. Programs also engage in an annual review process to assess the effectiveness of academic programs and learning experiences. The institution reports its overall progress to the HLC every ten years.

GRADING SYSTEM

The following system of grading is used at FAIRMONT STATE UNIVERSITY:

A - Superior. Given only to students for exceptional performance
B - Good. Given for performance distinctly above average in quality
C - Average. Given for performance of average quality
D - Lowest passing grade, for performance of poor quality
F - Failure. Course must be repeated if credit is to be received
I - Incomplete, a temporary grade given only when students have completed more than 70% of the course but are unable to conclude it because of unavoidable circumstance.
W - W - Withdrew
CR - Credit/grade of "C" or higher. Does not affect quality points (see below)
NC - No Credit. Does not affect quality points
NCX - No Credit, indicating a significant lack of effort. Does not affect quality points.
NR - Not Reported. Given when instructor has not submitted grade
S - Satisfactory. Given for Continuing Education courses only
U - Unsatisfactory. Given for Continuing Education courses only

QUALITY POINTS

The value of a student's work is indicated by quality points. Candidates for graduation must have at least twice as many quality points as GPA hours; that is, a point-average of 2.0 on all college work.

Quality points for grades A, B, C, D, are computed as follows:

A - Four (4) quality points for each semester hour of credit
B - Three (3) quality points for each semester hour of credit
C - Two (2) quality points for each semester hour of credit
D - One (1) quality point for each semester hour of credit

Students' grade averages are determined by dividing the number of quality points by the number of GPA hours. No quality points are attached to grades of F, but the GPA hours for the courses in which these grades are received will be used in computing grade averages. In order to graduate, candidates for degrees must maintain a grade point average of 2.0 or better in all college courses and in all credit earned at Fairmont State University. An average of 2.0 must also be maintained in the major and minor fields of study. Students in the teacher education program must attain a grade point average of 2.75 overall, in each teaching field and in professional education. It is the student's responsibility to remain informed of quality point standing. This information can be obtained at any time from the Registrar's Office.

EXAMPLE FOR COMPUTING GRADE-POINT AVERAGE

Courses Taken	Final Grade	Quality Points	Semester Hours	Quality Points (Total)
ENGL 1101	A	4	3	12
BIOL 1101	D	1	4	4
HIST 2211	B	3	3	9
SOCY 1110	C	2	3	6
POLI 1100	B	3	3	9
MATH 1510	W	-	-	-
		13	16	40

40 Quality Points
16 Semester Hours = 2.5 Grade-Point Average

PRE-ENGINEERING CURRICULUM

Students planning graduate-level work in engineering should complete the following course work with a B average or better. Students are advised to carefully consult the catalog of the engineering school which they plan to attend, as Fairmont State University does not have an articulation agreement with any school of engineering.

- CHEM 1105, 2200 CHEMICAL PRINCIPLES, FOUNDATIONAL BIOCHEMISTRY 9
- ENGL 1101, 1102 WRITTEN ENGLISH I, II 6
- MATH 1540 TRIG. AND ELEMENTARY FUNCTIONS 3
- MATH 2501 CALCULUS I 4
- MECH 1100 STATICS 3
- PHED 1100 FITNESS AND WELLNESS 2
- PHYS 1101, 1102 INTRODUCTION TO PHYSICS I, II 8
- -OR PHYS 1105, 1106 PRINCIPLES OF PHYSICS I, II 8
- SOCIAL SCIENCE ELECTIVE 3
- TECH 1108 ENGINEERING GRAPHICS I 3

C. Transfer Students and Transfer Courses

Summarize the requirements and process for accepting transfer students and transfer credit. Include any state-mandated articulation requirements that impact the program.

TRANSFER STUDENTS

Any applicant for admission to Fairmont State University who has attended another collegiate institution will be classified as a transfer student. Every effort will be made to allow credit earned at other accredited colleges and universities to count towards a degree at Fairmont State University. Transfer students must meet the previously stated admission requirements of Fairmont State University. They must provide evidence of good standing at the institution last attended and must have maintained a minimum 2.0 GPA.

Students transferring fewer than 24 semester hours must provide an official copy of their high school transcript/home school or high school equivalency transcript, official ACT or SAT scores (if the student has graduated from high school less than 5 years prior to the enrollment term) and official college transcript(s).

TRANSFERRING CORE COURSEWORK

According to Series 17, Policy Regarding the Transferability of Credits and Grades at the Undergraduate Level, students who transfer from one state college or university to another may transfer core coursework that will count toward fulfillment of general studies requirements at the receiving institutions.

Under the terms of the agreement, a student may transfer up to thirty-five credit hours of undergraduate coursework in the areas of English composition, communications and literature, fine arts appreciation, mathematics, natural science, and social science as general studies credits. Copies of the agreement are available in the Enrollment Services Center.

The following is a list of General Studies Requirements that may be fulfilled by comparable coursework at another institution. All other General Studies Requirements must be completed at Fairmont State University.

English Composition - 6 hours
ENGL 1101 WRITTEN ENGLISH I 3
ENGL 1102 WRITTEN ENGLISH II.. 3

Communication and Literature - 6 hours
COMM 2200 INTRO. TO HUMAN COMMUNICATION 3
ENGL 2220 LITERATURE OF THE WESTERN WORLD I 3
ENGL 2221 LITERATURE OF THE WESTERN WORLD II 3
ENGL 2230 INTRODUCTION TO LITERATURE I 3
ENGL 2231 INTRODUCTION TO LITERATURE II 3
ENGL 3391 THE SHORT STORY 3

Fine Arts Appreciation - 3 hours
ART 1120 ART APPRECIATION 3
INTR 1120 EXPERIENCING THE ARTS 3
MUSI 1120 MUSIC APPRECIATION 3
THEA 1120 THEATRE APPRECIATION 3

Mathematics - 3-4 hours
MATH 1507 or 1407 FUNDAMENTAL CONCEPTS OF MATHEMATICS ….. 3-4
MATH 1530 or 1430 COLLEGE ALGEBRA 3-4
MATH 1540 TRIGONOMETRY AND ELEMENTARY FUNCTIONS 4
MATH 2501 CALCULUS I 4

Natural Science - 8-10 hours
BIOL 1105 BIOLOGICAL PRINCIPLES I 4
BIOL 1106 BIOLOGICAL PRINCIPLES II.. 4
CHEM 1101 GENERAL CHEMISTRY 4
CHEM 1102 GENERAL CHEMISTRY II 4
CHEM 1105 CHEMICAL PRINCIPLES I... 5
PHYS 1101 INTRODUCTION TO PHYSICS I 4
PHYS 1102 INTRODUCTION TO PHYSICS II 4
PHYS 1105 PRINCIPLES OF PHYSICS I 4
PHYS 1106 PRINCIPLES OF PHYSICS II 4
GEOL 1101 GENERAL GEOLOGY 4
GEOL 1102 HISTORICAL GEOLOGY 4

Social Science - 9 hours

BSBA 2200 ECONOMICS 3
BSBA 2211 PRINCIPLES OF MACROECONOMICS 3
HIST 1107 U.S. HISTORY I 3
HIST 1108 U.S. HISTORY II 3
HIST 2211 HISTORY OF CIVILIZATION I..................................3
HIST 2212 HISTORY OF CIVILIZATION II 3
HIST 2213 HISTORY OF CIVILIZATION III 3
POLI 1103 AMERICAN GOVERNMENT 3
POLI 2200 INTRODUCTION TO POLITICAL SCIENCE 3
PSYC 1101 INTRODUCTION TO PSYCHOLOGY 3
SOCY 1110 INTRODUCTION TO SOCIOLOGY 3

CREDIT FROM A JUNIOR OR COMMUNITY COLLEGE

The maximum credit accepted from a Junior or Community College accredited by the North Central Association of Colleges and Schools or other regional accrediting association will not exceed 72 semester hours.

D. Advising and Career Guidance

Summarize the process for advising and providing career guidance to students. Include information on how often students are advised, who provides the advising (program faculty, departmental, college or university advisor).

ACADEMIC ADVISING SYSTEM

Students are assigned academic advisors when they first enroll at Fairmont State University. The advisor is a faculty member in the respective major. Those students who are not ready to select a major upon entrance will be assigned to the Office of Exploratory Advising. Students wanting to change their major fields of study must contact the Registrar's Office; students will then be referred to their major departments to have a new advisor assigned.

Students should discuss problems relating to degree requirements, registration, and withdrawals from class or college with their advisors. Students are assigned a PIN number for registration each semester and must meet with their assigned advisor to discuss academic progress and scheduling. Once a schedule is established, students obtain their PIN numbers and may register for courses.

Faculty advising consists of academic and career planning. Students meet with their faculty advisors every semester until graduation. During the advising sessions, students are advised regarding course schedules, internships and career goals. Advisors will encourage elective and special topic courses that may enhance an individual students' goals.

All students in the Electronics Engineering Technology program have internship opportunities beginning in the freshmen/sophomore summer. Students are advised to choose opportunities that interest them and vary their experiences each summer with a different company or type of work environment. In the academic year 2018-2019, a variety of employers came to campus and gave students a chance to apply and interview. Students benefit from the opportunity to interview and potentially gain employment.

E. Work in Lieu of Courses

Summarize the requirements and process for awarding credit for work in lieu of courses. This could include such things as life experience, Advanced Placement, dual enrollment, test out, military experience, etc.

ADVANCED PLACEMENT EXAMINATION (AP)

Fairmont State University recognizes certain examinations of the College Board Advanced Placement Program. Students who participate in the AP program and wish to have their scores evaluated for credit should have their scores sent to Fairmont State University. The AP examinations are prepared by the College Board, and the papers are graded by readers of the Educational Testing Service, Princeton, NJ 08540. Students cannot receive credit for a score below 3 on any exam.

Students who do receive credit will be assigned the grade of CR, which is not calculated into the GPA. Students will not be awarded multiple credit, standing or GPA based on duplicated advanced placement scores, tests or transfer work.

COLLEGE LEVEL EXAMINATION PROGRAM (CLEP)

The College Level Examination Program (CLEP) provides students with the opportunity to demonstrate college-level achievement through a program of exams in undergraduate college courses. Students can reduce their costs in time and money by successfully completing CLEP tests for credit. The CLEP exams are prepared by the College Board and administered by Pierpont Community & Technical College. Students must achieve a minimum score of 50 to receive college credit. For additional information, contact the Center for Workforce Education at (304) 368-7254 or (304) 367-4920.

Students will not be awarded multiple credit, standing or GPA based on duplicated advanced placement scores, tests or transfer work.

EQUIVALENT CREDIT

A unique feature of the RBA Degree Program is the possibility of obtaining college-equivalent credit for demonstrated college-level knowledge that has been learned in environments and agencies outside the classroom. To earn credit, students must demonstrate knowledge of learning objectives and outcomes equivalent to specific courses taught at Fairmont State or within the West Virginia State System of Higher Education. Students who have obtained any professional, state, or national licenses or certifications can request a review of the credentials to determine if they are eligible to receive college credit.

Portfolio evaluations are completed for enrolled students by faculty members who teach the course for which credit is sought. Portfolios should be submitted prior to semester midterm to ensure that sufficient time is available for evaluation. The fee for portfolio evaluation is $300 regardless of whether or not credit is awarded. If credit is recommended, then the faculty members will also recommend the number of credit hours to be awarded along with the appropriate level (upper or lower). An additional $10 per credit hour processing fee is required to transcript the credit.

Credit earned via portfolio or prior learning assessment does not count toward meeting the state or institutional residency requirements for the RBA program. Awarded credit hours will not be posted to a student's academic transcript until after residency requirements have been met.

Academic credit will only be awarded to students who are admitted to and currently enrolled in the RBA Degree Program. Students, however, cannot be awarded college - Equivalent credit during their first or final semesters in the RBA program.

F. Graduation Requirements

Summarize the graduation requirements for the program and the process for ensuring and documenting that each graduate completes all graduation requirements for the program. State the name of the degree awarded (e.g., Bachelor of Science in Electrical Engineering Technology, Associate of Science in Engineering Technology, Associate of Applied Science in Civil Engineering Technology.)

DEGREE REQUIREMENTS

To qualify for an Associate Degree, candidates must accumulate a total of 60 credit hours with a minimum quality point average of 2.00. Students must complete 3 semester hours of General Studies courses.

Students are required to apply for graduation. This process takes place the semester before the anticipated graduation. The students are audited for degree compliance and receive a graduation audit form outlining any remaining degree requirements. The degree audit ensure the student is aware of any remaining requirements and can register for the appropriate courses.

G. Transcripts of Recent Graduates

The program must provide transcripts from recent graduates to the visiting team along with any needed explanation of how the transcripts are to be interpreted. **These transcripts will be requested separately by the Team Chair.** State how the program and any program options are designated on the transcript. (See 2019-2020 APPM, Section I.E.3.a.)

The degree is designated as an Associate of Science in Engineering Technology. No options currently exist in the program.

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

A. Mission Statement

Provide the institutional mission statement.

MISSION STATEMENT

The Fairmont State University family educates, enriches, and engages students to achieve personal and professional success.

VISION STATEMENT

Fairmont State University aspires to be nationally recognized as a model for accessible learner centered institutions that promote student success by providing comprehensive education and excellent teaching, flexible learning environments, and superior services. Graduates will have the knowledge, skills, and habits of mind necessary for intellectual growth, full and participatory citizenship, employability, and entrepreneurship in a changing environment.

B. Program Educational Objectives

List the program educational objectives and state where these can be found by the general public. *This is typically an easy to find web page clearly linked to the program's website.*

The Program Educational Objectives have changed during this accreditation cycle. The following were the PEO's until November of 2018:

Program Objectives

The Program Objectives, as determined by the Electronics Engineering Technology Program's constituencies, are intended to promote professional competencies and continued professional growth. Students and graduates shall, to varying degrees, be competent in:

1. applying academic competencies and methodologies in addressing and solving problems as a professional.
2. using learned technical and non-technical methodologies to communicate to audiences of varying demographics.
3. ethically and respectfully performing professional responsibilities as part of a team and or multidisciplinary team.
4. recognizing and assessing the societal and global impact of professional decisions and practices.
5. pursuing lifelong learning through professional development.

During the Fall 2018 semester the PEO's were changed to match industry need and also the newly adopted ABET 1-5 Student Outcomes. The current Program Educational Objectives for the Electronics Engineering Technology Program are as follows:

1) Relate the concepts of self-directed lifelong learning and the ability to undertake further study and/or examinations specific to the discipline through demonstration of technical skills as a practicing professional, applying knowledge and discipline specific tools.
2) Evaluate results and develop professional documents relevant to the discipline and to communicate such findings to a technical and non-technical audience.
3) Operate effectively in a diverse, multi-disciplinary environment demonstrating skills in leadership, professionalism and teamwork.

https://www.fairmontstate.edu/collegeofscitech/academics/electronics-engineering-technology-outcomes

C. Consistency of the Program Educational Objectives with the Mission of the Institution

Describe how the program educational objectives are consistent with the mission of the institution. *A table illustrating how educational objectives support the elements of the institutional mission can be used, in addition to a brief explanation.*

The university's mission and the Electronics Engineering Technology Program Educational Objectives promote the growth and realization of professional and personal development along with the desire for responsible citizenship of graduates. The mission emphasizes providing opportunities for students to achieve their professional and personal goals. The PEO's align with these goals. Through achieving academic competencies, enhancing communication abilities, a desire to pursue life-long learning opportunities and obtaining skills in working in teams, students are afforded the opportunity to attain a level of professional and personal growth that will increase their marketability and societal awareness thereby enriching their degreed field.

Students' personal goals of achieving a college degree that leads to employment in their degreed field supports the university's mission of providing opportunities for personal growth. Since academic competencies can be both intrinsically and extrinsically rewarding, all PEO's can map to personal goals as well.

Lastly, the Electronics Engineering Technology program promotes the exploration of the impact of professional decisions and inherent responsibilities of professionals through promoting ethical practices. This speaks directly to the university's mission of responsible citizenship. The program also promotes students to earn Professional Development Credits in an effort to teach the importance of professional development as well as community outreach.

In summary, Table 2-1 maps the Program Objectives to the university's mission. The mapping is subject to change depending on the students' personal and professional goals.

Program Objectives *"broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve at the time of graduation and during the first few years following graduation." Graduates and students shall be competent in*	The Fairmont State University family educates, enriches, and engages students to achieve personal and professional success.		
	Professional goals	***Personal goals***	***Responsible citizenship***
1. Relate the concepts of self-directed lifelong learning and the ability to undertake further study and/or examinations specific to the discipline through demonstration of technical skills as a practicing professional, applying knowledge and discipline specific tools.	X	X	X
2. Evaluate results and develop professional documents relevant to the discipline and to communicate such findings to a technical and non-technical audience.	X		X
3. Operate effectively in a diverse, multi-disciplinary environment demonstrating skills in leadership, professionalism and teamwork.	X	X	X

Table 2-1

D. Program Constituencies

List the key program constituencies involved in the review of the program educational objectives. Describe how the program educational objectives meet the needs of these constituencies.

Faculty: Faculty are responsible for successfully teaching the material in the courses, developing the curriculum, student advising and institutional committees. The curriculum is designed to meet the student outcomes and Program Educational Objectives (PEO's). Full time faculty are an integral part of the PEO review process. Part time faculty provide input during meetings or through evaluations.

Alumni: As former students, the success of alumni reflects the achievement of the PEO's. Alumni are asked to provide input on the relevance and achievement of PEO's. Alumni are part of our annual meetings and provide feedback during those events.

Employers: Employers may be academic, industry, government or private entities. Employers provide feedback on recent graduates and achievement of PEO's. Their feedback is typically given at annual meetings and career fairs.

Engineering Advisory Board: This group meets annually at minimum. They are comprised of all constituents plus project managers and team leaders from regional and national employers. They share current practice and experience and help shape the PEO's.

Each of the constituents are a part of the educational process in the Electronics Engineering Technology program. The faculty have the responsibility for curriculum and education of the students. The program curriculum and program are the main component of accomplishing the

PEO's. The alumni are the results of the program and represent accomplishment of the PEO's. They also have advisory roles in both curriculum and program needs. The employers seek well prepared graduates who can accomplish the PEO's. Employers advise the program to ensure success. The advisory board is comprised of all the constituents and other industry leaders who periodically review the PEO's and modify them to meet the needs of all constituents.

E. Process for Review of the Program Educational Objectives

Describe the process that periodically reviews the program educational objectives including how the program's key constituencies are involved in this process. Describe how this process is systematically utilized to ensure that the program's educational objectives remain consistent with the institutional mission, the program constituents' needs and these criteria.

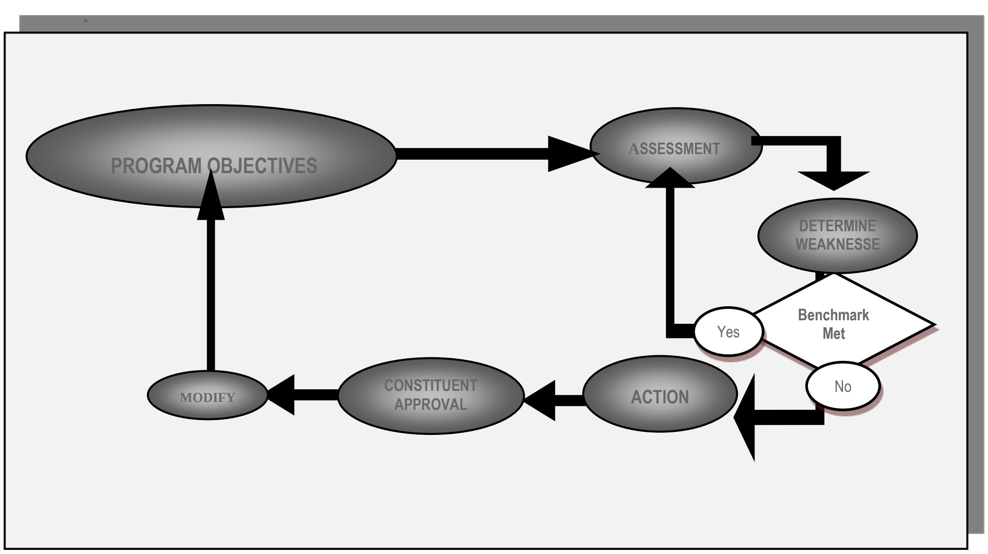
Review of Program Educational Objectives:

Program Educational Objectives are reviewed annually at the Industrial Advisory Committee meeting. The PEO's are displayed annually and reviewed by all constituents. The PEO's were to be updated in the Fall of 2017, however, the impending change to ABET Outcomes caused a delay in the implementation of the new PEO's as faculty wanted to ensure alignment between PEO's and SO's.

The meeting minutes capture any discussion of PEO's. The minutes are reviewed by faculty and program coordinators. The overall continuous improvement (CI) forms document the changes to PEO's. Display materials documenting PEO revision will include:

1) Industrial Advisory Committee (IAC) meeting minutes
2) Continuous Improvement plan form

Program Educational Objectives were approved for change in November of 2018. The PEO's will be reviewed at the next annual IAC meeting. Below is a description of the overall continuous improvement process with relation to PEO's:



CRITERION 3. STUDENT OUTCOMES

A. Process for the Establishment and Revision of the Student Outcomes

Describe the process used for establishing, reviewing, and revising student outcomes.

The Electronics Engineering Technology program has adopted ABET outcomes 1-5. The adoption of those outcomes is documented in the Industrial Advisory Committee meeting minutes. The new outcomes were discussed and approved November 2018. The review and revision of outcomes will occur when program educational objectives are reviewed annually. PEO's and SO's are reviewed as part of the annual Industrial Advisory Committee meetings. Prior to November 2018, the program had six outcomes linked to ABET student outcomes. A mapping of the former outcomes will be provided in the following sections.

B. Student Outcomes

List the student outcomes for the program. Indicate where the student outcomes are documented and made accessible to the public. *This is typically an easy to find web page clearly linked to the program's website but could also be in a student handbook.*

The Electronics Engineering Technology program adopted ABET outcomes 1-5 as program outcomes. The student outcomes were changed by the program in November 2018. Prior to November 2018 the student outcomes were ABET "a-k" plus the discipline specific outcomes for the program. The student outcomes can be found on the programs web page:

https://www.fairmontstate.edu/collegeofscitech/academics/electronics-engineering-technology-outcomes

The Student Outcomes prior to November 2018 were as follows:

1. Students will master and apply current knowledge, techniques, skills, and modern tools of their disciplines including mathematics and science.
2. Students will identify, analyze, and improve technical processes including experimental verification.
3. Students will apply creativity in the design of systems, components, or processes appropriate to program objectives including working on teams and communicating effectively.
4. Students will prepare for the ability to engage in lifelong learning, a commitment to quality, timeliness, and continuous improvement.
5. Students will demonstrate an awareness of professional, ethical, and social responsibilities, including a respect for diversity and a knowledge of contemporary professional, societal and global issues.
6. Students will solve complex problems utilizing discipline specific expertise.

The current recently adopted student outcomes are as follows:

1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, or technology to solve broadly-defined engineering problems.
2. An ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline.
3. 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.
4. An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments.
5. An ability to function effectively as a member of a technical team.

Mapping of these outcomes is shown in the following tables. These have been replaced by the new ABET 1-5 SO's adopted by the program.

Program Outcomes as Relating to ABET a-k and Program Specific Criteria

The Electronics ET program has recoded the program specific outcomes mandated by ABET. The coding used by the program is shown below.

7.

ABET Code	Outcome	ELEC ET Code
a	an ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;	a
b	an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge;	b
c	an ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;	c
d	an ability to function effectively as a member of a technical team;	d
e	an ability to identify, analyze, and solve narrowly defined engineering technology problems;	e
f	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;	f
g	an understanding of the need for and an ability to engage in self-directed continuing professional development;	g
h	an understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity;	h
i	a commitment to quality, timeliness, and continuous improvement.	i
j	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.	j
k	the applications of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry.	k

Table *3-1* maps ABET’s a-k and the program criteria as required in criterion 3 to the Electronics Engineering Technology program’s Student Outcomes.

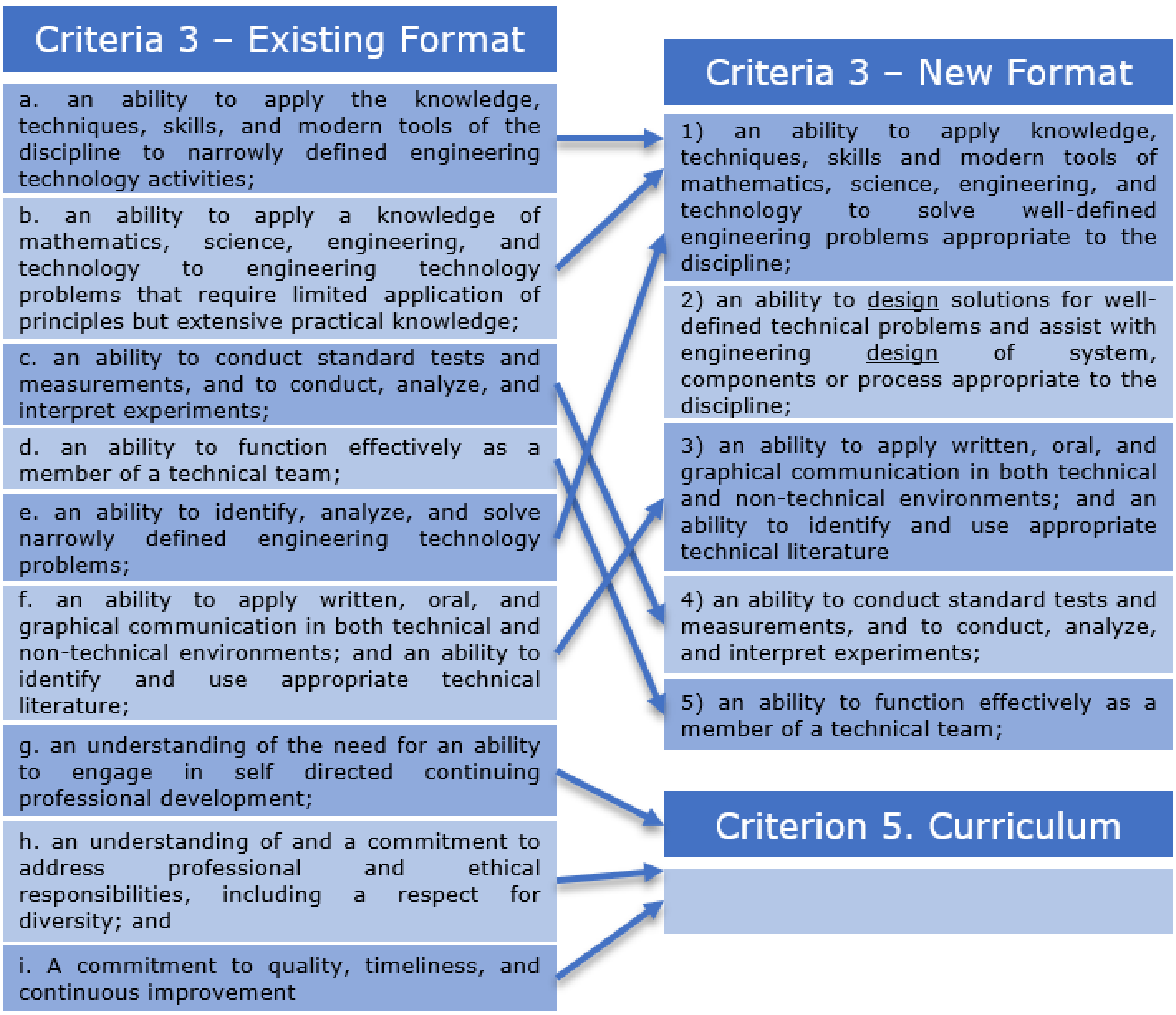
Program Student Outcomes	General Criteria											
	a	b	c	d	e	f	g	h	i	j	k	
1. Students will master and apply current knowledge, techniques, skills, and modern tools of their disciplines including mathematics and science.	X	X										
2. Students will identify, analyze, and improve technical processes including experimental verification.			X			X						
3. Students will apply creativity in the design of systems, components, or processes appropriate to program objectives including working on teams and communicating effectively.				X	X		X					
4. Students will prepare for the ability to engage in lifelong learning, a commitment to quality, timeliness, and continuous improvement.								X			X	
5. Students will demonstrate an awareness of professional, ethical, and social responsibilities, including a respect for diversity and a knowledge of contemporary professional, societal and global issues.									X	X		
6. Students will solve complex problems utilizing discipline specific expertise.												

Table 3-1

C. Mapping of Student Outcomes to Criterion 3 Student Outcomes

Describe if the student outcomes used by the program are stated differently than the requirements listed in Criterion 3. If so, provide the mapping of the program’s student outcomes to the Criterion 3 requirements one through five.

The Electronics Engineering Technology program adopted ABET outcomes 1-5 as the program student outcomes. Performance indicators are used to define program needs within the outcomes. These are newly defined and implemented. The following table shows the mapping from the “a-i” outcomes to the new 1-5 outcomes.



D. Relationship of Student Outcomes to Program Educational Objectives

Describe how the program's student outcomes prepare graduates to attain the program's educational objectives.

It is helpful if the self-study questionnaire provides a mapping, using the table below, of the Program Educational Objectives, Student Outcomes, the ABET (1) – (5) student outcomes and the program courses that support the program student outcomes (courses where the students learn or develop competencies related to the student outcomes).

Program Educational Objective	*ABET (1)-(5)*	*Program Courses Supporting the Program Outcome*
PEO 1	Outcome 1	ELEC 1100 Circuit Analysis I ELEC 2225 Electronic Devices ELEC 2210 Circuit Analysis II ELEC 2230 Digital Electronics ELEC 2240 Industrial Electronics ELEC 2250 AC/DC Mach and CTL ELEC 2280 Programmable Controllers
	Outcome 2	ELEC 2210 Circuit Analysis II ELEC 2230 Digital Electronics ELEC 3310 Adv Microcontroller Sys
PEO 2	Outcome 3	ELEC 2210 Circuit Analysis II ELEC 2240 Industrial Electronics
	Outcome 4	ELEC 1120 AC/DC Elect Analys. ELEC 2225 Electronic Devices ELEC 2240 Industrial Electronics ELEC 2250 AC/DC Mach and CTL ELEC 2280 Programmable Controllers
PEO 3	Outcome 5	ELEC 2225 Electronic Devices ELEC 2240 Industrial Electronics ELEC 2250 AC/DC Mach and CTL ELEC 2280 Programmable Controllers

CRITERION 4. CONTINUOUS IMPROVEMENT

This section of your Self-Study Report should summarize your processes for regularly assessing and evaluating the extent to which the student outcomes are being attained and for using those results for continuous improvement of the program.

Assessment is defined as one or more processes that identify, collect, and prepare the data necessary for evaluation. Evaluation is defined as one or more processes for interpreting the data acquired though the assessment processes in order to determine how well the student outcomes are being attained.

Although the program can report its processes as it chooses, the following is presented as a guide to help you organize your Self-Study Report and present your documentation.

A. Documentation of Processes or Plan

Provide a reference to the plan (documentation of processes in the appendices or in electronic form) used to assess student outcome attainment for the purpose of continuous program improvement. In the sections below, briefly summarize key elements of that process (tabular presentation, where appropriate, is encouraged).

Provide the written plan/graphical representation of the assessment plan clearly identifying who will do what when. If different student outcomes will be assessed in different years, provide an overview of this via a simple table (student outcome versus year of assessment).

ETAC recommends the use of a table (one table per outcome) that captures much of what is requested below (see sample table below). Once data and the other boxes are completed, the table will grow to be several pages.

Overview

The Department of Technology has developed and implemented a Continuous Improvement Plan (CIP) for all ABET accredited programs. The department faculty, in conjunction with the IAC for Civil ET, Electronics ET, Mechanical ET, and Occupational Safety, worked to create a plan that is broad enough to encompass all programs but flexible enough to meet the needs of the individual programs. This collaborative effort has resulted in a diverse initiative. Annual IAC and regular ABET meetings allow for discussion of continuous improvement from differing perspectives. This allows for sharing of ideas and viewpoints that would otherwise not be expressed or shared. This is especially beneficial to academic programs with few faculty members.

The following is a synopsis of the CIP. The CIP is scheduled for review and possible revision the Fall 2019 semester.

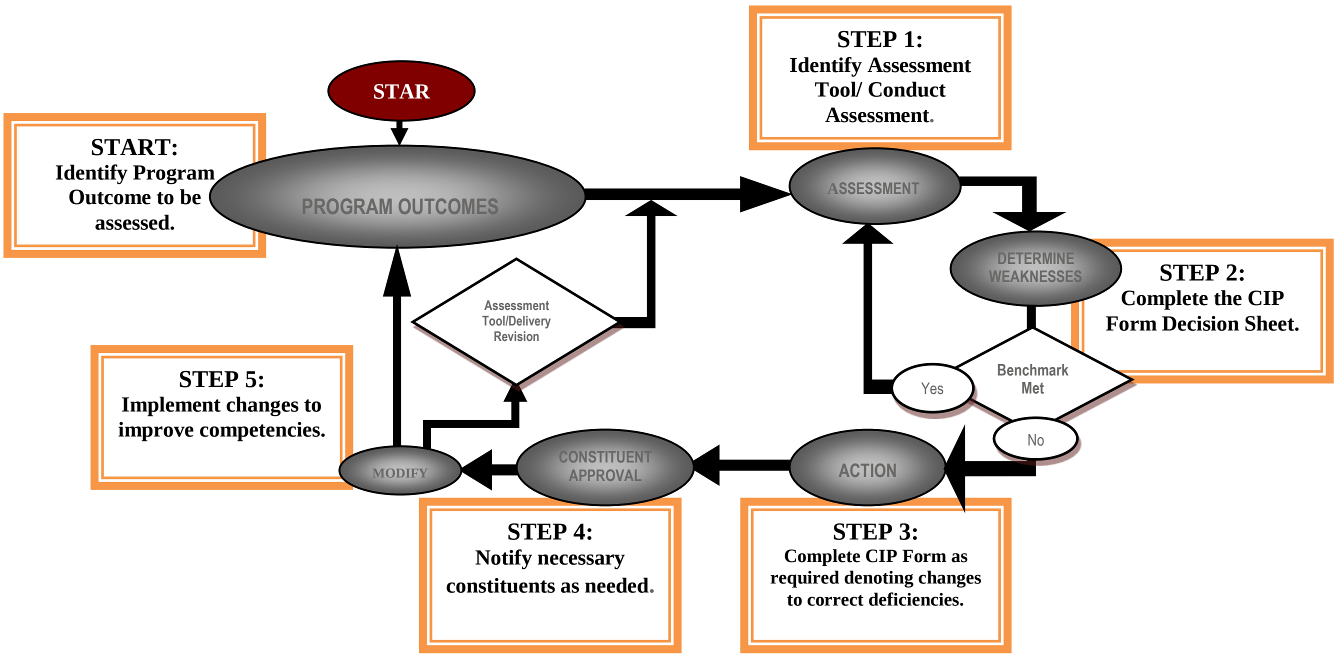
Terminology

The ANSAC and ETAC of ABET accredited programs at FSU use the following terms in its Continuous Improvement Plan and in meetings when discussing continuous improvement:

- **Assessment Points:** The intersection of the course and Student Outcome on the matrix denoted by ABET's legacy outcomes. Mapping to the new ABET 1-5 outcomes was shown in Criteria 3.
- **Assessment Tools**: Materials used to gather information for assessment purposes. Assessment tools are specific to the Program Outcomes 1-5. Examples include but are not limited to:
    - Exam questions,
    - Projects,
    - Quizzes,
    - Interviews,
    - Pre and Post exams,
    - Labs,
    - Other.
- **Assessment**: Process of gathering/utilizing assessment tool, and evaluation of assessment tools.
- **Determination of Weakness:** Evaluation of the assessed data in comparison to established benchmark.
- **Actionable Item:** Outcome falling below established benchmark.
- **Action:** Steps proposed for the elimination or control of the weakness.
- **Constituent Approval:** When necessary, the constituencies will be consulted on the intended action.
- **Continuous Improvement Plan:** A comprehensive plan developed and approved by the faculty and IACs used to evaluate outcomes against established benchmarks.
- **Modification:** Change to the Program Outcomes or elements relating to the outcomes.
- **Program Outcomes:** 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.

CIP Flowchart

Assessment of Program Outcomes is systematically conducted following the procedure specified in the CIP. This flowchart depicts the steps taken to gather and assess materials and modify either delivery or outcomes when established benchmark is not achieved.



Start: Identify Program Outcome to be assessed

To begin the assessment process, the assessment point must be identified on the program's outcomes matrix. This matrix was developed by the program faculty and approved by the IAC. As seen in the matrix (Figure 4-2), the model schedule maps to Program Outcomes indicating which of ABET's outcomes is to be assessed. The example matrix shown was for the legacy outcomes and was used for continuous improvement planning throughout the six year cycle.

Program Outcomes Electronics Engineering Technology							
	Course	1 (a)	2 (c,d,i)	3 (f,g)	4 (b,h)	5 (e)	6 (j,k,)
Freshman First Semester 14 hrs.	***ENGL 1101*** ***MATH 1520*** ***ELEC 1100*** ***ELEC 1120*** ***ENGL 1103***	X	X	X X	X X		X
Freshman Second Semester 16 hrs.	***MATH 1520*** ***COMP 1110/1120*** ***ELEC 2210*** ***ELEC 2225*** ***PHYS 1101***	X		X X	**A(b)**		X
Sophomore First Semester 15 hrs.	***TECH 2290*** ***G.S. Cat. 10*** ***ELEC 2230*** ***ELEC 2250***	**A(a)**	**A(c,d,i)**	X			**A(k)**
Sophomore Second Semester 15 hrs.	***PHYS 1102*** ***TECH 3300*** ***COMM 2202*** ***ELEC 2240*** ***ELEC 2280***			**A(f,g)** X	A(h)	**A(e)**	X **A(j)**
*Curriculum Revised Fall 2016 as Part of CIP		**Assessment Cycle One** (2013-2014) (*2016-2017)		**Assessment Cycle Two** (2014-2015) (2017-2018)			**Assessment Cycle Three** (2016-2017) (2018-2019)

Figure 4-2

Understanding the Matrix

As explanation to the coding of the matrix, Figure 3 clarifies the meaning of the notations. The left column contains the academic courses. The “x” indicates courses in which students should attain academic competencies related to that Program Outcome. The “A” indicates the course in which that competency is assessed. Lastly, the parenthetical notation specifies which ABET outcome is being assessed.

	Program Outcomes					
	1 (a,e)	2 (b,c,k)	3 (h,I,j)	4 (f)	5 (d,g)	6 Program Specific
MATH 1101	X			X		
TECH XXXX	A (a)			A (f)		

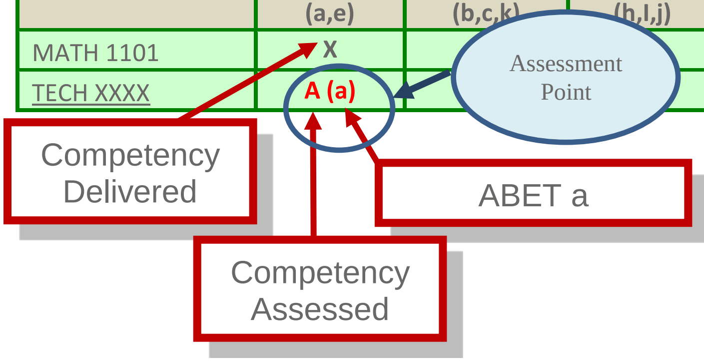


Figure 3

STEP 1: Identify Assessment Tool/ Conduct Assessment

For each assessment point on the matrix, there is an assessment tool developed and managed by the course professor. This tool may be an exam question, project, report, or quiz. The tool used may not be identical each time administered but is similar in content and depth of knowledge.

An example of an assessment tool is:

ELEC 2240

6. **solve complex problems utilizing discipline specific expertise.**

q. employing productivity software to solve technical problems.

Simulation Lab: Students will create a circuit to light an LED when the voltage is below threshold.
Required for the lab:
-Circuit Analysis and Computation
-Schematic Diagram with proper component labels

***Used for assessment (Or similar Project, Lab Exercise, HW Problem, or Report)**
Once the assessment is conducted, the work is graded/evaluated by the course professor. This may be as simple as the work being correct or incorrect or it may require the use of a grading rubric developed for the assignment.

STEP 2: Complete the CIP Decision Sheet

Once the student work is evaluated, the professor completes a CIP Decision Sheet. This form (Form 4-1), tracks the success of the assessment point in comparison to the established benchmark. If the benchmark is met or exceeded, this form is filed away, and the assessment point is collected and assessed again when required by the assessment cycle.

CI Form **Continuous Improvement**	3	e	2280 Course Number
	Outcome Number	ABET outcome	

Program Name:	(●) AS ( ) BS Civil ET	( ) AS ( ) BS Mechanical ET	
	( ) AS ( ) BS Electronics ET	( ) BS Occupational Safety	
Date:	8/14/2015	Form Completed By: Gary Zickefoose	

1. Assessment Tool Example/Description (ie: exam, project description, homework problem)

Comprehensize test covering water pollution parameters, water quality, closed conduit and open chanel, and hydrology.

2. Established Benchmark: 70% of students achieve or exceed 60%

3. Assessment

( ) AC 1 (●) AC 2 ☐ AC 3 Spring 2013	Spring 2014	Spring 2015
Data Summary	Data Summary	Data Summary

Aggrate Data (using the data collected for three years, record the percentage of students achieving or exceeding the established benchmark)

Benchmark Met
- ( ) Yes (action not required)
- (●) No (action required - continue to Section 4)

4. Description of Weakness:

5. Description of Proposed Actions:

6. Implementation Plan:

Implementation Steps:	Implementation Date

Form 4-1

The course professor establishes the benchmark for that assessment point in their course. All assessed materials are measured against the benchmark system established in Figure 4-4. The targeted benchmark indicates that 70% of the students have met or exceeded the desired score or grade established by the assignment. Note that the benchmark has been approved by the IAC.

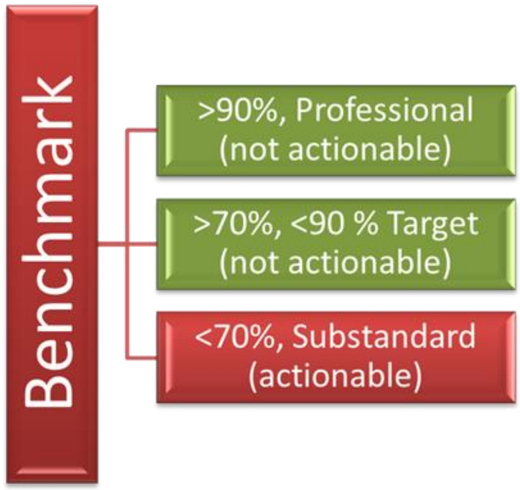


Figure 4-4

Assessment and Benchmarking

Once the assessment tool is completed by the students, the collected work is evaluated by the course professor. All assessed materials are measured against the benchmark system established in Figure 4. The targeted benchmark indicates that 70% of the students have met or exceeded 70% of the desired score or grade established by the assignment. Note that the benchmark has been approved by the IAC.

STEP 3: Complete CIP Form as Required Denoting Changes to Correct Deficiencies

When the benchmark is not met, this is considered substandard and actionable. The professor must complete a CIP Form (shown below, Form 4-2). This form requires the professor to identify and note the weaknesses, offer strategies for modifications (this can be related to material delivery, development, etc…), and share information or seek counsel of constituencies.

CI Form **Continuous Improvement**	3	e	2280 Course Number
	Outcome Number	ABET outcome	
Program Name:	◉ AS ○ BS Civil ET	○ AS ○ BS Mechanical ET	
	○ AS ○ BS Electronics ET	○ BS Occupational Safety	
Date: 8/14/2015		Form Completed By:Gary Zickefoose	

1. Assessment Tool Example/Description (ie: exam, project description, homework problem)

Comprehensize test covering water pollution parameters, water quality, closed conduit and open chanel, and hydrology.

2. Established Benchmark: 70% of students achieve or exceed 60%

3. Assessment

○ AC 1 ◉ AC 2 ☐ AC 3 Spring 2013	Spring 2014	Spring 2015
Data Summary	Data Summary	Data Summary

Aggrate Data (using the data collected for three years, record the percentage of students achieving or exceeding the established benchmark)

Benchmark Met
- ○ Yes (action not required)
- ◉ No (action required - continue to Section 4)

4. Description of Weakness:

5. Description of Proposed Actions:

6. Implementation Plan:

Implementation Steps:	Implementation Date

Form 4-2

STEP 4: Notify Necessary Constituents as Needed

Constituencies may need to be notified of weaknesses as well as proposed changes. The IAC is briefed annually on the weaknesses identified in the collection and processing of Program Outcomes. Students, as constituents, are often notified of substandard performance when reviewing the material or if the assessment tool is deemed flawed in some way. Other program faculty members may be notified of findings if a change in delivery methodology is proposed or if the course faculty wants to move the assessment point.

The decision to present this information to the IAC is discussed during the Collaborative Report meeting. This is a meeting of program faculty conducted the first week of every semester to discuss the findings from the previous semester. These meetings produce reports that are filed in the ABET room, and reviewed with the IAC at the annual November meetings.

STEP 5: Implement Changes to Improve Competencies

The last step in the CIP is to implement changes by either changing pedagogy, or the outcome itself. At no point has a Program Outcome been changed. However, it is common to change the assessment tool, delivery methodology, or location (course) of the assessment. When weaknesses are identified, it is common for faculty to develop a new or revised assessment tool, attach it to the CIP and administer it during the next applicable cycle.

Assessment Cycle

As cited on the bottom row of the matrix and summarized in Figure 4-5, below, the assessment frequency is a three year cycle.

- Year 1: Assess Outcomes 1 and 2
- Year 2: Assess Outcomes 3, 4, and 5
- Year 3: Assess Outcome 6

Program Outcomes Electronics Engineering Technology						
Course	1 (a)	2 (c,d,i)	3 (f,g)	4 (b,h)	5 (e)	6 (j,k)
	ASSESSMENT CYCLE ONE (AC1)		**ASSESSMENT CYCLE TWO (AC2)**			**ASSESSMENT CYCLE THREE (AC3)**

Figure 4-5

Maintenance and Management of Documents

All CIP documentation is maintained in a file system in the ABET room. Faculty are encouraged to utilize TaskStream to electronically file and manage the documents as well. The faculty are responsible for completing and filing all forms in order to track assessment results and required corrective measures.

Collaborative Report

As previously mentioned, program faculty meet during the first week of every semester to discuss actionable items from the previous semester's assessment points. These meetings allow for discussion and collaboration on corrective actions to substandard student performance. The reports are filed with the program coordinator and the ABET coordinator for future reference

AC-2
F-17

Continuous Improvement Plan – Collaborative Review

Civil Engineering Technology Program
Faculty Collaborative Review
Fall 2017

Scope:

The Civil Engineering Technology Faculty, Gary Zickefoose, Tia Como and James Vassil, met January 2018 to review the Continuous Improvement Plans (CIP) established for all assessment points that did not meet benchmark during Fall Semester 2017. During **Assessment Cycle 2 – Fall Semester** the following points were assessed:

Assessment Cycle 2 – Fall 2017

Course	Assessment Point
CIVL 2210	4h, 5i
CIVL 2220	3e,3f
CIVL 2275	3d,3g
CIVL 3305	3d
CIVL 4410	3d
CIVL 4460	5j
CIVL 4470	4k

Highlighted = Actionable Points

Findings:

At this time, based upon the data collected, 70% of the course students met the assessment points established benchmarks. As a result, a no CIP was prepared for assessment points not meeting benchmark. Assessment data for the following classes was not available and will be reviewed prior to the Fall 2017 semester: CIVL 3305, 4410, 4460.

B. Assessment Metrics and Methods of Student Outcomes

List the metric(s), measure(s) or performance indicator(s) used for each student outcome. Describe the process for collecting data or making assessments for each (tabular format is encouraged). Examples of assessment instruments can be electronically referenced in the self-study report and must be available for review at the time of the visit.

All assessment Metrics and Methods of SO's are shown in tabular format on the following pages.

C. Assessment Schedule and Frequency

Present the schedule and frequency for each type of assessment as well as points of accountability (tabular format is encouraged). Examples of assessments or data collected to date can be referenced electronically in the self-study report and must be available for review at the time of the visit.

All assessment schedule and frequency of SO's are shown in tabular format on the following pages.

D. Evaluation

Present the evaluation schedule, points of accountability, and expected level of attainment for each student outcome. Provide summaries of the results of evaluation analyses over time illustrating current attainment of each student outcome and trends in attainment over time (tabular presentation is encouraged). Describe how results are communicated and preserved and provide one or more examples electronically or in appendices.

Assessment evaluation of SO's are shown in tabular format on the following pages. Descriptions are provided within the tables. It should be noted that the Electronics Engineering Technology revamped the curriculum according to discussions with the IAC and faculty as part of the continued process improvement progression. The new curriculum was implemented fully in 2016 along with the creation of new assessment tools. The following SO charts will identify assessment data collected before 2016. Because of the new curriculum and new student model schedule initiated in 2016, only one set of data was collected in 2016 and 2017. During the 2018 and 2019 semesters, the assessment procedures were paused because of the new student outcomes initiated by ABET and our preparation for accreditation review in 2019. During the 2018-2019 semesters, student data was collected and boxed for ABET evaluator review according to plans discussed and implemented by the FSU ABET coordinator and staff.

Student Outcome 1: _*An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well defined engineering problems appropriate to the discipline*___

*This outcome is linked to legacy outcome "a and f". The legacy outcome was used to measure new Student Outcome 1.

Legacy Outcomes mapped to New ABET 1-5	Courses where outcome exists (ELEC courses)	Specific Method of Assessment (rubric, etc.)	Courses Assessed (where the outcome and related data are collected)	Cycle when the outcome Assessed (how often)	Year & Semester when Data Were Collected	Performance Target for outcome
a. an ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;	1100 1120 2210 2225	Direct: HW assessment Indirect: Student survey	ELEC 2230	3 years	FALL 2014 FALL 2016	70%
f. 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;	1100 1120 2210 2225	Direct: Report assessment Indirect: Student survey	ELEC 2240	3 years	SPRING 2016	70%

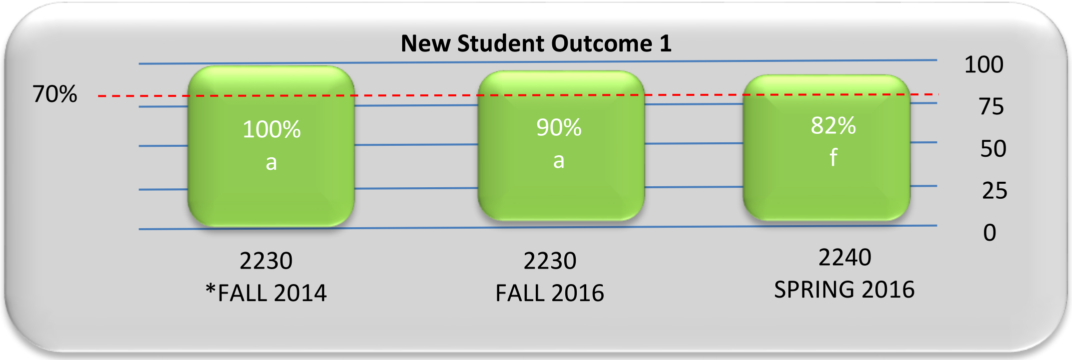
Summary of Aggregated Assessment Data:

Describe how the assessment data from each outcome is aggregated and provide an overall assessment data set. Use charts or formulas as necessary but include the numbers of students that were assessed.

Outcome a is linked to SO 1: Assessment data was aggregated in 2014 and 2016. The curriculum was changed and implemented during the Fall 2016 semester. The data is based on multiple-years of aggregated assessment data. All students in the course were assessed. The course enrollment is typically 12.

Outcome a is linked to SO 1: Assessment was aggregated in 2016. All students in the course were assessed. The course enrollment is typically 12.

Results of Evaluation of Aggregated Assessment Data:
Based on aggregated assessment data, provide evaluation and analysis to illustrate the extent to which the student outcome is being attained. Use of charts/graphs with an explanation is recommended.



Actions for Continuous Improvement:
Briefly list the actions for program improvement that have resulted from the results of evaluation processes described above. Indicate any significant future program improvement plans based upon recent evaluations. Provide a brief rationale for each of these planned changes. Details can be provided in the following report section.

All targets were met and no improvements were made during this cycle. However, beginning Fall 2019, new Performance Indicators will be implemented for this and all student outcomes.

Results of Actions for Improvement
Briefly describe the results of any changes (whether or not effective) in those cases where re-assessment of the results has been completed. Details can be provided in the following report section.

As shown in the graphic above, all targets were met.

Assessment Instruments:
How are the assessment and evaluation results documented and maintained? Attach copies of the assessment instruments or materials referenced in your table. Attach samples of student work at various levels (poor, satisfactory, very good). This can be an appendix or separate file.
All assessment and evaluation results are documented on the departments Continuous Improvement (CI) form. The forms are filed in the Assessment file storage and reviewed when the cycle dictates. Annual faculty collaborative reports summarize all assessments and continuous improvement changes. Examples of the assessment instruments and student work are in the on-site FSU ABET cabinets.

Student Outcome 2: _*An ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline*___

This outcome is linked to legacy outcome "d". The legacy outcome was used to measure new Student Outcome 2.

Performance Indicators (PI) for this outcome	Courses were PI exists (ELEC courses)	Specific Method of Assessment (rubric, etc.)	Courses Assessed (where the PI and related data are collected)	Cycle of When the PI Assessed (how often)	Year & Semester of Data Collection	Performance Target for PI
d. an ability to function effectively as a member of a technical team;	1100 1120 2210 2225	Direct: Lab Indirect: Student survey	ELEC 2250	3 years	SPRING 2015	70%

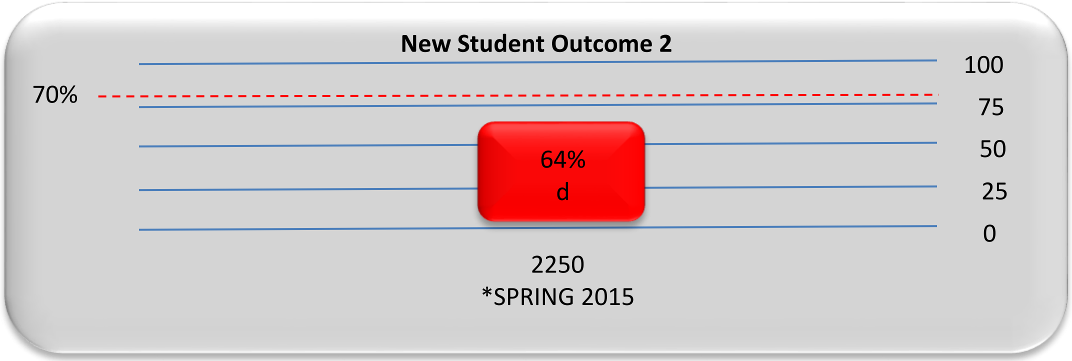
Summary of Aggregated Assessment Data (across all PIs):

Describe how the assessment data from each PI is aggregated and provide an overall assessment data set. Use charts or formulas as necessary but include the numbers of students that were assessed.

Outcome d is linked to SO 2: Assessment data was aggregated in 2015. All students in the course were assessed. The course enrollment is typically 30 because there are students from other disciplines taking this course. These students take only ELEC 1100 as prerequisite.

Results of Evaluation of Aggregated Assessment Data:

Based on aggregated assessment data, provide evaluation and analysis to illustrate the extent to which the student outcome is being attained. Use of charts/graphs with an explanation is recommended.



*This data was collected and assessed before the curriculum changes in which were implemented in Fall of 2016.

Actions for Continuous Improvement: *Briefly list the actions for program improvement that have resulted from the results of evaluation processes described above. Indicate any significant future program improvement plans based upon recent evaluations. Provide a brief rationale for each of these planned changes. Details can be provided in the following report section.* Outcome d did not meet the 70% performance threshold and requires process improvement.
Results of Actions for Improvement *Briefly describe the results of any changes (whether or not effective) in those cases where re-assessment of the results has been completed. Details can be provided in the following report section.* Because of the low score for outcome d, the instructor will spend more time discussing the subject matter and communicate the significance of the assessment for ABET evaluation. Extra training and discussion about the significance of this assignment will be adopted for the next assessment. There are students from many disciplines taking this course.
Assessment Instruments: *How are the assessment and evaluation results documented and maintained? Attach copies of the assessment instruments or materials referenced in your table. Attach samples of student work at various levels (poor, satisfactory, very good). This can be an appendix or separate file.* All assessment and evaluation results are documented on the departments Continuous Improvement (CI) form. The forms are filed in the Assessment file storage and reviewed when the cycle dictates. Annual faculty collaborative reports summarize all assessments and continuous improvement changes. Examples of the assessment instruments and student work are in the on-site FSU ABET cabinets.

Student Outcome 3: _*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*__

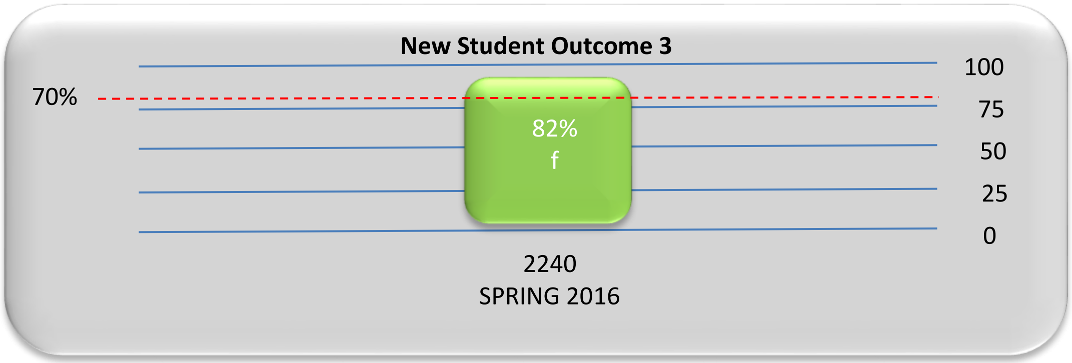
*This outcome is linked to legacy outcome "f". The legacy outcome was used to measure new Student Outcome 3.

Performance Indicators (PI) for this outcome	Courses were PI exists (ELEC courses)	Specific Method of Assessment (rubric, etc.)	Courses Assessed (where the PI and related data are collected)	Cycle of When the PI Assessed (how often)	Year & Semester when Data Were Collected	Performance Target for PI
f. 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;	1100 1120 2210 2225 2230	Direct: Research paper Indirect: Student survey	ELEC 2240	3 years	SPRING 2016	70%

Summary of Aggregated Assessment Data (across all PIs):
Describe how the assessment data from each PI is aggregated and provide an overall assessment data set. Use charts or formulas as necessary but include the numbers of students that were assessed.

Outcome f is linked to SO 3: For summative assessment, the decision was made to focus on the direct assessment for all indicators. All students in the course were assessed. The course enrollment is typically 12

Results of Evaluation of Aggregated Assessment Data:
Based on aggregated assessment data, provide evaluation and analysis to illustrate the extent to which the student outcome is being attained. Use of charts/graphs with an explanation is recommended.



Actions for Continuous Improvement:
Briefly list the actions for program improvement that have resulted from the results of evaluation processes described above. Indicate any significant future program improvement plans based upon recent evaluations. Provide a brief rationale for each of these planned changes. Details can be provided in the following report section.

All targets were met and no improvements were made during this assessment cycle. However, beginning Fall 2019, new Performance Indicators will be implemented for this and all student outcomes.

Results of Actions for Improvement
Briefly describe the results of any changes (whether or not effective) in those cases where re-assessment of the results has been completed. Details can be provided in the following report section.

As shown in the graphic above, all targets were met.

Assessment Instruments:
How are the assessment and evaluation results documented and maintained? Attach copies of the assessment instruments or materials referenced in your table. Attach samples of student work at various levels (poor, satisfactory, very good). This can be an appendix or separate file.

All assessment and evaluation results are documented on the departments Continuous Improvement (CI) form. The forms are filed in the Assessment file storage and reviewed when the cycle dictates. Annual faculty collaborative reports summarize all assessments and continuous improvement changes. Examples of the assessment instruments and student work are in the on-site FSU ABET cabinets.

Student Outcome 4: _*An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments*___
*This outcome is linked to legacy outcome "c". The legacy outcome was used to measure new Student Outcome 4.

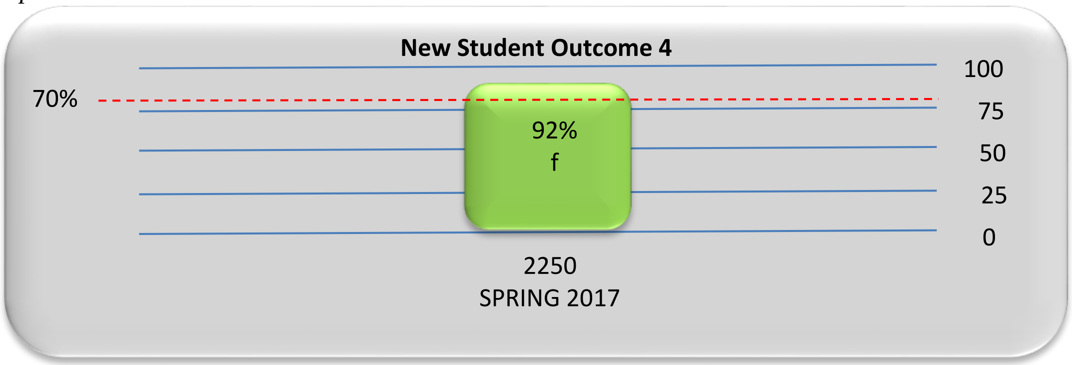
Legacy Outcome mapped to New ABET 1-5	Courses were PI exists (ELEC courses)	Specific Method of Assessment (rubric, etc.)	Courses Assessed (where the PI and related data are collected)	Cycle of When the PI Assessed (how often)	Year & Semester when Data Were Collected	Performance Target for PI
c. An ability to conduct standard tests and measurements, and to conduct, analyze and interpret experiments	1100 1120 2210 2225 2230	Direct: Fine Aggregate Lab, Rubric Indirect: Student survey	ELEC 2250	3 years	FALL 2017	70%

Summary of Aggregated Assessment Data (across all PIs):
Describe how the assessment data from each PI is aggregated and provide an overall assessment data set. Use charts or formulas as necessary but include the numbers of students that were assessed.

For summative assessment, the decision was made to focus on the direct assessment for this outcome.

Outcome c is linked to SO 4: Assessment data was aggregated in 2017. All students in the course were assessed. The course enrollment is typically 30 because there are students from other disciplines taking this course.

Results of Evaluation of Aggregated Assessment Data:
Based on aggregated assessment data, provide evaluation and analysis to illustrate the extent to which the student outcome is being attained. Use of charts/graphs with an explanation is recommended.



Actions for Continuous Improvement:
Briefly list the actions for program improvement that have resulted from the results of evaluation processes described above. Indicate any significant future program improvement plans based upon recent evaluations. Provide a brief rationale for each of these planned changes. Details can be provided in the following report section.

All targets were met and no improvements were made during this assessment cycle.

Results of Actions for Improvement
Briefly describe the results of any changes (whether or not effective) in those cases where re-assessment of the results has been completed. Details can be provided in the following report section.

As shown above the target was met.

Assessment Instruments:
How are the assessment and evaluation results documented and maintained? Attach copies of the assessment instruments or materials referenced in your table. Attach samples of student work at various levels (poor, satisfactory, very good). This can be an appendix or separate file.

All assessment and evaluation results are documented on the departments Continuous Improvement (CI) form. The forms are filed in the Assessment file storage and reviewed when the cycle dictates. Annual faculty collaborative reports summarize all assessments and continuous improvement changes. Examples of the assessment instruments and student work are in the on-site FSU ABET cabinets.

Student Outcome 5: _*An ability to function effectively as a member of a technical team*___

There is no assessment data for Outcome 5. The data below is the planned performance indicators/assessments that will be collected and used for continuous improvement. This assessment falls during the 2018-2019 cycle when all course data is being collected.

Legacy Outcome mapped to New ABET 1-5	Courses were PI exists (ELEC courses)	Specific Method of Assessment (rubric, etc.)	Courses Assessed (where the PI and related data are collected)	Cycle of When the PI Assessed (how often)	Year & Semester when Data Were Collected	Performance Target for PI
e. an ability to identify, analyze, and solve narrowly defined engineering technology problems;	1100 1120 2210 2225 2230	Direct: Lab, score sheet Indirect: Student survey	ELEC 2280	3 years		70%

Summary of Aggregated Assessment Data (across all PIs):

Describe how the assessment data from each PI is aggregated and provide an overall assessment data set. Use charts or formulas as necessary but include the numbers of students that were assessed.

Outcome e is linked to SO 5: The course enrollment is typically 12.

Results of Evaluation of Aggregated Assessment Data:

Based on aggregated assessment data, provide evaluation and analysis to illustrate the extent to which the student outcome is being attained. Use of charts/graphs with an explanation is recommended.

Data was collected for this cycle, but not assessed. The data will be avialable for ABET evaluators for review.

Actions for Continuous Improvement:

Briefly list the actions for program improvement that have resulted from the results of evaluation processes described above. Indicate any significant future program improvement plans based upon recent evaluations. Provide a brief rationale for each of these planned changes. Details can be provided in the following report section.

None currently.

Results of Actions for Improvement

Briefly describe the results of any changes (whether or not effective) in those cases where re-assessment of the results has been completed. Details can be provided in the following report section. None currently.
Assessment Instruments: *How are the assessment and evaluation results documented and maintained? Attach copies of the assessment instruments or materials referenced in your table. Attach samples of student work at various levels (poor, satisfactory, very good). This can be an appendix or separate file.* All assessment and evaluation results are documented on the departments Continuous Improvement (CI) form. The forms are filed in the Assessment file storage and reviewed when the cycle dictates. Annual faculty collaborative reports summarize all assessments and continuous improvement changes. Examples of the assessment instruments and student work will be in the on-site display

E. Using Results for Continuous Improvement

Describe how the results of the evaluations (from section D above) and any other available information are systematically used as input in the continuous improvement of the program. Present points of accountability, schedule and frequency. Summarize deliberations, decisions and actions which have been implemented as a result of these evaluations and indicate any significant future program improvement plans including the rationale for each. Provide references in the appendices or electronically as evidence of deliberations and decisions on improvements and input used. Evidence might include evaluation reports, agendas, minutes, memos, etc.

The table above has boxes for this information. The program should describe the use of the results for individual Student Outcomes in the table above and summarize the use for all Student Outcomes in Section E.

Program changes due to assessment findings are explained and documented through the use of the Collaborative Review Reports for the program. The collaborative reports identify all assessed points under that assessment cycle, all actionable items, and offer a summary of modifications for improvement. These collaborative reports are shared with the IAC and feedback is provided by the IAC.

Indirect data is also used for continuous improvement. Each academic year, students are surveyed to provide indirect measurement of outcome success. Faculty review the surveys for points that do not meet benchmark or are repeatedly noted in student comments. This is also documented in the Collaborative review reports.

Major program changes are not implemented until multiple assessment cycles (in a row) demonstrate student performance below benchmark. Instructional and delivery methods are tweaked every semester to meet the needs of the student population. For example, delivery methods that may vary include in-class examples, homework problems, project scenarios, lab exercises, etc. All collaborative reports shall be provided to the evaluator during site visit.

CRITERION 5. CURRICULUM

A. Program Curriculum

The applicable program criteria could include statements that add specificity to the curricular requirements found in Criterion 5 to differentiate the discipline designated by the program's title. These should be included in the program's coursework. Contact ABET at etac@abet.org if you have questions about the program criteria that apply to your program.

1. Complete Table 5-1 that describes the plan of study for students in this program including information on course offerings in the form of a recommended schedule by year and term along with average section enrollments for all courses in the program over the two years immediately preceding the visit. State whether the program is based on a quarter system or a semester system and complete a separate table for each option in the program.

2. Describe how the curriculum aligns with the program educational objectives.

Curriculum Aligns with Program Objectives

The lower level major and general studies courses in the curriculum are chosen and developed to build a foundation for students regarding math, science, and liberal sciences. These learned competencies are then used in upper level courses to develop professional aptitudes. Table 5-2, below indicates how all courses align with the Program Objectives.

Program Objectives *"broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve at the time of graduation and during the first few years following graduation." Graduates shall be competent in*	***Course Alignment***		
	General Studies	***Major Courses other than ELEC Courses***	***ELEC Courses***
1. Relate the concepts of self-directed lifelong learning and the ability to undertake further study and/or examinations specific to the discipline through demonstration of technical skills as a practicing professional, applying knowledge and discipline specific tools..	GS 10	TECH 2290 TECH 3300 COMP 1110/1120	ELEC 2225 ED ELEC 2230 DE
2. Evaluate results and develop professional documents relevant to the discipline and to communicate such findings to a technical and non-technical audience.	ENGL 1101, 1103	PHYS 1101 PHYS 1102	ELEC 2240 IE ELEC 2250 AC/DC MC
3. Operate effectively in a diverse, multi-disciplinary environment demonstrating skills in leadership, professionalism and teamwork.		COMM 2202	ELEC 2280 PC

Table 5-2

3. Describe how the curriculum and its associated prerequisite structure support the attainment of the student outcomes.

Prerequisite Structure Supports Program Outcomes

Prerequisites are assigned to each course to ensure that the students enter the course with the necessary competencies to successfully meet course outcomes. These prerequisites and course outcomes are clearly defined on the course syllabus. Table *5-3* below summarizes the necessary prerequisites for each course in the program.

For example, in the Electronics Engineering Technology program, Math, Technology, and Science skills are essential for many of the upper level Electronics Engineering Technology courses. Therefore, these courses are listed as pre-requisites for courses that deal with machine to machine communication and Programmable Logic Controllers.

4. Attach a flowchart or worksheet that illustrates the prerequisite structure of the program's required courses.

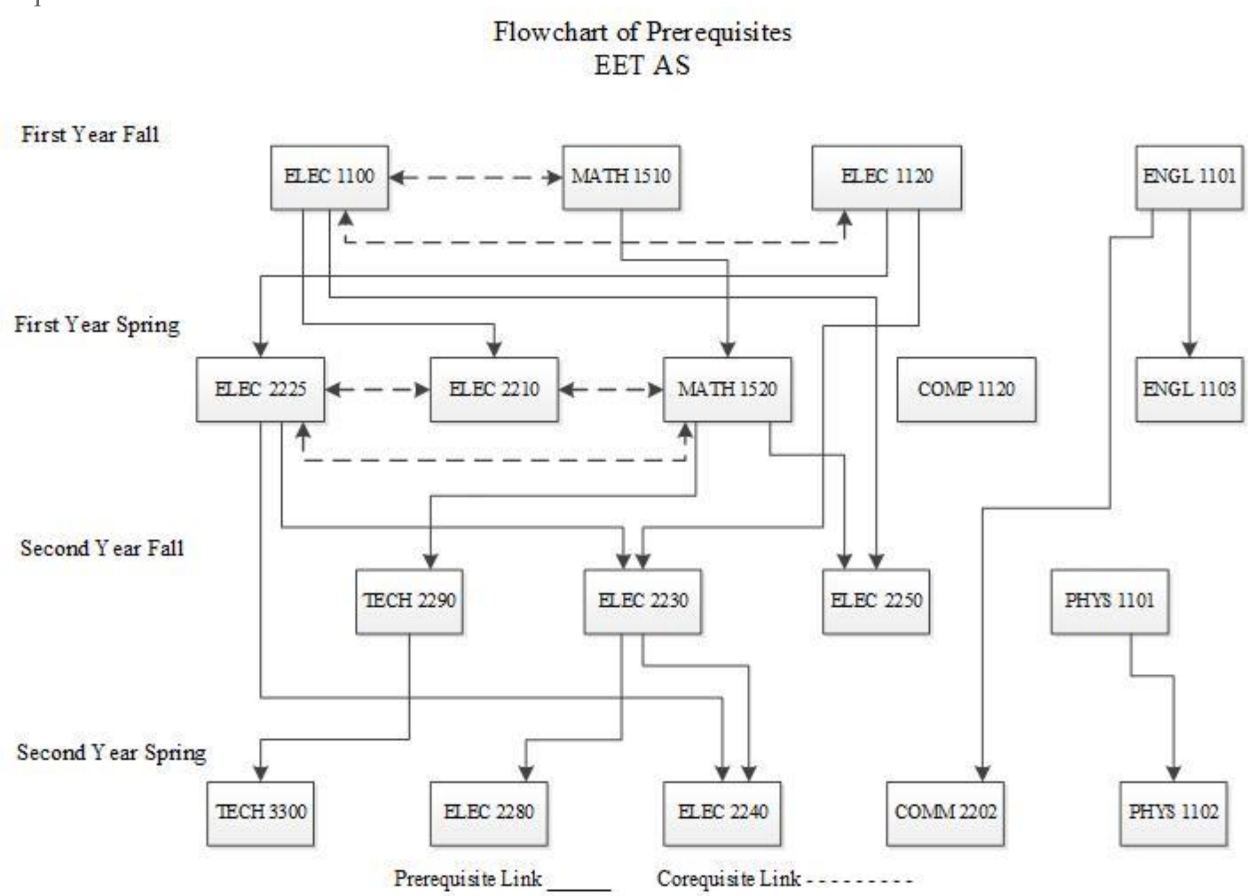


Table 5-3

A.S.E.T in Electronics Engineering Technology			
Current Program			
Required Courses		**Credits**	**Prerequisites**
ELEC 1100	Circuit Analysis I	3	MATH 1510 or better
ELEC 1120	AC/DC Electronics Analysis	3	Co-requisite: ELEC 1100
ELEC 2210	Circuit Analysis II	3	ELEC 1120
ELEC 2225	Electronic Devices	3	ELEC 1120
ELEC 2230	Digital Electronics	3	ELEC 1120
ELEC 2250	AC/DC Machinery and Controls	3	ELEC 2230
ELEC 2240	Industrial Electronics	3	ELEC 2230
ELEC 2280	Programmable Controllers	3	ELEC 1100, MATH 1520 or better
MATH 1510	Applied Technical Math I	3	(ACT.SAT) Test Score
MATH 1520	Applied Technical Math II	3	(ACT.SAT) Test Score
TECH 2290	Engineering Analysis I	4	MATH 1520
TECH 3300	Engineering Analysis II	4	TECH 2290
COMP 1110/1120	Principles of Programming I	3	(ACT.SAT) Test Score
PHYS 1101	Intro to Physics I	4	MATH 1102
PHYS 1102	Intro to Physics II	4	PHYS 1101

5. Describe how your program meets the specific requirements for this program area in terms of hours and depth of study for each curricular area (Math and Basic Sciences, Discipline Specific Topics) specifically addressed by either the general criteria or the specific program criteria as shown in Table 5-1. It is helpful to describe how the coverage of algebra and trigonometry (for A.S. programs) or differential and integral calculus or other mathematics above the level of algebra and trigonometry (for B.S. programs) is accomplished. Please describe how the curriculum develops student proficiency in the use of equipment and tools common to the discipline is appropriate to the student outcomes and the discipline.

Curricular areas that have been identified by ABET's general criteria include competencies in college algebra, chemistry, and physics. Table 5-4 below outlines the terms of hours needed and the depth in which those competencies are used in the Electronics Engineering Technology Program.

Competency Area	Credit Hours	Contact Hours	Demonstration of Depth of Study: ELEC ET Courses in which Competencies are used
Math (Algebra, Trigonometry, Statistics, Calculus)	14	15	ELEC 1100, ELEC 2210, ELEC 2225, ELEC 2240, ELEC 2250
Physics	8	15	ELEC 1100, ELEC 2210, ELEC 2225, ELEC 2250, ELEC 2240

Table 5-4

6. Describe how the curriculum accomplishes a capstone or culminating experience (addressed by either the general or program criteria) and describe how this experience helps students attain related student outcomes as appropriate to the discipline and the degree (not degree level). Such description should give, consideration to factors such as engineering standards and codes; public health and safety; and local and global impact of engineering solutions on individuals, organizations and society.

Courses Requiring Cumulative Knowledge

There is a progression of knowledge starting with theory (ELEC 1100 Circuit Analysis I) and learning to apply the theory in the lab (ELEC 1120 AC/DC Electronics Analysis). From these courses on, the knowledge base expands to passive and active devices (ELEC 2225 Electronic Devices) and more complex circuit analysis applications (Circuit Analysis II ELEC 2210). ELEC 2230 Digital Electronics, ELEC 2250 AC/DC Machinery and Controls, and ELEC 2240 Industrial Electronics introduces the students to tools and techniques for solving more complex systems with theory and lab exercise to reinforce and test this knowledge. ELEC 2280 Programmable Controllers introduces the students to automation and systems that mirror those used in industry.

7. Describe how professional and ethical responsibilities, respect for diversity, and quality and continuous improvement are addressed in the curriculum.

Legacy outcome “i” states: an understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity. This was assessed and measured in the course ELEC 2250 AC/DC Machinery and Controls. Students were required to develop a report that either discusses professional and ethic responsibilities by engineers or a report with a report that communicates the role of diversity in the workplace.

Legacy outcome “k” states: a commitment to quality, timeliness, and continuous improvement. This was assessed and measured in the course ELEC 2240 Industrial Electronics. Students were required to produce a detailed report to solve a technical problem as a team effort. All data related to the technical problem must be acquired, compiled into tables and analyzed requiring the attributes of quality and timeliness.

8. If your program allows cooperative education or internships to satisfy curricular requirements specifically addressed by either the general or program criteria, describe the academic component of this experience and how it is evaluated by the faculty.

The Electronics Engineering Technology program does not have a formal internship or cooperative education program. These activities are encouraged and are advertised by the faculty members when opportunities arise. Throughout the year, we tour various engineering facilities which produces opportunities for developing relationships for internships. Also, our Industrial Advisory Committee members and offer to discuss internship opportunities with our students.

9. Describe by example how the evaluation team will be able to relate the display materials, i.e. course syllabi, textbooks, sample student work, etc., to each student outcome. (See the 2019-2020 APPM Section I.E.5.b. (2) regarding display materials.)

Display Materials at the Time of the Visit-Evaluators will review samples of displayed course materials including course syllabi, textbooks, example assignments and exams, and examples of student work, typically ranging from excellent through poor for only those courses that:

a) support attainment of the program's student outcomes; and

b) develop subject areas supporting attainment of student outcomes or contained in specific program criteria requirements.

At the program's discretion, other materials that document efforts made to continuously improve curricula, or that illustrate novel, unusual or creative efforts to enrich the curriculum and/or attainment of student outcomes may be provided.

Wherever possible, materials should be provided online or electronically.

For all programs, evidentiary displays during the visit will thoroughly represent the Program Objectives, Course Information, and Program Outcomes. The following displays will be developed and presented to the visiting teams.

1. Program Objectives: Since these are delivered and assessed through the use of various tools, all examples will be compiled and displayed for perusal. This includes the following:
   a. Exit interviews:
      Graduating seniors are interviewed by a third-party prior to graduation. Information garnered is used to make modifications to the program, courses, or delivery of materials.
   b. Meeting minutes from Industrial Advisory Committee, Employers, and Alumni

2. Course Information: For each major course, there will be provided a syllabus, textbook (where applicable), laboratory assignments (where applicable), and other course materials provided by the faculty.

3. Program Outcomes: Since this is the most vital component of the CIP, each outcome will be presented with distinct mapping to the courses that support it. Figure 5-1 represents the process that will be used for the visit.

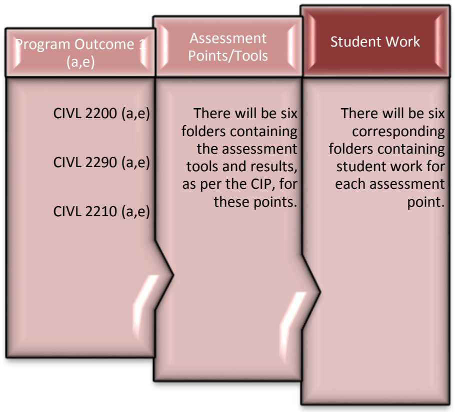


Figure 5-1

Each Program Outcome and the assessment point and tool will be displayed, and explained. Furthermore, the CIP information will be provided with the Program Outcomes indicating actionable items and modifications to correct. Lastly, the student work samples for those outcomes will be available for review.

B. Course Syllabi

In Appendix A of the Self-Study Report, include a syllabus for each course used for the degree.

C. Advisory Committee

Describe the composition of the program's advisory committee and describe how it is representative of organizations being served by the program's graduates. Describe activities of the advisory committee and provide evidence that it periodically reviewing the program's curriculum and advising the program on its program educational objectives and the current and future aspects of the technical fields for which the graduates are being prepared.

The Electronics Engineering Technology's industrial advisory committee (IAC) is composed of individuals from local industry. The main industries that our program serves are the DOT, construction, and coal/gas industries. The advisory committee members are employed and have inside knowledge in these industries. Please see the following table of committee members and their employer and expertise.

Name	Employer	Job description
Mike Detch	Mylan Pharmaceuticals	Electrical Engineer
Jeff Holmes	Pillar Innovations	Senior Controls Engineer
Jim Kirby	First Energy	Senior Engineer
John Waugaman	Tygart Technology, Inc.	President
Paul Deavers	CED Mosebach Electric Supply	Regional Product Manager
William McKinsey	Federal Bureau of Investigation	Section Chief
Patrick Stevens	Novelis Light Gauge Products	Product Engineer
Kolt Decker	MarkWest Energy Partners	Engineer
Jim Goodwin	Retired Professor of Electronics ET	Fairmont State University
Clifton Jackson	Information Technology	Fairmont State University
Laurel Pell	Federal Bureau of Investigation	Engineer
Matt Wright	Federal Bureau of Investigation	Engineering Supervisor
Tom Bonazza	EWA-Government Systems, Inc	VP Embedded Systems Div.
Alex Patton	Monongahela Power Company	Director, Operations Services
Dr. William Mark Hart	MATH Energy Oil and Gas Co.	CEO

Table 5-5

The IAC meets annually to discuss trends, offer guidance, and review and support the continuous improvement initiatives of the program.

Table 5-1 Curriculum

Associate of Science: Electronics Engineering Technology

Course (Department, Number, Title) List all courses in the program by term starting with first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]	*Curricular Area (Credit Hours)* Math and Basic Sciences	Discipline Specific Topics	General Education	Other	Last Two Terms the Course was Offered: Year and Semester	Average Section Enrollment for the Last Two Terms the Course was Offered[1]
ELEC 1100 Circuit Analysis I	R		3 hours			*F18, S19*	*30*
ELEC 1120 AC/DC Electronics Analysis	R		3 hours			*F17, F18*	*20*
ENGL, 1101, Written English 1	R			3 hours		*S19, F18*	*24*
MATH, 1510, Applied Technical Math 1	R	3 hours				*S19, F18*	*24*
ELEC 2210 Circuit Analysis II	R		3 hours			*S19, S18*	*12*
ELEC 2225 Electronic Devices	R		3 hours			*S18, S19*	*12*
COMP 1110 or 1120 Intro to Programming	R		3 hours			*S19, S18*	*15*
MATH, 1520, Applied Technical Math 2	R	3 hours				*S19, F18*	*24*
ENGL, 1103, Technical Report Writing	R			3 hours		*S19, F18*	*24*
PHYS, 1101, Introduction to Physics I	R	4 hours				*F18, S19*	*15*
TECH, 2290, Engineering Analysis 1	R	4 hours				*S19, F18*	*20*
GS 10	E			2 hours		*S18, S19*	*20*
ELEC 2230 Digital Electronics	R		3 hours			*F17, F18*	*12*
ELEC 2250 AC/DC Machinery and Controls	R		3 hours			*S19, F18*	*12*
PHYS 1102, Introduction to Physics II	R	4 hours				*S19 S18*	*12*
TECH, 3300, Engineering Analysis II	R	4 hours				*F18, S19*	*20*
COMM, 2202, Communication in the World of Work	SE			3 hours		*S19, F18*	*24*
ELEC 2240 Industrial Electronics	R		3 Hours			*S19 S18*	*12*
ELEC 2280 Programmable Controllers	R		3 hours			*S19, S18*	*12*
OVERALL TOTAL CREDIT HOURS FOR THE DEGREE		22	27	11	0		
PERCENT OF TOTAL		*37%*	*45%*	*18%*	*0%*		

1. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the average enrollment in each element.
2. Required courses are required of all students in the program, elective courses are optional for students, and selected electives are courses where students must take one or more courses from a specified group.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

CRITERION 6. FACULTY

A. Faculty Qualifications

Describe the qualifications of the faculty and how they are adequate to cover all the curricular areas of the program and also meet any applicable program criteria. This description should include the composition, size, credentials, and experience of the faculty. Complete Table 6-1. Include faculty curriculum vitae in Appendix B.

The Electronics Engineering Technology program is supported by three full-time faculty members. Each of the faculty member's qualifications is discussed below offering justification for expertise in given areas.

The Electronics Engineering Technology program is supported by two full-time faculty members. Each of the faculty member's qualifications is discussed below offering justification for expertise in given areas.

- **Musat Crihalmeanu, PE** – Musat Crihalmeanu earned his BS from Technical University, Cluj-Napoca, Romania and MS from West Virginia University. Professor Crihalmeanu has over 30 years of diverse work experiences along with extensive ongoing research in the field of automation, solar energy, Programmable Logic Controllers (PLCs) and hardware and software related to electronic instrumentation. Professor Crihalmeanu is responsible for teaching courses that include PLCs, data acquisition and control systems, communications, and motor control classes. https://www.fairmontstate.edu/collegeofscitech/musat-crihalmeanu

- **Thomas M. McLaughlin** - Thomas McLaughlin earned his BS degree from West Virginia University and MS degree from Johns Hopkins University. Tom has over 25 years of work experience in field engineering, electronic integration, circuit design, and information security. His specialization is in microcontrollers and digital electronics. Professor McLaughlin has responsibilities in courses related to circuit analysis, microcontrollers, and digital and linear electronics. Tom serves as the Electronics ET program coordinator. https://www.fairmontstate.edu/collegeofscitech/thomas-mclaughlin

Table *6-1* is provided to summarize faculty qualifications.

Table 6-1. Faculty Qualifications

Electronics Engineering Technology

Faculty Name	Highest Degree Earned- Field and Year	Rank [1]	Type of Academic Appointment[2] T, TT, NTT	FT or PT[3]	Years of Experience			Professional Registration/ Certification	Level of Activity[4] H, M, or L		
					Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Thomas M. McLaughlin	MS, Electrical Engineering- 1999	AST	TT	FT	32	5	5	None	L	M	L
Musat Crihalmeanu	MS, Electrical Engineering- 2003	AST	TT	FT	35	4	4	PE	L	H	M

Instructions: Complete table for each member of the faculty in the program. Add additional rows or use additional sheets if necessary. Updated information is to be provided at the time of the visit.

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other
2. Code: TT = Tenure Track T = Tenured NTT = Non-Tenure Track
3. At the institution
4. The level of activity, high, medium or low, should reflect an average over the year prior to the visit plus the two previous years.

B. Faculty Workload

Complete Table 6-2, Faculty Workload Summary and describe this information in terms of workload expectations or requirements for the current academic year.

Workload Expectations

For the current academic year faculty workload expectations are in line with previous years and university guidelines.

Both full-time faculty in the Electronics Engineering Technology program teach upwards of 27 credit hours per year. Both Professors have upgraded the course materials, subject matter and lab software/hardware in consultation with the department chair, dean and Industrial Advisory Committee, and University committees to reflect the changes in industry and high technology. The core curriculum reflects a strength in automation, circuit analysis, instrumentation, which features Programmable Logic Controllers and Microcontrollers and supportive current software languages used by industry.

Professor Crihalmeanu maintains his PE licensure in the state of West Virginia and Pennsylvania, teaches his regular 12-13 credit hours of course load per semester which includes data acquisition and control systems, communications, advanced automation concepts, and industrial electronics. Musat also offers a summer course in ac/dc machinery and controls. He continues to earn professional development hours and has recently attended workshops involving PLC training from Siemens and Allen Bradley systems. Musat has also assisted students in gaining valuable research experiences by writing and being awarded grants from NASA to develop robotic vision technologies, drone systems, and solar projects. Professor Crihalmeanu has been invaluable in assisting students in developing interesting projects to showcase their skills.

Professor McLaughlin is responsible for 12 credit hours of course load per semester which includes Circuit Analysis, Digital Electronics, Microcontroller Systems, Advanced Linear Electronics, and Senior Electronics Projects. Tom has developed strong relationships with industrial partners that have assisted numerous students finding internship opportunities. The internship offers the student valuable work experience and good pay to help cover the high costs of education. Because of these efforts, Tom was instrumental in Fairmont State University receiving $16,500 from First Energy for instrumentation equipment for the electronic labs. Tom is responsible for outfitting the lab with the necessary equipment and electronic components by managing the program’s yearly budget.

C. Faculty Size

Discuss the adequacy of the size of the faculty and describe the extent and quality of faculty involvement in interactions with students, student advising, and oversight of the program.

The Electronics Engineering Technology program is served by two full-time faculty members for an average enrollment between 50 students per year. The academic advising is evenly divided between the faculty members so that each one is responsible for advising approximately 25 students. Faculty also share the responsibilities of other students activities including but not limited to industrial site tours, internship and employment assistance and curriculum management. The Electronics ET program is witnessing a spike in enrollment because of a more vibrant economy and by maintaining a stable teaching staff with a robust current model schedule. Students are learning the tools and instruction necessary to succeed in the workplace. Currently, a minimum of 2 faculty members are required to maintain a strong viable program.

D. Professional Development

Provide a description of program professional development support for faculty and a general description of how faculty avail themselves of these opportunities (specific recent activities for each faculty member should be noted in their CV in Appendix B).

Table 6-3 below summarizes the professional development activities for the Electronics Engineering Technology full-time faculty members.

Full-time Faculty Member	Professional Development Activities for 2018-2019
Musat Crihalmeanu, PE	• Attendance at all department lectures • ABET Continuous Improvement Workshop • PLC Training (Siemens, Allen Bradley)
Thomas M. McLaughlin	• Attendance at all department lectures • Faculty Senate representative for College of Science and Technology • ABET Continuous Improvement Workshop • Microcontroller Training (Parallax)

Table 6-3

E. Authority and Responsibility of Faculty

Describe the role played by the faculty with respect to course creation, modification, and evaluation, their role in the definition and revision of program educational objectives and student outcomes, and their role in the attainment of the student outcomes. Describe the roles of others on campus, e.g., dean or provost, with respect to these areas.

Role of Faculty in Curricular Concerns

Faculty members are considered program and content experts in their respective disciplines of study. As such, they maintain full autonomy over their respective programs of study. Faculty is expected to design the best possible programs of study, course and program outcomes, and extra-curricular activities to support student learning. At Fairmont State University, ABET faculty are expected to participate in ABET assessment and meet with their industrial advisory committees on a yearly basis to review the programs of study being offered in the Technology Department at Fairmont State University.

The Department of Technology’s ABET accredited programs maintain a Continuous Improvement Plan that assists faculty in assuring that programs and course outcomes are being met and that the programs of study are relevant based on the business and industrial needs of our constituents. The faculty work directly with their industrial advisory committees to review faculty or student issues associated with meeting program and student outcomes and objectives.

The Role of Administration in Curricular Concerns

Administration relies heavily on faculty to assure that quality program of study are being offered at the institution. However, upper administration does not micromanage course or program outcomes or course development. The Dean of the College of Science and Technology and Provost are charged with monitoring the progress that students are making in program and course outcomes. Every five years, each program of study is reviewed by the institution to assure program quality and a sufficient number of graduates are able to enter the workforce. This data is reported to the West Virginia Higher Education Policy Council and the Board of Governors at Fairmont State University. Procedures are in place to address deficiencies in programs should the need arise.

All curriculum changes must be approved by the Curriculum Committee on the campus of Fairmont State University. Changes in curricula produce reactions that may be far-reaching in their effects. It is, therefore, important that all proposed changes be studied carefully before they are made.

1) An academic unit that wishes to propose a change in its curriculum should begin by communicating the nature of the change to all the faculty of the unit. The opinions of the unit’s faculty should be reflected in the report of the proposed change, and proposals for curriculum changes should be forwarded only when they enjoy the support of the faculty of the unit. It is the Dean’s role in the College of Science and Technology to assure that all faculty have access to the proposed curriculum, issues are addressed that may result from the curriculum change, and that faculty have an opportunity to vote on the proposed changes.
2) Proposals for change originating in academic units are forwarded to the Provost and Vice President for Academic Affairs [through the Associate Provost], who will be responsible for initial evaluation and recommendation.
3) After evaluating and consulting with the proposal's sponsors and other interested parties, the Provost and Vice President for Academic Affairs will recommend that the proposal be accepted, rejected, or modified; the proposal and recommendation are then submitted to the Curriculum Committee.
4) The Provost and Vice President may initiate proposals for curriculum change. The Provost and Vice President's proposals may be of two types: (a) those affecting existing instructional programs and academic units and (b) those bearing on the

creation of new programs. Proposals of the first type should be submitted to the affected unit for its approval. Proposals of the second type should be submitted to the Academic Affairs Council for its approval. The position of the body is then included in the report forwarded to the Curriculum Committee.

5) The Curriculum Committee then reviews the decisions of the Provost and Vice President for Academic Affairs, especially those of major importance to the University and those receiving negative recommendations. The Curriculum Committee also must hear appeals from any member of the faculty or any School of the University.
6) All actions taken by the Curriculum Committee are to be reported at regular intervals to the Faculty Senate, where final decisions concerning all curriculum matters will be made. In the case of rejected proposals, reversals of the Provost and Vice President's recommendations, or decisions that have been appealed, the Curriculum Committee must supply the Senate with detailed information.

The following deadlines are to be used when determining the "Implementation Date Requested" entry on curriculum proposals:

Any curriculum change that is to become effective at the beginning of a school year must be approved before January 1 of the preceding academic year. Any change that is to become effective at the beginning of a spring semester must be approved before the end of the preceding year. It should be noted that "approved" in this instance means final approval by the Faculty Senate or, if appropriate, by the Higher Education Policy Commission.

All institutional grant proposals, regardless of the source of funding, which propose the creation of new academic programs, must be approved by the Board of Governors prior to submission to the funding agency.

The Higher Education Policy Commission requires the President of the University to inform the Board as soon as the institution begins to plan for the addition or deletion of an academic degree program.

Each institution must submit to the Board formal proposals for new academic programs in conformity with the currently approved Procedures and Format for the Submission of New Academic Program Proposals.

Table 6-1. Faculty Qualifications

Electronics Engineering Technology

Faculty Name	Highest Degree Earned- Field and Year	Rank [1]	Type of Academic Appointment[2] T, TT, NTT	FT or PT[3]	Years of Experience: Govt./Ind. Practice	Years of Experience: Teaching	Years of Experience: This Institution	Professional Registration/ Certification	Level of Activity[4] H, M, or L: Professional Organizations	Level of Activity[4] H, M, or L: Professional Development	Level of Activity[4] H, M, or L: Consulting/summer work in industry
Thomas M. McLaughlin	MS, Electrical Engineering- 1999	AST	TT	FT	32	5	5	None	L	M	L
Musat Crihalmeanu	MS, Electrical Engineering- 2003	AST	TT	FT	35	4	4	PE	L	H	M

Instructions: Complete table for each member of the faculty in the program. Add additional rows or use additional sheets if necessary. Updated information is to be provided at the time of the visit.

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other
2. Code: TT = Tenure Track T = Tenured NTT = Non-Tenure Track
3. At the institution
4. The level of activity, high, medium or low, should reflect an average over the year prior to the visit plus the two previous years.

Table 6-2. Faculty Workload Summary

Electronics Engineering Technology

Faculty Member (name)	PT or FT[1]	Classes Taught (Course No./Credit Hrs.) Term and Year[2]	Program Activity Distribution[3]			% of Time Devoted to the Program[5]
			Teaching	Research or Scholarship	Other[4]	
Thomas M. McLaughlin	FT	ELEC 1100, 3 hrs - Fall 2018	75%	10%	15%	100%
		ELEC 1120, 3 hrs – Fall 2018				
		ELEC 2230, 3 hrs – Fall 2018				
		ELEC 2270, 3 hrs – Fall 2018				
		ELEC 2210, 3 hrs – Spring 2019				
Musat Crihalmeanu	FT	ELEC 2250, 3 hrs – Summer 2018	75%	10%	15%	100%
		ELEC 2250, 3 hrs - Fall 2018				
		ELEC 2225, 3 hrs – Spring 2019				
		ELEC 2240, 3 hrs – Spring 2019				
		ELEC 2280, 3 hrs – Spring 2019				

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the Self-Study Report is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other." (i.e. advising students, interfacing with industrial partners, assisting with student resumes, assisting student projects)
5. Out of the total time employed at the institution. *If a faculty member teaches for more than one program or is an administrator, indicate level of effort for only specific program activities (teaching, etc.).*
6. *Do not include faculty in units that teach service courses, e.g., math or science.*

CRITERION 7. FACILITIES[1]

A. Offices, Classrooms and Laboratories

Summarize each of the program's facilities in terms of their ability to support the attainment of the student outcomes and to provide an atmosphere conducive to learning.

1. Offices (such as administrative, faculty, clerical, and teaching assistants) and any associated equipment that is typically available there.

2. Classrooms and associated equipment that are typically available where the program courses are taught.

3. Laboratory facilities including those containing computers (describe available hardware and software) and the associated tools and equipment that support instruction. Include those facilities used by students in the program even if they are not dedicated to the program and state the times they are available to students. Complete Appendix C containing a listing of the major pieces of equipment used by the program in support of instruction.

The Engineering Technology Building on the main campus of Fairmont State University currently houses the Department's administrative, faculty, clerical offices, classrooms and labs. The facilities are equipped with the tools needed for faculty to appropriately guide students in the attainment of the student educational outcomes. The layout and atmosphere are intended to be conducive to learning. Laboratory and Classroom equipment is regularly maintained an upgraded as needed.

The main office is located on the third floor near the main entrance; most faculty offices are of the fourth floor. The office for the Dean of College of Science and Technology is located on the second floor.

The Electronics Engineering Technology classes utilize four main rooms and are on the third floor of the Engineering Technology Building as shown below:

Room 307: The main instrumentation laboratory, features 10 instrumentation workstations, and can easily accommodate 20 students.

Room 309: The main simulation laboratory and combined lecture facility housing 15 computer workstations, and can easily accommodate 15 students.

Room 311: The main power laboratory and combined lecture facility houses six three-phase power workstations, and can accommodate up to 30 students.

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[1] Include information concerning facilities at all sites where program courses are delivered.

Room 313: Lecture room only can accommodate up to 30 students for lectures.

All four rooms are used exclusively for the Electronics program, except for room 313 which is sometimes used by the Mathematics Department. Each room is equipped to allow instructors to present using digital projectors. The third and fourth floors of the ET Building have auditoriums that can seat 120 students and are used for industrial partner presentations and departmental meetings.

B. Computing Resources

Describe any computing resources (workstations, servers, storage, networks including software) in addition to those described in the laboratories in Part A, which are used by the students in the program. Include a discussion of the accessibility of university-wide computing resources available to all students via various locations such as student housing, library, student union, off-campus, etc. State the hours the various computing facilities are open to students. Assess the adequacy of these facilities to support the scholarly and professional activities of the students and faculty in the program.

There are approximately 2,400 computers on campus of which approximately 1,200 are available for student use related to instruction and another 325 are in use by full-time faculty.

There are nearly 80 computer labs, mobile computer carts, and classrooms with instructor stations with access to audio/visual resources on campus. There are 9 labs and 5 classrooms dedicated to the Engineering Technology program. Engineering Technology students may also use any of the publicly accessible labs and work stations that are located throughout the Library and in the Student Center.

Network access, as well as access to the open internet, is provided campus-wide. Every office, classroom, lab, and residence hall room are fully networked. Free, fast, reliable, and secure wireless internet connectivity is available from anywhere on campus.

C. Guidance

Describe how students in the program are provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories.

The Electronics Engineering Technology program contains courses that offer both textbook examples as well as practical applications. There are eight required ELEC courses for the ASEET degree and only two of these courses do not require laboratory work; but are strictly theoretical. Student laboratory have the Professor as the lab assistant. Therefore students receive one-on-one lab assistance for guidance on the equipment and understanding of the circuit. Each lab has an accompanying sheet(s) that provide a circuit, and places for data entry of measurements and calculations. Students are required to use standard bench instrumentation such as function generators, oscilloscopes, multimeters, and power supplies. The labs are furnished with computers with software applications for further simulation and analysis. Students are exposed to interfacing external electronics using standard programming languages used in industry. The PLC courses provide experiences and exercises similar to real-world industrial automation.

D. Maintenance and Upgrading of Facilities

Describe the policies and procedures for maintaining and upgrading the tools, equipment, computing resources, and laboratories used by students and faculty in the program.

The College of Science and Technology receives an appropriation each year to provide instruction (i.e., faculty and adjunct pay), purchase and repair existing equipment, and support faculty development. In addition, there is an appropriation based on the number of students enrolling in classes and paying lab fees. These lab fees can be used to support instruction, purchase and repair existing equipment, or support faculty development. Overall, the funding is constrained in the College. However, the College has used its funding efficiently, and has been able to purchase and repair existing equipment on a yearly basis. Every four to five years the College has a major expense in the purchase of new computers. The Dean of the College attempts to stagger these purchases and roll out new hardware on a planned basis so as not to use all of the resources in one year.

All programs of study have a budget that is allocated at the beginning of the year. These funds can be used to hire teaching assistants, purchase and repair equipment, support student clubs and extra-curricular activities, and for purchasing expendable supplies. Major repairs are paid for by the Dean's budget so as not to adversely impact program budgets. Faculty maintain complete autonomy over the use of their budgets provided they are within state guidelines. Should a program of study run short of funding due to unforeseen circumstances, their budget may be offset by the College of Science and Technology.

E. Library Services

Describe and evaluate the capability of the library (or libraries) to serve the program including the adequacy of the library's technical collection relative to the needs of the program and the faculty, the adequacy of the process by which faculty may request the library to order books or subscriptions, the library's systems for locating and obtaining electronic information, and any other library services relevant to the needs of the program.

Fairmont State University has two libraries that may be used by all students, faculty and staff members. The Ruth Ann Musick Library is located on the main campus, and the Aerospace Library is located at the National Aerospace Education Center (NAEC) in Bridgeport. These libraries actively support the academic programs of the University. Library personnel (currently 15 staff members) work closely with faculty and students to develop research skills and to provide a wide range of support services that are designed to enhance the learning experience. The print and electronic resources support most of the curricular needs of the Occupational Safety program while encouraging intellectual and personal growth.

The Fairmont State University Libraries provide access to over 500,000 books in both print and electronic format, as well as print periodicals, government documents, compact discs, videos, and other multimedia, and to nearly 100 electronic databases. Subscriptions to more than 28,000 unique journals and newspapers, available in either print or online full text, provide the latest information for all disciplines.

The libraries hold over 23,000 print and electronic books, over 500 academic journals, and over 400,000 full text articles relating specifically to engineering and/or engineering technology. All print materials are classified according to the Library of Congress classification system and online resources are accessible via the library website, 24/7

The libraries hold over 700 print and electronic books, over 64 academic journals, and over 36,000 full text articles relating specifically to occupational safety. All print materials are classified according to the Library of Congress classification system and online resources are accessible via the library website, 24/7.

F. Overall Comments on Facilities

Describe how the program ensures the facilities, tools, and equipment used in the program are safe for their intended purposes. (See the 2019-2020 APPM section I.E.5.b.(1).)

The facilities in the College of Science and Technology are maintained well. Equipment that is in disrepair is not used if it is deemed unsafe. The equipment is either repaired or taken out of service. The College does have three laboratory technicians that help to assure that our facilities and equipment are up-to-date and in working order. One technician is assigned to the Technology Department in the Engineering Technology Building, and two are assigned to Hunt Haught Hall (i.e., one in Chemistry and one in Biology and Geoscience). The Physical Plant on campus maintains all of the buildings on campus, and the majority of costs associated with upkeep and repair do not come from College budgets. The same is also true for maintaining our technological infrastructure. However, the College is charged for the repair or updating of all instructional technology devices used in classrooms and laboratories. Over the past five years, this has been a priority (i.e., updating existing teaching technology, investing in SMART Classrooms, and providing adequate computer hardware and software for faculty and students) in the College of Science and Technology.

CRITERION 8. INSTITUTIONAL SUPPORT

A. Leadership

Describe the leadership of the program and discuss its adequacy to ensure the quality and continuity of the program and how the leadership is involved in decisions that affect the program.

The Electronics Engineering Technology program is directed by a Program Coordinator who reports directly to the Chair of the Department of Technology who is under the Dean of the College of Science and Technology. The Program Coordinator is instrumental in curriculum revisions, program changes, course development, and all other aspects of the day-to-day operations of the program. Since there are three full-time faculty members in the program (one being the coordinator), any decisions on matters that affect the program are usually made jointly. Excluding general studies requirements, and degree hour limitations, the coordinator has complete control of academic issues. However, consults with the faculty, IAC, and Dean prior to changes to the curriculum. This ensures meeting the needs of the constituencies as well as working within the framework of the university.

B. Program Budget and Financial Support

1. Describe the process used to establish the program's budget and provide evidence of continuity of institutional support for the program. Include the sources of financial support including both permanent (recurring) and temporary (one-time) funds.

   The Dean of the College organized the budgets using historical data (i.e., FTE's, student enrollments, amount of expendable supplies used, etc.). Using the data as a baseline, each program area is provided with a set budget, and faculty were provided complete autonomy over how that budget could be spent. As previously noted the College of Science and Technology receives an appropriation each year to provide instruction (i.e., faculty and adjunct pay), purchase and repair existing equipment, and support faculty development. In addition, there is an appropriation based on the number of students enrolling in classes and paying lab fees. These lab fees can be used to support instruction, purchase and repair existing equipment, or support faculty development.

   The current process used to allocate budgets to program areas appears to be working. However, adjustments are needed every couple of years to reflect student growth or special needs in any particular program. For example, one of the current programs of study in the College has a very low number of students. The budget for this particular program will be reduced to better serve the existing programs of study. At various times a program may expend all of their funding due to unforeseen circumstances. The College has been very fortunate in that it has always been able to meet these expenditures without detriment to students or the program of study.

2. Describe how teaching is supported by the institution in terms of graders, teaching assistants, teaching workshops, etc.

The institution supports faculty in teaching by providing numerous professional development experiences during an academic year. As a teaching institution (and not a Research I Institution), Fairmont State University values teaching above all other criteria. The institution provides hardware and software to assist faculty in the teaching of their courses. This consists of Blackboard as a component for delivery of content, at minimum, for syllabus and course grades. In addition to Blackboard, FSU is also using clicker technology for the purpose of quick assessment and engagement of student learning. Classrooms are equipped with Sympodia. Software that is supported through instructional technology includes Respondus, StudyMate Server, Camtasia, SafeAssign, Wimba Classroom, Wimba Voice Tools, and the Lockdown Browser.

Strategies undertaken to ensure success in the use of Instructional Technology:

- The Teaching and Learning Commons was established to merge services of the Help Desk with Blackboard services and other technology-related needs. The Teaching and Learning Commons was re-located to the Library where expanded hours are available. The wireless network has been expanded to all parts of the campus.
- Computer labs have been updated and will continue on a three-year replacement cycle. FSU is also in the process of implementing an intra-net so that some documents and information will not be available to the public, but so students will receive information they need for their classes and majors.
- Student mobile technologies, i.e. Smartphones and laptop computers, have been integrated into courses for enhanced electronic delivery. Students have Smartphone access to an e-web site for ease of information transfer and can also get their Blackboard courses via their smart phones.
- Fairmont State is in the process of implementing cloud computing so that students might have access to any software they need anywhere on campus. This may be accessed in a regular computer lab, by their laptop through the wireless network, by any other device such as an I Pad that they might bring to campus, or by their Smartphone.
- The College of Science and Technology had also received a Title III Grant from the Department of Education to support student retention, increase graduation rates, provide peer mentors, and to purchase new technology in increase student learning and development. The grant has been completed.

3. To the extent not described above, describe how resources are provided to acquire, maintain, and upgrade the infrastructures, facilities, and equipment used in the program.

The Physical Plant on campus maintains all of the buildings on campus, and the majority of costs associated with upkeep and repair do not come from College budgets. The same is also true for maintaining our technological infrastructure. However, the College is charged for the repair or updating of all instructional technology devices used in classrooms and laboratories. Over the past five years, this has been a priority (i.e., updating existing teaching technology, investing in SMART Classrooms, and providing adequate computer hardware and software for faculty and students) in the College of Science and Technology.

The Dean of every College or School is able to submit financial plans and needs to the Budget Committee. In the annual budget planning process, one first identifies the mission or strategic plan agenda to be funded and the accompanying rationale. Second, the resources required for accomplishing that mission or plan must be determined and may include additional personnel (i.e. wages and benefit costs) or operating expense dollars for activities such as the purchase of supplies, equipment, or allocation for travel expenses. Budget resources may come from adjustments to tuition and fees, state appropriations, enrollment, and / or a reallocation of existing resources. Lastly, after the mission or plan is established and institutional resources have been allocated for its achievement, it is important that there is some measure of the success of the activities toward the targeted goals. Again, the College has been fortunate to receive funding to support student academic success in meeting program and course outcomes, equipment, and professional development of faculty and staff.

4. Assess the adequacy of the resources described in this section with respect to the students in the program being able to attain the student outcomes.

As with any organizations, increased funding that is budgeted well could result in improved educational efforts. However, the allocation and use of funds in the program provides for adequate emphasis and work toward student outcomes. With the upgrades in facilities, and equipment over the last ten years, students have been exposed to industry-quality experiences. This addresses the outcomes of developing technical competencies, communication skills, and professional awareness. In addition to the state funding, this program works to develop relationships with industry as a way to give the students the opportunity of field experiences through site tours and internships.

C. Staffing

Describe the adequacy of the staff (administrative, instructional, and technical) and institutional services provided to the program. Discuss methods used to retain and train staff.

The University has allowed the College to fill necessary positions based on the existing budget available to the College. There is an adequate number of support staff, and faculty for the College to be successful. The university is currently undergoing a re-alignment of all colleges and programs. The new model, although not finalized as of this SSR, should provide the program with adequate staff.

Fairmont State University regularly provides professional development activities for faculty, staff, and administrators on campus. These professional development activities occur on a regular basis, and some of them call for required attendance. All faculty and staff in the

College have the ability to utilize professional development funds to meet their own educational needs.

Mentorship is key to training new faculty or staff. In the College of Science and Technology each new staff or faculty member is assigned a peer mentor for the first year. This mentor meets regularly with the new staff or faculty member to assist in their career development and to help answer questions related to their job roles, teaching, or service.

D. Faculty Hiring and Retention

1. Describe the process for hiring of new faculty.
2. Describe strategies used to retain current qualified faculty.

In the hiring process of new faculty, the Dean of the College will gain approval for the position from the Provost, President, Office of Finance, and Human Resources. A position description is written with the assistance of faculty from that particular program of study. The position is then advertised in local and regional newspapers and in the Chronicle of Higher Education. Prior to releasing the candidates for review by the department, Human Resources will vet the pool of candidates to assure for diversity among the candidates.

Candidates are then screened by the faculty of the department. This is usually done with telephone or Skype interviews. The top 3-4 candidates are then requested to come to campus and present a 'teaching lesson' to the faculty of the department. Recommendations are then made to the Dean and Provost of the University. In this process, faculty take the lead role in recommending hires. All successful candidates must pass a criminal history background check prior to being hired.

The College uses a mentorship strategy to help retain qualified faculty. At Fairmont State University it usually can take 6 years to receive tenure. The process used by the College is to review faculty each year (i.e., teaching, scholarship, and service) to help keep the candidate on track. During the first year of employment, new faculty does not serve as advisors in a program of study.

E. Support of Faculty Professional Development

Describe the adequacy of support for faculty professional development, how such activities such as sabbaticals, travel, workshops, seminars, etc., are planned and supported.

As previously noted the College of Science and Technology provides professional development funds to support faculty and staff. No one has been turned down for the use of these funds in the past 6 years. Faculty can apply for sabbaticals, travel, workshops, and seminars on a regular basis. Sabbaticals are granted pending funding from existing budgets. Anyone holding faculty rank is eligible for sabbatical leave after the completion of at least six years of full-time employment at Fairmont State University. The award of sabbatical leave is not automatic, but depends on the merits of the request and on conditions prevailing at the University at the time. After completing a sabbatical leave, the individual will not again be eligible until the seventh subsequent year.

Sabbatical leave may be granted for the purpose of research, writing, study, or other activity designed to improve teaching and usefulness to the University. Applicants for sabbatical leave will initiate the procedure by obtaining application forms from their Deans. Applications will include: 1) personal professional data; 2) a typewritten proposal detailing the activity to be pursued; and 3) relevant supporting documents. Completed application forms will be submitted by applicants to their Deans on or before December 1 for a sabbatical leave to begin the fall or spring semester of the following academic year.

PROGRAM CRITERIA

Describe how the program satisfies any applicable program criteria. If already covered elsewhere in the self-study report, provide appropriate references.

[NOTE: It can be useful to list the program criteria requirements and then include a description or reference for how the program satisfies each of those requirements. The applicable program criteria could include statements that add specificity to the requirements for student outcomes found in Criterion 3. These statements differentiate the discipline designated by the program's title and should be included in the mapping to the program's student outcomes. The applicable program criteria could also include statements that add specificity to the curricular requirements found in Criterion 5 to differentiate the discipline implied by the title of the program criteria. These should be included in the program's required coursework.]

This section can consist of the listing of required topics and indicating which courses contain that content. The program should expect to provide examples of student work in each topic area to validate that the students are doing work related to each topic.

Other Engineering Experiences and Opportunities

If a student qualifies for advanced mathematics (as determined through ACT and SAT test scores), they can be immediately enrolled into Calculus math courses and skip lower level math courses. The student can apply themselves in advanced mathematics or advanced technical courses as discussed with their advisor.

Also, ELEC 1199 is a special topic opportunity open to students that excel academically. In these courses, special selected topics that are determined by the instructor and approved by the department chairperson. Credits earned will be applicable as free electives in degree and certificate programs. Also, various research topics used as experiential learning activity provide an opportunity for a student to engage in the scholarly activities of their major discipline under the guidance of a faculty mentor who will work in close partnership with each student in his or her formulation of a project, the development of a research strategy, and the assessment of a student's progress. The primary goal is for each student scholar to conduct an inquiry or investigation that makes an original, intellectual or creative contribution to their discipline and which is shared in an appropriate venue. Instructor approval required.

Curriculum

Graduates of associate degree programs typically enter careers in testing, operation, and maintenance of systems and may produce and utilize basic design documents and perform basic analysis and design of system components. Our instructional strategy is designed to produce graduates with knowledge, applied skills, and experiences in engineering technology, but also with problem solving, critical thinking, teamwork, and communication skills required by modern industries.

Graduates of the Electronics Engineering Technology Associate Level Program are exposed with a curriculum that prepares graduates with competence in the following areas:

a) the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems;

   ELEC 1100 Circuit Analysis I and ELEC 2210 Circuit Analysis II provide a broad introduction to the concepts of voltage, current, resistance, capacitance and inductance. Also covered are Kirchhoff’s Laws with applications in basic DC-AC, series-parallel circuits. Basic electromechanical devices and transformers as well as three phase electrical circuits are studied. The theory and applications of circuit analysis theorems, sinusoidal and non-sinusoidal waveforms, three-phase circuits and the use of computers in solving problems.

b) 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;

   ELEC 1100 Circuit Analysis I make use of algebra and trigonometry in AC circuits.

c) the ability to analyze, design, and implement one or more of the following: control systems, instrumentation systems, communications systems, computer systems, or power systems;

   ELEC 2240 Industrial Electronics and ELEC 2280 Programmable Controllers cover programmable controllers and their application to sequential process control.

   ELEC 1120 develops a strong competency to implement instrumentation systems. ELEC 2250 provides a strong and broad understanding of power systems.

d) the ability to apply project management techniques to electrical/electronic(s) systems;

   ELEC 2250 AC/DC Machinery and Controls contribute to developing management skills to work in a team environment to complete lab assignments. The teams are comprised of students from various disciplines and provide challenges to understand the tasks to complete in an organized and timely manner. These attributes are the underpinning of project management applied to an electrical/electronic system.

e) the ability to utilize differential and integral calculus, as a minimum, to characterize the performance of electrical/electronic systems.

ELEC 2210 Circuit Analysis II and ELEC 2240 Industrial Electronics introduce techniques to solve complex circuits and utilize advanced mathematics and techniques to solve problems. A knowledge and use of Calculus is helpful to understand systems using these techniques.

APPENDICES

APPENDIX A – COURSE SYLLABI

Please use the following format for the course syllabi (2 pages maximum in Times New Roman 12 point font)

1. Course number and name
2. Credits and contact hours
3. Instructor's or course coordinator's name
4. Text book, title, author, and year
    a. other supplemental materials
5. Specific course information
    a. brief description of the content of the course (catalog description)
    b. prerequisites or co-requisites
    c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program
6. Specific goals for the course
    a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.
    b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
7. Brief list of topics to be covered

1) Course Name Circuit Analysis I
Course Number: ELEC 1100

2) Lecture Information 3 credit hours
Location: 311 Engineering-Technology Building
Meeting day(s): Wednesday (lecture, problem solving review, and testing)
Meeting time(s): 9:00 AM – 10:50 AM

3) Instructor Name Mr. Thomas McLaughlin
Email: Thomas.McLaughlin@fairmontstate.edu
Office location: 403 ET Building
Office hours: Posted on office door or by appointment
Phone: (304) 367-4915

4) Required Textbook
Introductory Circuit Analysis, 13th Edition, Robert L. Boylestad **ISBN 978-0-13-392360-5**
Optional References: None
Other Tools/Supplies: Scientific Calculator
Software: None

5) Description: The student will be introduced to the concepts of voltage, current, power, resistance, capacitance, inductance, Ohm's and Kirchhoff's Laws with applications in basic and complex AC-DC series and parallel circuits, transformers and three phase power.
Course Pre-requisite(s): None
Course Co-requisite(s): MATH 1510 or better

6) Course Goals At the end of this course, students will be able to:
1. Understand the use of Ohm's law involving current, voltage, and resistance.
2. Determine how to compute power consumed by various components.
3. Be able to perform circuit analysis on series and parallel circuits.
4. Understand the fundamentals of AC and DC circuits.

ABET Student Outcome:

1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, or technology to solve broadly-defined engineering problems.

7) Topics Covered

I. Introduction – Chapter 1 Sections 1.3-1.11
  Units of Measurement
    Powers of Ten
II. Voltage and Current – Chapter 2 sections 2.1 – 2.10
    Atoms and their Structures, Voltage, Current
    Conductors and Insulators, Semiconductors
III. Resistance – Chapter 3 sections 3.1-3.14
    Resistance, Color Coding and Standard Resistor Values
    Conductance, Resistance
IV. Ohms Law Power and Energy - Chapter 4 sections 4.1—4.6
  Ohm's law, Power
V. Series DC circuits - Chapter 5 sections 5.1 – 5.8
    Series resistance, Series circuits
VI. Parallel DC Circuits - Chapter 6 sections 6.1 –6. 8
  Parallel resistance, Parallel circuits
VII. Series-Parallel Networks – Chapter 7 section 7.2
VIII. Chapter 13 sections 13.1 – 13.8
  Frequency Spectrum, Sinusoidal waveform
  Phase Relations, verage Value, Effective (rms) value
IX. The Basic Elements and Phasors - Chapter 14 sections 14.1-14.9
    Response of Basic R, L, and C Elements, Frequency Response of the Basic Elements
    Complex Numbers, Rectangular and Polar Forms and conversion between
    Mathematical Operations with Complex Numbers
XI. AC Power - Chapter 20 sections 20.1-20.9
      Resistive Circuit, Apparent Power, Inductive Circuit and Reactive Power
      Capacitive Circuit and Reactive Power, The Power Triangle
      The Total P, Q, and S, Power Factor Correction
XIII. Transformers and Three-Phase (Polyphase) Systems - Chapters 23 and 24
  A. Transformers (Chapter 23, sections 23.3 -23.4)
    Turns ratio, Voltage transformation, Current transformation, Reflected Impedance
  B. Three-Phase Intro (Chapter 24 sections 24.1-24.9) (High Level Overview)
    Wye configuration, currents and voltages,
        Delta configuration, currents and voltages

1) COURSE NAME: AC DC Electronics Analysis
COURSE NUMBER: ELEC 1120

2) Lecture Information: 3 credit hours
Location: 307 Engineering Technology Building
Meeting day(s): M W
Meeting time(s): 9:00-10:50 AM

3) Instructor Name: Mr. Thomas McLaughlin
Email: Thomas.McLaughlin@fairmontstate.edu
Office location: 403ET Building
Office hours: Refer to Office Door Schedule or by appointment
Phone: (304) 367-4915

4) Required Textbook(s): None
Optional References: None
Required Other Tools/Supplies: (All these items can be purchased online or at Bookstore)
Prototyping Parts Kit 32BPPK Electronix Express
Powered Breadboard with LCD panel meter 03PBB509 Electronix Express
Digital Multimeter RSR MY64 DMM Electronix Express
Learn to Solder Kit C6445 Chaney Electronics (stored in front of bookstore)
Deluxe SMD Learn to Solder Kit C6719 Chaney Electronics (stored in front of bookstore)

Tool Kit (not required)

Software: NI-Multisim is available in Labs 307 and 309, MS Office

4) **Course description:**

This course introduces the concepts of measuring voltage, current, and resistance after building various ac and dc circuits using discrete and integrated circuit components. The student will be introduced to circuit design and construction and learn to read a schematic diagram. The student will be familiarized with soldering components on surface mount and through-hole printed circuit boards. Different electronic instruments common in the laboratory; such as the digital multimeter (DMM), oscilloscope, function generator, and power supplies will be covered and utilized in a lab setting. The student will also learn to utilize simulation software and make comparisons between theoretical and real-world results. This course lays the foundation for all future lab courses.

Course Pre-requisite(s): None
Course Co-requisite(s): MATH 1510 or better
Delivery Method: The course takes place in an electronic laboratory setting. Blackboard will supplement course management.

Students will be required to access the course syllabus, assignments, and grades from Blackboard. The student is expected to purchase a number of kits and tools at the book store or online. The instructor can provide guidance about these purchases. The student will use these items throughout their time at school. If you can't afford these items, contact the instructor who will attempt to find substitution components for this course.

6) Course outcomes: At the end of this course, students will be able to:

1. Master and apply learned knowledge, techniques, skills and modern tools of the electronics discipline including mathematics and science.
2. Develop the ability to read a schematic and build and test the circuit.
3. Be able to simulate electronic circuits using application software.
4. Prepare for the ability to engage in lifelong learning, a commitment to quality, timeliness, and continuous improvement
5. Solve circuit analysis problems utilizing mathematics and confirm results by building and testing the circuit using standard lab equipment.
6. An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments.

ABET Student Outcomes: An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments.

7) Topics covered:

I. Schematic symbols and component identification
II. Resistors
III. Series, Parallel, Series-Parallel resistance circuits, Transistor circuits, Integrated Circuits and diode functionality
IV. Software Simulation and Schematic Capture
V. Oscilloscope and Function Generator
  A. Basic Operation and Controls
VI. Circuit boards
  A. Prototyping using breadboards
  B. Soldering
VII. Power supplies and meters
  A. DMM
  B. DC power supplies
  C. Capacitor Meter
VIII. Integrated Circuits
  A. Build and test a 555 timer circuit.

1) COURSE NAME: **Circuit Analysis II**
COURSE NUMBER: **ELEC 2210**

2) Lecture Information: 3 credit hours
Location: 311 Engineering Technology Building
Meeting day(s): T TR
Meeting time(s): 01:30 pm - 02:50 pm

3) Instructor Name: Mr. Thomas McLaughlin
Email: Thomas.McLaughlin@fairmontstate.edu
Office location: 403ET Building
Office hours: By appointment or refer to hours posted on office door
Phone: (304) 367-4915

4) Required Textbook:
Introductory Circuit Analysis, 13th Edition, Robert L. Boylestad**, ISBN 978-0-13-392360-5**

Optional References: None
Other Tools/Supplies: Scientific Calculator
Software: None

5) Course description: ELEC 2210 is the follow-up course of circuit analysis I. It consists of analyzing both AC and DC circuits using the three passive circuit elements of resistance, capacitance and inductance. Voltage current and power will be solved using a variety of methods. Frequency analysis of AC systems will also be investigated as well as three phase systems.

Course Pre-requisite(s): ELEC 1100, MATH 1101 or better
Course Co-requisite(s): MATH 1102 or better
Delivery Method: The course will be delivered via traditional lecture and will be enhanced and managed on-line utilizing Blackboard. Students will be required to access the course enhancement tools to obtain the course syllabus, assignments, and grades for the course.

6) Course outcomes: At the end of this course, students will be able to:

1. Solve circuits containing current sources and voltage sources.
2. Determine if a bridge circuit is balanced.
3. Analyze a DC circuit using Superposition, Thevenin's theorem and max power transfer.
4. Solve simple RC and RL transient problems.
5. Solve a sinusoid for amplitude, period, frequency, angular velocity, phase, radian, degrees, average and rms.
6. Solve ac phasor problems for voltage and current in both polar and rectangular form using KCL and KVL.
7. Solve for average power, power factor, and power factor correction in the basic elements using the power triangle.
8. Solve for voltage, current, turns ratio, impedance, and impedance matching in simple transformers.

ABET Student Outcomes:

1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, or technology to solve broadly-defined engineering problems.
2. An ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline.

7) Topics to be Covered:

III. Methods of dc analysis. Chapter 8 Sections 2, 3, 4, 11
- A. Current sources
  - 1. Source conversions
  - 2. Current sources in parallel
- B. Bridge networks

IV. Network theorems. Chapter 9 Sections 2, 3, 4
- A. Superposition theorem
- B. Thevenin's theorem
- C. Maximum power transfer theorem

V. Capacitors. Chapter 10 Sections 3, 5, 6, 11, 12
- A. Capacitance
  - 1. RC charge phase, RC discharge phase
  - 2. Capacitors in series and parallel

VI. Inductors. Chapter 11 Sections 5, 13
- A. Inductance
  - 1. RL storage phase
  - 2. RL release phase

VII. Sinusoidal alternating waveforms. Chapter 13 Sections 1, 2, 3, 4, 5, 6, 7, 8
- A. The Sinusoidal AC Voltage Characteristics/Definitions

VIII. The basic elements and phasors. Chapter 14 Sections 1, 2, 3, 4, 5, 6, 7, 8, 9
- A. Response of a Basic R, L, and C Elements to a Sinusoidal Voltage or Current
- B. Frequency Response of the Basic Elements

IX. Series ac circuits. Chapter 15 Sections 1, 2, 3, 4, 5, 6, 7, 8
- A. Resistive Elements
- B. Inductive Elements
- C. Capacitive Elements

X. Parallel ac circuits. Chapter 16 Sections 1, 2, 4
- A. Total Impedance
- B. Parallel ac Networks

XI. Series-parallel ac networks and the power triangle. Chapter 17 Sections 1, 2
- A. Illustrative Examples

XII. Power (ac). Chapter 20 Sections 1, 2, 3, 4, 5, 6, 7, 8, 9
- A. Resistive Circuit, Apparent Power, Inductive Circuit and Reactive Power

D. The Power Triangle

XIII. Transformers. Chapter 23 Sections 1, 2, 3, 4,

XIV. Polyphase Systems. Chapter 24 Sections 1, 2, 3, 4, 5, 6, 7, 8, 9
- A. Three-Phase Generator
- B. Y-Connected Generator
- C. Delta-Connected Generator

1) COURSE NAME: Digital Electronics
COURSE NUMBER: ELEC 2230
2) Lecture Information: 3 credit hours
Location: 313 Engineering Technology Building
Meeting day(s): M W
Meeting time(s): 11:00-11:50 AM
Laboratory Room 307 Engineering Technology Building - Thursday 9 – 10:50
3) Instructor Name: Mr. Thomas McLaughlin
Email: Thomas.McLaughlin@fairmontstate.edu
Office location: 403ET Building
Office hours: Refer to hours or by appointment
Phone: (304) 367-4915
4) Required Textbook(s): Digital Systems Principles and Applications, 12th edition**,** Pearson, 2017, by Tocci, Widmer, and Moss
ISBN 10: 0-13-422013-7 ISBN 13: 978-0-13-422013-0
Optional References: None
Other Tools/Supplies: Scientific Calculator, Parts Kit (In Bookstore)
Software: None
5) Course description: This course consists of digital systems, including such basic components as gates, flip-flops, and counters.
Course Pre-requisite(s): ELEC 1120, ELEC 2225
Course Co-requisite(s): NA
6) Course outcomes: At the end of this course, students will be able to:
1. Design logic circuits from Boolean expressions and analyze circuits to produce a Boolean expression.
2. Be able to design, build and test digital circuits.
3. Analyze and Design circuits with gates, flip flops, and counters.
4. Be able to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities.

ABET Student Outcomes:

1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, or technology to solve broadly-defined engineering problems.
2. An ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline.

7) Topics covered:

I. Chapter 1 sections 1 2 3 4 5 6 7
- A.Numerical Representations
- B. Digital And Analog Systems
- C. Digital Number Systems
- D. Representing Binary Quantities

II. Chapter 2 sections 1 2 3 4 5 6 7 8 9 10
- A. Binary-To-Decimal Conversions
- B. Decimal-To-Binary Conversions
- C. Hexadecimal Number System
- D. BCD Code
- E. The Gray Code

F. Putting It All Together
G. The Byte, Nibble, and Word
H. Alphanumeric Codes
I. Parity Method For Error Detection
J. Applications

III. Chapter 3 section 1 2 3 4 5 6 7 8 9 10 11 12 13 14
A. Boolean Constants and Variables
B. Truth Tables
C. OR Operation With OR Gates
D. AND Operation with AND Gates
E. NOT Operation
F. Describing Logic Circuits Algebraically
G. Evaluating Logic-Circuits Outputs
H. Implementing Circuits From Boolean Expressions
I. NOR Gates and NAND Gates
J. Boolean Theorems
K. DeMorgan's Theorems
L. Universality of NAND Gates and NOR Gates

IV. Chapter 4 sections 1 2 3 4 6 8 9
A. Sum-Of_Products and Product of Sums Forms
B. Simplifying Logic Circuits
C. Algebraic Simplification
D. Designing Combinational Logic Circuits

V. Chapter 5 sections 1 2 4 5 6 7 8 9 10 17 18 19
A. NAND Gate Latch
B. NOR Gate Latch
1. Flip-Flop State on Power-Up
C. Digital Pulses
D. Clock Signals and Clocked Flip-Flops
I. D Latch (Transparent Latch)
I. Asynchronous Inputs
1. Designations for Asynchronous Inputs
J. Data Storage and Transfer
1. Parallel Data Transfer
K. Serial Data Transfer: Shift Registers
L. Frequency Division and Counting
1. Counting Operation
2. MOD Number

VI. Chapter 7 sections 4 5 6
A. Counters with MOD numbers $< 2^N$
1. Decade Counters/BCD Counters
B. Synchronous Down and Up/Down Counters
C. Presettable Counters
1. Synchronous Presetting

FAIRMONT STATE UNIVERSITY
DEPARTMENT: ENGINEERING TECHNOLOGY
PROGRAM: ELECTRONICS ENGINEERING TECHNOLOGY
COURSE TITLE: ELECTRONIC DEVICES
COURSE NUMBER: ELEC 2225
SEMESTER: SPRING 2019

Instructor Name: Assistant Professor **Musat Crihalmeanu** BSEE, MSEE, PE
Email: mcrihalmeanu@fairmontstate.edu
Office location: 410 ET Building
Office hours: See office door posting

Phone: (304) 367-4105
Communication with students: ***If you need to contact the instructor outside of regular class time use the Fairmont State regular e-mail system. If the instructor needs to communicate with the entire class outside regular class time, it will be done through Blackboard. If the instructor needs to contact individuals, it will be done through the Fairmont State regular email system. All students should regularly check both systems for communications.***

Electronic Devices and Circuit Theory by Bolyestad and Nashelsky 11th edition. Pearson (Prentice Hall) Publishing.

Other Tools/Supplies: A simple scientific calculator such as one of the TI series or Casio fx-116MS, or any calculator permissible on the FE and PE exams.
Note: During exams the use of sophisticated graphing and wi-fi calculators are prohibited!
Lab kit. Digital voltmeter. Lab trainer. Various lengths of bread boarding wires. Solder gun. Alligator clips. Various sizes of resistors. Scope probes.
Kit available at the bookstore

ELEC 2225 Electronic Devices : 3 credit hours; It is a required course for the EE Program
Devices studied will include diodes, transistors, Op Amps, and timers. The circuitry will include power supplies, basic amplifier types, power amplifiers, switching circuits, voltage regulators, comparators and active filters.
Prerequisites: ELEC 1120 (Instrumentation Lab / AC/DC Electronics Analysis), ELEC 1100 (CA1).
Co-Requisites: ELEC 2210(CA2), MATH 1102 (Applied Tech. Math2) or ACT 24

Course Topics Outline

Diodes
Diode Types and Characteristics
Diode Applications
Bipolar Junction Transistors
Bipolar Junction Transistors
DC Biasing-BJT's

Field-Effect Transistors
JFET
MOSFET depletion and enhancement

Power Amplifiers , classes

Operational Amplifiers
Operational Amplifiers
Op-Amp Applications

Comparators
Linear-Digital ICs
Comparators

Timers
Timer Operation
The 555 IC timer

Grading	**Weight of Assignments in the grade**
90-100 = A	**Homework (20%)**
80-89 = B	**Tests (20%)**
70-79 = C	**Labs (40%)**
60-69 = D	**Comprehensive Final Exam (20%)**
59 and below = F	

Goals of this course

At the end of this course, the student should be capable of understanding the use of diodes, BJTs, JFETs, MOSFETs, OpAmps and timer 555. Due to the Lab section of the course, the students will enhance their instrumentation knowledge (oscilloscopes, power supplies, function generators and breadvoards) and their circuit troubleshooting knowledge. The students should be able to understand and use Data-Sheet information, Maximum Absolute ratings and Electrical Characteristics.

Course Outcomes from *Criterion 3:*
1. Ability to apply knowledge, techniques, skills, and modern tools of Math, Science, Engineering, or Technology to solve broadly-defined engineering problems. (a, b, f)
4. Ability to conduct standard tests and measurements, and to conduct, analyze and interpret experiments (e).
5. Ability to function effectively as a member of a technical team (also e).

FAIRMONT STATE UNIVERSITY
DEPARTMENT: TECHNOLOGY
PROGRAM: ELECTRONICS ENGINEERING TECHNOLOGY
COURSE TITLE: INDUSTRIAL ELECTRONICS
COURSE NUMBER: ELEC 2240
SEMESTER: SPRING 2019

Course Information
Course description: ELEC 2240 is a lecture and "hands-on" lab-based course designed to instruct students in the operation of industrial power and control systems. A systems approach of many devices studied in earlier coursework (as well as non-familiar devices) will be encountered.

Course Pre-requisite(s): ELEC 2210 CA II, ELEC 2225 El. Devices, ELEC 2230 Digital El.
Course Co-requisite(s):

Delivery Method: The course will be a combination of classroom lecture and supporting laboratory experiments. The course will be supplemented through the use of Blackboard to post assignments and grades.

Lecture Information: 3 credit hours
Location: Room 311 ET (Engineering Technology Building)
Meeting day(s): Monday, Friday
Meeting time(s): 9:00-9:50 AM

Laboratory Information: The credit for the lab is included in the 3 hour lecture credit.
Location: Room 307 ET
Meeting day(s): Wednesday
Meeting time(s): 9:00 AM-10:50 PM

Instructor Information
Instructor Name: Musat Crihalmeanu
Email: mcrihalmeanu@fairmontstate.edu
Office location: 410 ET Building
Office hours: See office door posting

Phone: (304) 367-4105

Required Course Materials
Required Textbook(s):
Industrial Electronics by Humphries and Sheets 4th edition. Delmar Publications (Cengage Learning)
ISBN13: 978-0827358256
ISBN10: 0827358253

Other Tools/Supplies: A good scientific calculator such as the TI-89 series. Also consider a HP 33s which is a very capable calculator and is permissible on the FE and PE exams. Lab kit for purchase at the book store. Check the bookstore for the current price. Digital voltmeter. Lab trainer. Various lengths of bread boarding wires. Solder gun. Alligator clips. Various sizes of resistors. Scope probes.
Software: Multisim, Excel, Word, internet capability.
Course Outline and Tentative Schedule of Topics
Outline and Tentative Schedule of
I. Operational Amplifiers for Industrial Applications - Chapter 1
- A. Instrumentation Amplifier
- B. Logarithmic Amplifier
- C. Miscellaneous Op Amp Applications
- D. Current-Differencing Amplifier
- E. Operational Transconductance Amplifier

II. Linear Integrated Circuits for Industrial Applications – Chapter 2
- A. Voltage-to-Frequency (V/F) Conversion
- B. Phase-Locked Loops
- C. Frequency-to-Voltage (F/V) Conversion
- D. Digital-to-Analog (D/A) Conversion
- E. Analog-to-Digital (A/D) Conversion

III. Brushless and Stepper DC Motors – Chapter 4
- A. Stepper Motors
- B. Optical Encoders

V. Transducers – Chapter 8
- A. Temperature

VII. Pulse Modulation – Chapter 11
- A. The LM555 Timer

Student outcomes
At the end of this course the student should be able to understand and use opamps for industrial applications, special ICs like VCOs, PLLs, CDAs and OPAs. They should enhance their motors knowledge with steppers and brushless motors and their specifics and ways to control them.

Specific outcomes from Criterion 3:
1. Ability to apply knowledge, techniques, skills, and modern tools of Math, Science, Engineering, or Technology to solve broadly-defined engineering problems. [a, b, f]
3. An ability to apply written, oral, and graphical communication in well-defined technical and nontechnical environment; and an ability to identify and use appropriate technical literature.
4. Ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments. [e]
5. Ability to function effectively as a member of a technical team. [e].

FAIRMONT STATE UNIVERSITY
DEPARTMENT: ENGINEERING TECHNOLOGY
PROGRAM: ELECTRONICS TECHNOLOGY
COURSE TITLE: AC/DC MACHINERY
COURSE NUMBER: ELEC 2250
SEMESTER: SPRING 2019

Course Information

Course description: Study of the basic concepts of rotating machinery and transformers

Course Pre-requisite(s): ELEC 1100 CA1, ELEC 2100 CA2, MATH 1520. No co-requisites.
Delivery Method: The course will be a combination of classroom lecture and supporting laboratory experiments. The course will be supplemented using Blackboard to post some of the assignments and grades.
Lecture Information: 3 credit hours
Location: 311 Engineering Technology Building (ET)
Meeting day(s): T, R
Meeting time(s): 10:00-10:50 AM
Laboratory Information: The credit for the lab is included in the 3-hour lecture credit.
Location: 311 ET
Meeting day(s): F
Meeting time(s): 10:00 AM-12:00 PM (Noon)

Instructor Information
Instructor Name: Assistant Professor Musat Crihalmeanu, PE, BSEE, MSEE.
Email: mcrihalmeanu@fairmontstate.edu
Office location: 410 ET Building
Office hours: See office door posting
Phone: (304) 367- 4105

Required Textbook(s):
Electric Machines: Theory, Operation, Applications, Adjustment, and Control 2nd edition by Hubert, ISBN: 9780130612106, $81.00 to $218.00.
Software: Software: Multisim, Excel, Word, internet capability.

Course Outline Chapter 1 sections 2 3 4 5 6 7 8 9 10 11 12 15
- A. Magnetic Field
- B. Magnetic Circuit Defined
- C. Reluctance and the Magnetic Circuit Equation
- D. Relative Permeability and Magnetization Curves
- F. Magnetic Hysteresis and Hysteresis Loss
- G. Interaction of Magnetic Fields (Motor Action)
- H. Elementary Two-Pole Motor
- K. Elementary two-Pole Generator

II. Chapter 2 sections 2 3 4 5 8 11 13 14

- B. Principle of Transformer Action
- D. No-Load Conditions
- E. Ideal Transformer
- G. Transformer Losses and Efficiency
- H. Determination of Transformer Parameters

IV. Chapter 4 sections 2 3 5 7 8 11 12 15

- A. Induction-Motor Action
  - B. Reversal of Rotation
  - C. Synchronous Speed
  - D. Slip and its Effect on Rotor Frequency and Voltage
  - E. Equivalent Circuit of an Induction-Motor Rotor
  - F. Mechanical Power and Developed Torque
  - G. Torque-Speed Characteristic

VII. Chapter 7 section 6

- H. Basic DC Motor

Student Grade Scale

A: 90%-100% Benchmark: Professional
B: 80%-89.9% Benchmark: Target
C: 70%-79.9% Benchmark: Target
D: 60%-69.9% Benchmark: Substandard
F : <60% Benchmark: Substandard

Student Grade Distribution

90-100 = A
80-89 = B
70-79 = C
60-69 = D
59 and below = F

Assignments weight on final grade

- Homework (25%)
- Labs (40%)
- Tests (20%)
- Comprehensive Final (15%)

Student Outcomes for ELEC 2250 AC/DC Machinery

At the end of this course the student should be able to understand electromagnetism concepts like Magneto-Motive Force, Reluctance, Magnetic Flux, Magnetic Flux Intensity, Magnetic Flux Density, Hysteresis. Broad understanding of Transformers, AC Induction Motors is expected and basic introductory concepts of DC Motors.

Student Outcomes based on ABET Criterion #3:

1. Ability to apply knowledge, techniques, skills, and modern tools of Math, Science, Engineering, or Technology to solve broadly-defined engineering problems. [a,b,f]
4. Ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments. [e]
5. Ability to function effectively as a member of a technical team. [e]

1) COURSE NAME: PROGRAMMABLE CONTROLLERS
COURSE NUMBER: ELEC 2280
2) Lecture Information: 3 credit hours
Location: Room 309 Engineering Technology Building
Meeting day(s): T, R
Meeting time(s): 1:30 - 3:30 PM
3) Instructor Name: Musat Crihalmeanu BSEE, MSEE, PE
Email: mcrihalmeanu@fairmontstate.edu
Office location: 410 ET Building
Office hours: See office door
Phone: (304) 367-4105
Fax: (304) 367-4934
4) Required Textbook(s):
Frank D. Petruzella
PROGRAMMABLE LOGIC CONTROLLERS
5th edition, McGraw Hill, 2016.
ISBN 978-0-07-337384-3
Optional References:
Frank D. Petruzella – ELECTRIC MOTORS CONTROL SYSTEMS
2nd edition, McGraw Hill, 2016

Other Tools/Supplies: Scientific Calculator (TI series, HP 33s), CASIO fx 116 series
.
Software: LogixPro simulation, SIEMENS S7-1200 TIA Portal,
Allen Bradley RS Logix 500, Factory talk View, STUDIO 5000.

5) Course description: Introduction to Programmable Logic Controllers. General concepts about PLC's hardware and software. The course is designed for students with no prior PLC experience.
Course Pre-requisite(s): ELEC 2230 Digital Electronics and ELEC 2250 AC/DC Machines

6) Course outcomes: At the end of this course, students will be able to:
- Understand the parts of a PLC and their purposes.
- Learn about Ladder Logic and how to apply it to control systems.
- Wire PLCs to common input and output devices.
- Program PLCs using instructions such as Timers, Counters, Math Instructions, etc..
- Using Analog signals with a PLC.
- Converting Relay Schematics into PLC Ladder Programs.
- Writing a Ladder Logic directly from a Narrative Description
- Learn LogixPro simulation software
- Accomplish simple projects using Allen Bradley Micrologix and Siemens S7-1200 PLCs.

7) Course Outline and Tentative schedule of Topics :
I. Chapter1 PLCs – An Overview

II. Chapter 2 PLC Hardware Components

III. Chapter 4 Fundamentals of Logic

IV. Chapter 5 Basics of PLC Programming

VI. Chapter 7 Programming Timers

VII. Chapter 8 Programming Counters

VIII.Chapter 9 Program Control Instructions

IX. Chapter 10 Data Manipulation Instructions

X. Chapter 11 Math Instructions

XI. Chapter 13 PLC Installation Practices, Editing, and Troubleshooting

8) Student Grade Scale and other information:

Grade Scale

Grades are comprised of:
Weight (%) , Tentative Dates

A: 90%-100% Homework and Class Assignments, Quizzes 25 TBA
B: 80%-89.9% Laboratory, Projects 30 TBA
C: 70%-79.9% Test 1, Test 2 25 TBA
D: 60%-69.9% Comprehensive Final TBA
F: <60%

Student Outcomes according to ABET Criterion #3:

1. Ability to apply knowledge, techniques, skills, and modern tools of Math, Science, Engineering, or Technology to solve broadly-defined engineering problems. [a,b,f]
4. Ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments. [e]
5. Ability to function effectively as a member of a technical team. [e]

APPENDIX B – FACULTY VITAE

Please use the following format for the faculty vitae (2 pages maximum in Times New Roman 12 point type)

1. Name
2. Education – degree, discipline, institution, year
3. Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time
4. Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time
5. Certifications or professional registrations
6. Current membership in professional organizations
7. Honors and awards
8. Service activities (within and outside of the institution)
9. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation
10. Briefly list the most recent professional development activities

1. **Thomas M. McLaughlin, Assistant Professor of Electronics Engineering Technology**

2. **Education:**
    - Master of Science, Electrical Engineering (Digital Electronics Focus), Johns Hopkins University, May 1999
    - Bachelor of Science, Electrical Engineering, West Virginia University, May 1987

3. **Academic experience:**
    - Fairmont State University - Electronics Engineering Technology
      Assistant Professor – 2014 to Present

4. **Non-academic experience:**
    - 2008 – 2014 Lockheed Martin Corporation, Systems Engineer Sr.; White Hall, WV
        - ➢ Collaborated to conduct an engineering study to analyze and choose a search platform for integration into a Department of Justice information exchange system (OneDOJ). Assisted to develop a Proof of Concept (POC) evaluation methodology to meet customer requirements and facilitate the team into selecting the best product for a specific application.
    - 2000 – 2008 WV High Technology Foundation, Project Manager; Fairmont, WV
        - ➢ Participant in the Department of Justice (DOJ) - National Institute of Justice (NIJ) Communication Technology (CommTech) Technology Working Group (TWG) and Biometrics TWG.
    - 1998 – 2000 - National Security Agency, Information System Security Engineer, Fort Meade, MD
        - ➢ Provided Information System Security Engineering (ISSE) guidance, services, identified security solutions and security awareness related to system architecture and data transport protocols. Duties included customer support within the intelligence community and across the Defense Information Infrastructure (DII).
    - 1996 – 1998 - Northrop Grumman Corporation, Electrical Engineer, Baltimore, MD
        - ➢ Responsible for the hardware/firmware upgrade (FPGAs and EEPROMs), prototype, and acceptance testing of a Graphics Card used to drive flat panel displays. Author of the Graphics Card Design Document, User’s Guide, and Technical Manual.
    - 1987 – 1996 Westinghouse Electric Corporation, Associate Engineer, Baltimore, MD
        - ➢ Conducted extensive maintenance training courses for customers world-wide in support of the ALQ-131 Electronic Countermeasure Pod for the Israeli AF, Royal Netherlands AF, Portuguese AF, Japanese Defense Force, Bahrain AF, and the Egyptian AF.

5. **Certifications or professional registrations:**
    - None

6. **Current membership in professional organizations:**
    - None

7. **Honors and awards:**
    - Lockheed Martin Corporation Special Recognition Award (2013) for Critical Design Review and the Team Excellence Award for outstanding performance and lasting contribution for the Next Gen Identification System delivered to FBI.
    - NSA Achievement Award (1998) for significant and outstanding contribution for the ATM Risk Assessment Report and follow-on briefings.
    - Westinghouse Electric Corp. Service Excellence Award (1989, 1990) for conducting outstanding customer training for Support of ALQ-131 System.

8. **Service activities: (within and outside of the institution)**
    - FSU College of Science and Technology Faculty Senate
    - Lions Club International

9. **Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation.**
    - None

10. **Briefly list the most recent professional development activities**

- Developed Course material and incorporated into the EET curriculum (ELEC 3310), advanced microcontroller training using single and multicore processors. Eliminated use of computer programming languages not used in industry per IAC directive.
- ABET Continuous Improvement Workshop, October 2018

1. 1. **Musat C. Crihalmeanu**, Assistant Professor of Electronics Engineering Technology
2. **Education**:

   Master of Science in Electrical Engineering, West Virginia University, 2003.
   Bachelor of Science in Electrical Engineering, Technical University of Cluj-Napoca, Romania, 1984.
3. **Academic Experience:**

   West Virginia University, Teaching Assistant, 2002-2003.
   West Virginia University, Instrumentation Laboratory for Civil and MAE Dept. 2005-2006
   West Virginia University, Research Engineering Scientist, 2004-2006.
   Fairmont State University, Assistant Professor of Electronics Technology, 2015 – Present.

4. **Non-Academic Experience:**

   ElectroSigma S.A. Cluj-Napoca, Electrical Design Engineer, 1984 – 1994.
   KD Yang Cluj-Napoca, Service and Assembly Engineer 1994-1996.
   KD Yang Cluj-Napoca, Technical Manager, 1996-1998.
   3D-Computer Cluj-Napoca, Service Manager, 1998-2000.
   Lotus International, Detroit, MI, Technical Specialist, 2000-2001.
   HSC Industrial Beckley, WV, Research and Development Engineer, 2006-2010.
   Doddridge Controls Inc., Fairmont, WV, Design Electrical Engineer, 2010-2013.
   EarthRes Group, Morgantown, WV, Electrical Engineer – Contractor, 2014.
   HSC Industrial Beckley, Electrical Design Engineer – Contractor, 2015.

5. **Certifications or Professional registrations:**

   Registered Professional Engineer for Electrical and Electronics for the state of WV-2009.
   Registered Professional Engineer for Electrical and Electronics for the Commonwealth of PA – 2014.

6. **Current membership in professional organizations:**

   FSU Robotics Club – “Full Metal Falcons”, co-founder.
   “Solar Army” – member

7. **Honors and awards:**

   None
8. **Service activities: (within and outside of the institution)**

   None

9. **Most important publications and presentations from past five years – title, co-authors if any, where published and / or presented, date of publication or presentation:**
   - Technical Report for the NASA Grant 2016, "Development of a Hybrid 3D printing and CNC Machine", together with student David Klug. Presented on FSU Campus on August 2016.
   - Technical Report for the NASA Solar Grant 2017, "Comparison between a fixed and a tracking solar panel", together with student Elazar Mann. Presented on FSU Campus on August 2017.
   - Technical Report for the NASA Grant 2019, "ARES the Intelligent Ground Vehicle", together with student Michael R. Butts. Will be presented and demonstrated, August 2019 on FSU Campus.

10. **Most recent professional development activities:**

-WV American Water and Waste Water Agency (WVWARN) Charleston, WV, ACCOL Conversion to RS Logix 5000, March 2015.
-Historian Server training – Invensys Operations Management - Richmond, VA, Sept. 2013
-InTouch Software training – Invensys Operations Management - Richmond, VA, July 2012
-Mosebach on the Move – CED Mosebach, Wisp, MD - Rockwell Automation training - May 2012
-WV American Water and Waste Water Agency (WVWARN) - Charleston, WV, training - March 2012
-Rockwell Automation – Course CCV207 – Factory Talk View SE Programming - Franklin, TN - Feb. 2011.
-Microchip Technology – 8 and 16 bit PIC Micro-Controllers Seminar - Pittsburgh, PA - April 2010.
-National Instruments LabView training Seminar – Cranberry Township, PA - May 2009.
- SIEMENS – training in Detroit, MI – 07/12 to 07/19/2016. Completed the course titled: "Workshop for Educators Platform S7-1200".
- SIEMENS – training in Pittsburgh, PA – 07/27 to 08/02/2016. Completed the course titled:
"TIA Portal WinCC Professional Configuration (SCADA)".
-SIEMENS – training in Atlanta, GA – 07/2017. Completed the course titled:
"Introduction to SINAMICS VFDs"
-Mosebach on the Move – CED Mosebach, Wisp, MD - Rockwell Automation training - May 2017
-National Instruments – Webminar: "Autonomous Vehicle using LabVIEW"- September 2018
-Mosebach on the Move –Wisp, MD - Rockwell Automation training – May 2019

APPENDIX C – EQUIPMENT

Please list the major pieces of equipment used by the program in support of instruction.

Classroom Instructional Resources

All electronics engineering technology classes are held in the engineering technology building and are equipped with whiteboards, projectors and network access. The computer lab located in room 309 of the engineering technology building has software specific to the major and has 15 computers. There are 9 computers with program specific software in Room 307 of the ET Building. There are additional computer labs across campus equipped with general software such as Microsoft Office.

The electronics engineering technology program has various equipment that satisfy to needs of the courses. Table C-1 bellow lists the necessary equipment used across the courses offered at FSU's CET program.

Course	**Equipment**	**Related Outcome (1-5)**
ELEC 1120	Oscilloscopes, Function Generator, Multimeter, Power Supplies, PCs (MS Office, NI Multisim)	1,2,4
ELEC 2225	Oscilloscopes, Function Generator, Multimeter, Power Supplies, PCs (MS Office, NI Multisim)	1,2,3,4
ELEC 2230	Oscilloscopes, Function Generator, Multimeter, Power Supplies, PCs (MS Office, NI Multisim)	1,2,3,4
ELEC 2240	Oscilloscopes, Function Generator, Multimeter, Power Supplies, PCs (MS Office, NI Multisim)	1,2,3,4,5,
ELEC 2280	Allen Bradley PLC Software	1,2,4
ELEC 2250	Hampden 3 Phase Machines	1,3,4,5

APPENDIX D – INSTITUTIONAL SUMMARY

Programs are requested to provide the following information.

1. The Institution

a. Name and address of the institution.

   Fairmont State University
   1201 Locust Ave, Fairmont, WV 26554

b. Name and title of the chief executive officer of the institution.

   Dr. Mirta Martin – President

b. Name and title of the person submitting the Self-Study Report.

   James Vassil, PE. Program Coordinator, Civil Engineering Technology

c. Name the organizations by which the institution is now accredited, and the dates of the initial and most recent accreditation evaluations.

Fairmont State University is accredited by The Higher Learning Commission and is a member of the North Central Association, 230 S. LaSalle Street, Suite 7-500, Chicago, IL 60604-1411, (800) 621-7440x105, http://www.ncahlc.org.

The Teacher Education program is approved by the West Virginia Board of Education and accredited by the National council for the Accreditation of Teacher Education/Council for the Accreditation of Educator Preparation, 2100 Massachusetts Ave., Suite 500, Washington, DC 20036,(202) 223-0077. In addition, selected teaching specializations are nationally approved by their respective learned society and/or professional organization. The most recent accreditation visit by the higher learning commission occurred in the summer of 2018.

Selected programs in the College of Science and Technology are accredited by the Engineering Technology Accreditation Commission and Applied Natural Sciences Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700. The following programs are currently accredited by ETAC of ABET: A.S. and B.S. Civil, A.S. and B.S. Electronics, and A.S. and B.S. Mechanical Engineering Technology. In addition, the B.S. Occupational Safety program is accredited by ANSAC of ABET. The Engineering Technology programs have been accredited by ABET since 1988. The most recent accreditation visit was October 2013.

The A.S. Nursing program is accredited by the West Virginia Board of Examiners for Registered Professional Nurses, 90 MacCorkle Avenue, SW, Suite 203, South Charleston, WV 25303, (304) 744-0900, Fax: (304) 744-0600, http://wwww.rnboard@wv.gov and the

Accreditation Commission for Education in Nursing (ACEN), 3343 Peachtree Road NE, Suite 850, Atlanta, GA, 30326, (404)975-5000, http://acenursing.org; the B.S. Nursing program is accredited by the Commission on Collegiate Nursing Education (CCNE), One Dupont Circle, NW Suite 530, Washington, DC, 20036, (202) 887-8476, http://www.aacn.nche.edu.

The School of Business is accredited by the Accreditation Council for Business Schools and Programs (ACBSP) 11520 West 119th Street, Overland Park, KS 66213, (913) 339-9356, www.acbsp.org.

The University is also a member of the American Association of Colleges for Teacher Education, National League for Nursing, American Library Association, and Public Relations Society of America (PRSA) West Virginia Chapter.

2. Type of Control

Description of the type of managerial control of the institution, e.g., private-non-profit, private-other, denominational, state, federal, public-other, etc.

Fairmont State University is a state institution governed by the state legislature and with oversight by the WV Higher Education Policy Commission. According to Chancellor, Paul Hill, PhD, "The West Virginia Higher Education Policy Commission is responsible for developing, establishing, and overseeing the implementation of a public policy agenda for the state's four-year colleges and universities. It is charged with oversight of higher education institutions to ensure they are accomplishing their missions and implementing the provisions set by state statute".

3. Educational Unit

Describe the educational unit in which the program is located including the administrative chain of responsibility from the individual responsible for the program to the chief executive officer of the institution. Include names and titles. An organization chart may be included.

Administrative Structure

The following positions and descriptions of duties represent the top-down hierarchy of the institution. The management of the academic program begins with oversight by the Board of Governors but is managed by the program coordinator and faculty.

Board of Governors

As noted on the Board of Governors' website (http://www.fairmontstate.edu/aboutfsu/board-governors) , the BOG "determines, controls, supervises and manages the financial, business and education policies and affairs" of Fairmont State University. (§18B-2A-4(a)) Its membership, terms of office, responsibilities, powers and electoral procedures are further governed by West Virginia Code, Chapter 18B. The twelve-member board meets bi-monthly on campus. Meetings are open to the public and anyone with an interest in the governance of the university is welcome to attend. Various campus reports are routinely sent to the Board of Governors. The Board of Governors may also make specific requests for data from the campus. These requests are routed through the President's Office, and from there they are routed to the appropriate office for response. All requested information is collected, and the campus response is then issued by the President's Office.

The President

The President is the chief executive officer on the campus and oversees the operation of the campus, including the academic, financial, student services, and external communication programs in consultation with the vice presidents of each of these areas. The President also serves as the campus representative to the West Virginia Legislature, the WVHEPC, and to the region the campus serves. The President is responsible to the Board of Governors.

Provost /Vice President for Academic Affairs

The Office of the Vice President for Academic Affairs (Provost) maintains the integrity of FSU's academic mission by overseeing academic programs, policies, procedures, calendars, academic appointments, promotion and tenure, and faculty grants and fellowships. Positions that report to Academic Affairs include academic Deans, the Director of the Honors Program, the Coordinator of the Advising Center, and the Director of the Center for Civic Engagement.

Associate Provost/Vice President for Academic Affairs

This administrator assists in the conduct of the academic functions of the University. When necessary, the Associate Provost assumes responsibility for academic matters in the absence of the Provost and Vice President for Academic Affairs.

College/School Deans, Associate Deans, and Department Chairs

The Dean is charged with implementing academic policies. They have authority to supervise the academic functions of faculty members within their academic units.

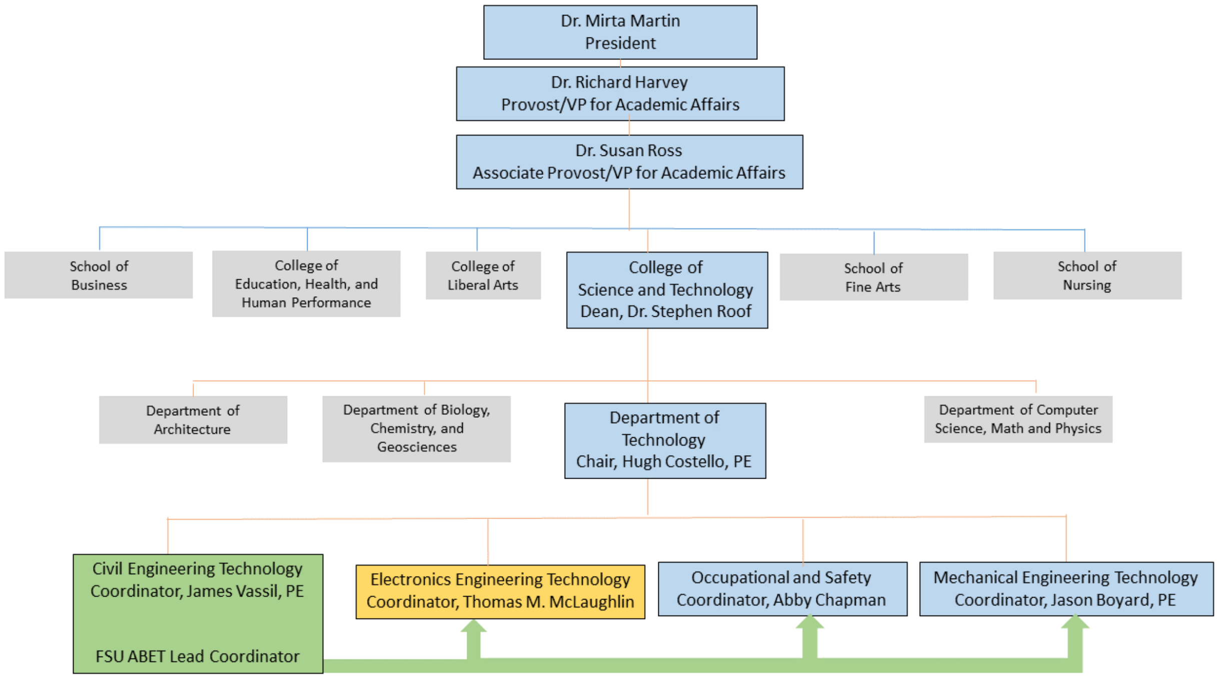
Program Coordinator

The coordinator is charged with assisting College/School Dean with academic functions including;

- Developing curriculum revisions
- Maintaining specialized accreditation
- Securing adjunct faculty
- Generating five-year program review reports
- Directing program faculty
- Reviewing academic transfers
- Contact person for all program matters

Program Faculty

Faculty members are responsible for the development and delivery of materials within the constraints of the established program objectives and outcomes. Faculty members are also responsible for assessment of course outcomes to ensure students are meeting program outcomes and objectives.



4. Academic Support Units

List the names and titles of the individuals responsible for each of the units that teach courses required by the program being evaluated, e.g., mathematics, physics, etc.

Chemistry/Biology:	Dr. Stephen Roof, Interim Dean
English:	Dr. Deanna Shields, Dean
Fine Arts:	Dr. Francine Kirk, Interim Dean
Math/Computer Science/Physics:	Dr. Stephen Roof, Interim Dean
Social Sciences:	Dr. Deanna Shields, Dean
Technology:	Dr. Stephen Roof, Interim Dean

5. Non-academic Support Units

List the names and titles of the individuals responsible for each of the units that provide non-academic support to the program being evaluated, e.g., library, computing facilities, placement, tutoring, etc.

Non-academic Unit	Director
Academic Advising	Jennifer Jones
Career Services	Ashley Tasker
Computing Services	Jonnie Raisovich
Housing	Alicia Kalka
Library	Sharon Mazure
Student Life	Alicia Kalka
Tutoring	James Mathews

6. Credit Unit

It is assumed that one semester or quarter credit normally represents one class hour or three laboratory hours per week. One academic year normally represents at least 28 weeks of classes, exclusive of final examinations. If other standards are used for this program, the differences should be indicated.

The university operates on a 16-week semester for fall and spring providing 32 weeks of instruction and examination during one fiscal year. At Fairmont State University, one credit hour is awarded for each class hour. Laboratory hours, in general, are two contact hours for one credit hour.

7. Tables

Complete the following tables for the program undergoing evaluation.

Table D-1. Program Enrollment and Degree Data

Elctronics Engineering Technology

	Academic Year		Enrollment Year 1st	2nd	3rd	4th	5th	Total Undergrad	Total Grad	Degrees Awarded Associates	Bachelors	Masters	Doctorates
Current Year	2018	FT	15	10	5	12	0	42		3			
		PT	1	0	0	1	0						
1	2017	FT	11	5	10	8	0	34		2			
		PT	0	0	0	0	0						
2	2016	FT	11	8	4	10	0	33		2			
		PT	0	0	0	0	0						
3	2015	FT	22	5	2	13	0	42		1			
		PT	0	0	0	0	0						
4	2014	FT	12	3	5	14	0	34		1			
		PT	0	0	0	0	0						

Give official fall term enrollment figures (head count) for the current and preceding four academic years and undergraduate and graduate degrees conferred during each of those years. The "current" year means the academic year preceding the on-site visit.

FT--full time
PT--part time

Table D-2. Personnel

Bachelor of Science Electronics Engineering Technology
Year: 2018

	HEAD COUNT		FTE[2]
	FT	PT	
Administrative[2]	0	1	
Faculty (tenure-track)[3]	2	0	
Other Faculty (excluding student Assistants)	1	1	
Student Teaching Assistants[4]	0	0	
Technicians/Specialists	1	0	
Office/Clerical Employees	0	0	
Others[5]	0	0	

Report data for the program being evaluated.

1. Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.

2. Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.

3. For faculty members, 1 FTE equals what your institution defines as a full-time load.

4. For student teaching assistants, 1 FTE equals 20 hours per week of work (or service). For undergraduate and graduate students, 1 FTE equals 15 semester credit-hours (or 24 quarter credit-hours) per term of institutional course work, meaning all courses — science, humanities and social sciences, etc.

5. Specify any other category considered appropriate, or leave blank.

SUBMISSION ATTESTING TO COMPLIANCE

Only the Dean or Dean's Delegate can electronically submit the Self-study Report.

ABET considers the on-line submission as equivalent to that of an electronic signature of compliance attesting to the fact that the program conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Engineering Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual.*