5 Year Program Review

BSET, Electronics Engineering Technology

Submitted Spring 2012

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Table of Contents

Appendices

PROGRAM REVIEW

Fairmont State Board of Governors

X Program with Special Accreditation ☐ Program without Special Accreditation

Date Submitted 2/18/2012

Program: Bachelor of Science in Engineering Technology, Electronics Engineering Technology
Degree and Title

INSTITUTIONAL RECOMMENDATION

The institution is obligated to recommend continuance or discontinuance of a program and to provide a brief rationale for its recommendation:

X **1. Continuation of the program at the current level of activity;**

CY X **2. Continuation of program with corrective action (for example, reducing the range of optional tracks or merging programs);**

____ **3. Identification of the program for further development (for example, providing additional institutional commitment);**

____ **4. Development of a cooperative program with another institution, or sharing courses, facilities, faculty, and the like;**

____ **5. Discontinuation of the Program**

Rationale for Recommendation:

The Electronics Engineering Technology program at Fairmont State University has maintained appropriate enrollments and graduates during the past five years. Classes offered as part of the program average 13 students per class during this same period. More importantly, this program is fully accredited by the Board of Engineering and Technology (ABET). The program maintains a rigorous assessment and continuous improvement plan, and the curriculum is currently being redesigned to address our regional needs of electrical generation, electronics, and the applications of electronics in business and industry. The Electronics Engineering Technology program is considered a high quality program with excellent faculty, and this program is strongly supported by the Dean of the College of Science and Technology at Fairmont State University.

Larry C. Allen — **Signature of person preparing report:** — 2/18/2012 — **Date**

Anthony F. Gilbert — **Signature of Dean** — 2/18/12 — **Date**

Christina Lavorata — **Signature of Provost and Vice President for Academic Affairs:** — 6-6-12 — **Date**

Maria C Rose — **Signature of President:** — 6-6-12 — **Date**

Ron L. Tucker — **Signature of Chair, Board of Governors:** — 6-6-2012 — **Date**

Executive Summary for Program Review
(not to be more than 2-3 pages)

Name and degree level of program

Electronics Engineering Technology– Bachelor of Science

External reviewer(s)

TAC of ABET – 2007-2008

Synopses of significant findings, including findings of external reviewer(s)

Deficiency

Electronics Engineering Technology Programs **Criterion 3. Assessment and Evaluation**

"Each program must use multiple assessment measures in a process that provides documented results to demonstrate that the program objectives and outcomes are being met…. Each program must demonstrate that the results of the assessment of program objectives and outcomes are being used to improve and further develop the program in accordance with a documented process."

"Therefore, it is required that the program demonstrate (1) that multiple assessment measures are being used in a process that provides documented results to demonstrate that the program educational objectives and program outcomes are being met, and (2) that these results are used to improve and further develop the programs in accordance with a documented process."

Concern

Electronics Engineering Technology Programs **Criterion 5. Faculty**

Each program must have effective leadership through a full-time faculty member with defined leadership responsibilities for the program.

Plans for program improvement, including timeline

Criterion 3. Assessment and Evaluation

All TAC of ABET accredited programs at Fairmont State University are meeting the terms and conditions established and set forth in the Continuous Improvement Plan (see Appendix A). This Plan was modified and adopted from Fairmont State University's ASAC of ABET accredited Occupational Safety program and implemented for the Engineering Technology programs during the Spring 2008 semester. This plan achieves two objectives. One objective is to formalize previous efforts to collect and evaluate established program objective and program outcome assessment points for the TAC of ABET accredited programs, and the other objective is to standardize the Department of Technology's ABET program as much as possible.

The Continuous Improvement Plan (CIP) is a dynamic and comprehensive program that establishes policy and procedures for assessing program objectives and outcomes.

Criterion 5. Faculty

Each academic program in the Department of Technology is headed by a program coordinator who performs the duties of managing the academic program. These program coordinators are appointed by and serve at the will and pleasure of the Dean of the College of Science and Technology. The program coordinators are compensated for their contributions by receiving annual course release time. This three hour (one course) release time is granted every Spring semester. The coordinators finalize accreditation activities and other responsibilities during that time. The currently appointed Program Coordinator is: Electronics Engineering Technology - Larry Allen, P.E.

Identification of weaknesses or deficiencies from the previous review and the status of improvements implemented or accomplished

All program deficiencies and weaknesses/status of improvement are discussed in detail above.

Five-year trend data on graduates and majors enrolled

A.S. – Enrolled 2007 - 27 students, 2008 - 17 students, 2009 - 15 students, 2010 - 15 students, 2011 - 14 students
Graduates – 2007=2, 2008=2, 2009=4, 2010=6, 2011=2
B.S. – Enrolled 2007 - 35 students, 2008 - 28 students, 2009 - 35 students, 2010 - 35 students, 2011 - 35 students
Graduates – 2007=5, 2008=9, 2009=4, 2010=5, 2011=4

Summary of assessment model and how results are used for program improvement

The Electronics Engineering Technology program utilizes a departmental Continuous Improvement Plan to meet institutional assessment needs. The Continuous Improvement Plan involves assessment and continuous improvement on three levels. The purpose of the Continuous Improvement Plan (CIP) is to identify, track, and remediate program weaknesses. The evaluation of competencies and program components leads to modifications of content, delivery, and other factors deemed instrumental in the pursuit of program improvement.

The CIP involves three levels of application. These levels include:

- Assessment of Program Objectives
- Assessment of Program Outcomes
- Program Modifications as determined necessary by the assessment practices.

Program Objectives are evaluated using various tools such as graduate surveys, employer surveys and a graduate competency exam. Benchmarks have been established for each of these assessment tools to determine program effectiveness. If data points within the results do not meet established benchmarks, an improvement plan is developed and implemented. Any modifications to the program objectives are approved by program faculty and the program's Industrial Advisory Committee.

Program Outcomes are evaluated using various tools such as course exams, assignments, quizzes, projects, labs, etc. Assessment points have been established for each course as they relate to the program outcomes. The program has established a benchmark in which 70% of the students in the course demonstrate competency. If less than 70% of the students cannot demonstrate success, a plan of improvement is established for the assessment point. These continuous improvement plans are approved by a collaborative agreement of the program faculty. An assessment matrix has been established to clearly define what assessment points are evaluated in each program course. The Electronics Engineering Technology program has established an assessment cycle of three years. Each assessment point on the matrix will be assessed at least once every three years. Additional assessments shall be conducted if warranted.

All program modifications such as curriculum changes are established as a result the program objective and outcome assessments. Any significant changes must be approved by program faculty and the program's Industrial Advisory Committee.

Data on student placement (for example, number of students employed in positions related to the field of study or pursuing advanced degrees)

Based on Electronics Engineering Technology exit interviews, graduate contacts and graduate surveys almost 100 percent of the students are successfully employed in the field of electronics. In addition, approximately 80 percent of the graduates are employed in West Virginia.

Final recommendations approved by governing board

PROGRAM REVIEW

FAIRMONT STATE UNIVERSITY OR PIERPONT COMMUNITY AND TECHNICAL COLLEGE	
Program:	Electronics Engineering Technology
School:	College of Science and Technology
Date:	2/12/12

Program Catalog Description:

The Electronics Engineering Technology program at Fairmont State University prepares graduates to work in industries that produce and use electrical and electronic equipment. Graduates are employed by a wide variety of industries, including coal, aerospace, semiconductor, control, utilities, glass, and computer companies. They may be involved in areas such as design, testing, maintenance, production, and supervision. The program is designed as a highly flexible 2 + 2 curriculum. Once the associate degree is earned, the graduate may choose to enter the workforce or continue studying at the baccalaureate level.

The Bachelor of Science degree provides students with a greater emphasis on design and analysis, with advanced classes in linear and microcomputer systems, data acquisition and control systems, an independent senior electronics project and elective hours that can be applied to a work experience practicum in industry. Graduates with the Bachelor of Science degree are qualified for positions that range from technician through electronic engineering technologist. Work at this level usually involves product design, writing performance requirements, developing maintenance schedules, data analysis, and programming PLC's. baccalaureate graduates are eligible to sit for the Fundamentals of Engineering Exam (FE) in West Virginia, the first step to becoming a professional engineer.

VIABILITY (§ 4.1.3.1)

Enrollment

Applicants, graduates

Applicant Data:

Over the past seven academic years, the Electronics Engineering Technology program has averaged 67.8 applicants per year.

Note: All applicant data includes students that applied to both the, AS and BSET programs. Many students apply into the AS program, but transfer over into the BSET program once they have met institutional requirements. Thus, students elect to obtain a BSET degree instead of the AS Electronics Engineering Technology degree.

Academic Year	Number of Applicants
2005-2006	63
2006-2007	51
2007-2008	44
2008-2009	73
2009-2010	94
2010-2011	82

Graduate Data:

Over the past five (5) academic years, the Electronics Engineering Technology program has averaged 9.4 graduates per year including graduates obtaining a BSET or AS.

Academic Year	Number of Graduates
2006-2007	10
2007-2008	11
2008-2009	8
2009-2010	11
2010-2011	7

Application/ Admission Requirements

Students apply for admission to FSU through modern techniques by completion of an Application for Admission located on FSU's homepage at www.fairmonstate.edu. Once the student fully completes the application process, the student's application is reviewed for determination of admission.

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. Applications 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.

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. Separate applications for residence halls must be submitted to the Office of Residence Life. Any change in local address of any student at Fairmont State University must be reported to the Registrar.

The application for admission must specify the student's desired degree or program objective. Fairmont State University grants bachelor's degrees, and Pierpont Community & Technical College grants associate's degrees and administers certificate programs.
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.

FAIRMONT STATE UNIVERSITY ADMISSION REQUIREMENTS
FIRST-TIME FRESHMEN

1. Application for Admission
2. Official high school transcript or GED (sent by high school or Department of Education) (2.5 GPA or higher)
3. ACT or SAT Scores (17 ACT or 830 Composite SAT[combination of critical reading and math scores])
4. College Transcript (if college credit was earned during high school)
5. Immunization Records (if born after January 1, 1957)
6. Statement of Activities (if out of high school more than six months)

PLEASE NOTE: REQUIREMENTS CHANGED FOR FALL 2008
The Following Units Were Required Beginning Fall 2008:
4 English (including courses in grammar, composition, and literature)
3 Social Studies (including U.S. History)
4 Mathematics (three units must be Algebra 1 and higher)
3 Science (all courses to be college preparatory laboratory science, preferably including units from biology, chemistry and physics)
1 Arts
2 Foreign Language (Two units of the same foreign language)

Program courses

Five year course enrollment for all Electronics Engineering Technology program courses is provided below:

ELEC Course Number	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Total Enrollment over 5 Years
1100	57	49	47	43	46	242
2200	24	11	22	18	13	88
2210	16	28	21	11	12	88
2215	13	13	12	8	11	57
2220	15	7	12	11	7	41
2230	9	6	10	10	7	44
2240	8	4	8	11	6	37
2250	20	19	22	33	30	124
2260	7	5	11	11	4	38
2270	7	5	10	11	7	40
2280	4	9	9	13	7	42
3300	7	3	5	5	14	34
3310	13	7	4	4	13	41
4400	3	10	3	6	6	28
4410	6	9	5	0	10	30

A list of course titles and descriptions are provided on the following pages.

The Electronics Engineering Technology Program offers the following program courses:

ELEC 1100 Circuit Analysis I (3 hrs.)
Introduction to the concepts of voltage, current, resistance, capacitance and inductance. Also covered are Kirchoff's Laws, with applications in basic DC-AC, series-parallel circuits. Basic electromechanical devices and transformers are studied. CR: MATH 1101 or 1115.

ELEC 1199 Special Topics in Electronics Engineering Technology (1-12 hrs.)
Studies in special selected topics, to be determined by the instructor and approved by the department chairperson. Credits earned will be applicable as free electives in degree and certificate programs.

ELEC 2200 Shop Practices (3 hrs.)
The student will build a breadboard to be used in subsequent courses. Skills covered in this course include PC board layout and construction, soldering, wiring, component selection, metal fabrication, plastic fabrication, wood fabrication and general layout procedures. Note: Extra costs are associated with this course. CR: ELEC 1100.

ELEC 2210 Circuit Analysis II (3 hrs.)
Continuation of ELEC 100, including the theory and application of circuit analysis theorems. Also covered are nonsinusoidal waveforms, three-phase circuits and the use of computers in solving problems. PR: ELEC 1100, CR: MATH 1102.

ELEC 2215 Basic Transistors (3 hrs.)
Devices studied will include rectifiers, zeners, filters, bipolar transistors and field-effect transistors. The circuitry will include power supplies, the basic amplifier types, multistate amplifiers, power amplifiers, switching circuits and oscillators. PR: ELEC 2200. PR or CR: MATH 1102, ELEC 2210.

ELEC 2220 Linear Electronics (3 hrs.)
Study of the basic concepts of linear integrated circuits, including OP amps, regulators, comparators, timers and phase-locked loops. PR: ELEC 2210, 2215.

ELEC 2230 Digital Electronics (3 hrs.)
Theory and experimentation with SSI, MSI, and LSI devices and systems, including such basic components as gates, flip-flops, counters, decoders, timers, displays, memories, etc., and such systems as thermometers, tachometers, meters, etc. PR: ELEC 2210, ELEC 2215.

ELEC 2240 Industrial Electronics (3 hrs.)
Study of the operation of industrial power control systems, including power devices and control circuits. Power devices covered include relays, contactors, transistors, SCRs and TRIACs. Control circuits include UJTs, PUTs, DIACs, photo-devices, timers and control ICs. PR: ELEC 2220, 2230.

ELEC 2250 AC-DC Machinery and Controls. (3 hrs.)
Practical aspects in the use and maintenance of AC-DC machinery and power distribution, including motors, generators, starters, speed controllers, breakers, transformers, etc. PR: ELEC 1100, MATH 1102.

ELEC 2260 Communication Systems (3 hrs.)
Theory, operation, and maintenance of AVMA, FM, PM and digital communications systems. PR: ELEC 2220, 2230.

ELEC 2270 Microcomputers (3 hrs.)
Theory and experimentation with microcomputers, including instruction sets, memories, I/O, programming (machine code, assembler, and high level), interrupts, peripherals and interfacing. PR: ELEC 2230, COMP 1101.

ELEC 2280 Programmable Controllers (3 hrs.)
An introduction to programmable controllers and their application to sequential process control. Topics include basic operating characteristics, relays, timers, counters, sequencers, editing and online data control. Practical laboratory experiences will be provided in controller applications, programming, installation and maintenance. PR: COMP 1101, ELEC 2230.

ELEC 3300 Advanced Linear Electronics (3 hrs.)
Study of linear devices including OP, AMPS, comparators, PLLs, timers, audio ICs, voltage references and current references. The course will include analysis and design concepts for the circuits studied. PR: ELEC 2260, 2270. CR: TECH 3300 OR MATH 1186 or MATH 3315.

ELEC 3310 Advanced Microcomputer Systems. (3 hrs.)
Continuation of ELEC 2270, with more in-depth study and laboratory work. Topics included are A/D and D/A converters, serial communications, interfacing to power devices, etc. PR: ELEC 2270.

ELEC 4400 Senior Electronics Project (3 hrs.) *Writing Intensive*
Instructor-approved project integrating concepts from previous courses. This course will allow the student to pursue specialized interests and show that s/he can complete an individual project. Baccalaureate majors only. PR: ENGL 1108, ELEC 3300 and 3310, Instructor approval required.

ELEC 4410 Data Acquisition and Control Systems (4 hrs.)
Theory and use of data acquisition and control systems, including transducers, signal conditioning circuits, multiplexing, A/D and D/A converters, computers and control devices. Baccalaureate majors only. PR: ELEC 2240, and 3300.

ELEC 4998 Undergraduate Research (0-6 hrs.)
Undergraduate research is an experiential learning activity that provides 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. Sophomore-Senior Level, Repeatable. Instructor approval required.

Service courses	The Electronics Engineering Technology program offers two (2) service courses. A brief summary of each service course is provided below. ELEC 1100: *Circuit Analysis I* is required by the following programs • Mechanical Engineering Technology, BSET and AS majors ELEC 2250: *AC-DC Machinery and Controls* is required by the following program. • Mechanical Engineering Technology, BSET and AS majors Five year course enrollment for these courses is provided below:

ELEC Course Number	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Total Enrollment over 5 Years
1100	57	49	47	43	46	242
2250	20	19	22	33	30	124

Success rates Serv Crs	The success rate of all service courses is based on the number of students that successfully pass the course with a letter grade of D or better. Below is a table summarizing student success rates for all Electronic Engineering Technology service courses as specified in the previous section. Each column depicts the number of students that successfully passed and failed the service course per academic year. The last column in the table below provides the overall % success rate for each service course.
ext ed/off campus crses	During the 5 years included in this program review, the Electronics Engineering Technology program did not offer any classes off campus.

	Number of Students Passed or Failed/Withdrew Per Academic Year										
	2006 – 2007		**2007-2008**		**2008-2009**		**2009-2010**		**2010-2011**		
ELEC Course Number	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	% Successfully Passed Over 5 years
1100	42	15	38	11	28	19	34	9	32	14	71.9
2250	10	10	16	3	13	9	32	1	26	4	78.2

cost/student credit hour

The Electronics Engineering Technology program operates under the organizational budget for the College of Science and Technology. Therefore all students costs provided below for the College of Science and Technology are considered representative for all Electronics Engineering Technology students.

College of Science and Technology

Academic Year	Total Cost Per Student (FTE) Equivalent	Total Cost per Student Credit Hour
2006-07	Data Unavailable	Data Unavailable
2007-08	$5960.33	$139.13
2008-09	$5334.50	$138.69
2009-10	$5511.00	$142.18
2010-11	$5176.94	$143.65

Liberal Studies Requirements Met

All four year degree programs at FSU are required to complete the institutional general studies requirements. The Electronics Engineering Technology Program requires students to complete these liberal studies requirements based on the criteria listed below.

THE FIRST YEAR EXPERIENCE..... 15-16 HOURS

(To be completed within the first 45 credit hours)

(Students are required to complete all Developmental Skills courses within their first 32 credit hours.)

ENGL 1104 Written English I 3Hrs
ENGL 1108 Written English II ..... .3 Hrs
INFO 1100 Computer Concepts & Applications 3 Hrs (or demonstrated competency)
MATH 1102, 1107, 1112, 1115, 1185, 1190..... 3 - 4 Hours
COMM 2200, 2201, 2202.....3 Hours

SCIENTIFIC DISCOVERY..... 8 HOURS

CULTURAL/CIVILIZATION EXPLORATION..... 9 HOURS

ART ISTIC / CREATIVE EXPRESSION & INTERDISCIPLINARY / ADVANCED STUDIES OPTION..... 6 HOURS

SOCIETY/HUMAN INTERACTIONS..... 6 HOURS

APPROVED WRITING INTENSIVE COURSE

Total Liberal Studies Credit Hours: 44-45 Hours

The table on the follow page summarizes where the general studies requirements are met for the Electronics Engineering Technology program.

Electronics Engineering Technology – Model Schedule

A.S. PROGRAM

Semester	Course	General Studies
Freshman First Semester 18 hrs	ENGL 1104 MATH 1101 DRFT 1100 ELEC 1100 ELEC 2200 COMM 2200	X X X
Freshman Second Semester 18 hrs	ENGL 1109 MATH 1102 ELEC 2210 ELEC 2215 COMP 1101 ECON 2200	 X
Sophomore First Semester 17 hrs	PHYS 1101 ELEC 2220 ELEC 2250 TECH 2290 ELEC 2230	X
Sophomore Second Semester 16 hrs	PHYS 1102 ELEC 2240 ELEC 2260 ELEC 2270 ELEC 2280	X
Junior First Semester 16 hrs	ELEC 3310 ENGL 1108 SFTY 1100 TECH 3300 L.S. Civ.	 X
Junior Second Semester 16 hrs	ELEC 3300 L.S. Civ. MECH 1113 L.S. Hum L. S. Art	 X X X
Senior First Semester 16 hrs	L.S. Civ. ELEC 4400 CHEM 1101 TECH Elec L.S. Art	X X
Senior Second Semester 13 hrs	ELEC 4410 MANF 2250 Elective TECH Elec L.S. Hum.	 X

Assessment Requirements

The Electronics Engineering Technology Program has successfully implemented a Continuous Improvement Program that ensures program outcomes and objectives are effectively evaluated and achieved. The complete Continuous Improvement Program is attached as Appendix A. These assessment practices have been thoroughly reviewed and approved (2008) by the Applied Science Accreditation Commission (ASAC) of Accreditation Board for Engineering and Technology (ABET). In addition, these assessment practices have also been established by the Electronics Engineering Technology's Industrial Advisory Committee.

Summary of Continuous Improvement Plan (Assessment Practices)

The ABET Accredited Programs at Fairmont State University use a Continuous Improvement Plan (CIP) designed and approved by selected program constituencies [faculty and the Industrial Advisory Committee (IAC)]. The CIP is a dynamic program used for assessing established objectives and outcomes along with procedures for implementation of necessary modifications to academic programs. The changes are presented to the programs' IACs for comments, recommendations, and approval.

The CIP Assessment Diagram (Figure 1, shown on the following page) illustrates the three assessment levels for the ABET Accredited Programs. The overall program assessment (Level 3) includes the scheduled review of the CIPs from the Program Objectives and the Program Outcomes. Since these two techniques differ slightly, reference to Program Objectives assessment specifications found in Section II of the plan and Program Outcomes assessment specifications found in Section III of the Continuous Improvement Plan are necessary.

Again, the CIP includes three levels of assessment: The Program Objectives (Level 1), the Program Outcomes (Level 2), and the overall assessment procedure (Level 3). The first two levels (Program Objectives and Program Outcomes) include the following components for assessment completion:

1. assessment,
2. determination of weakness(s),
3. action to be taken once the weakness is determined,
4. solicitation of approval/recommendation to correct from the appropriate constituencies,
5. implementation of change/modification to the Program Objectives (Level 1) or the Program Outcomes (Level 2) which can bring about overall change (Level 3) to the ABET Accredited Programs.

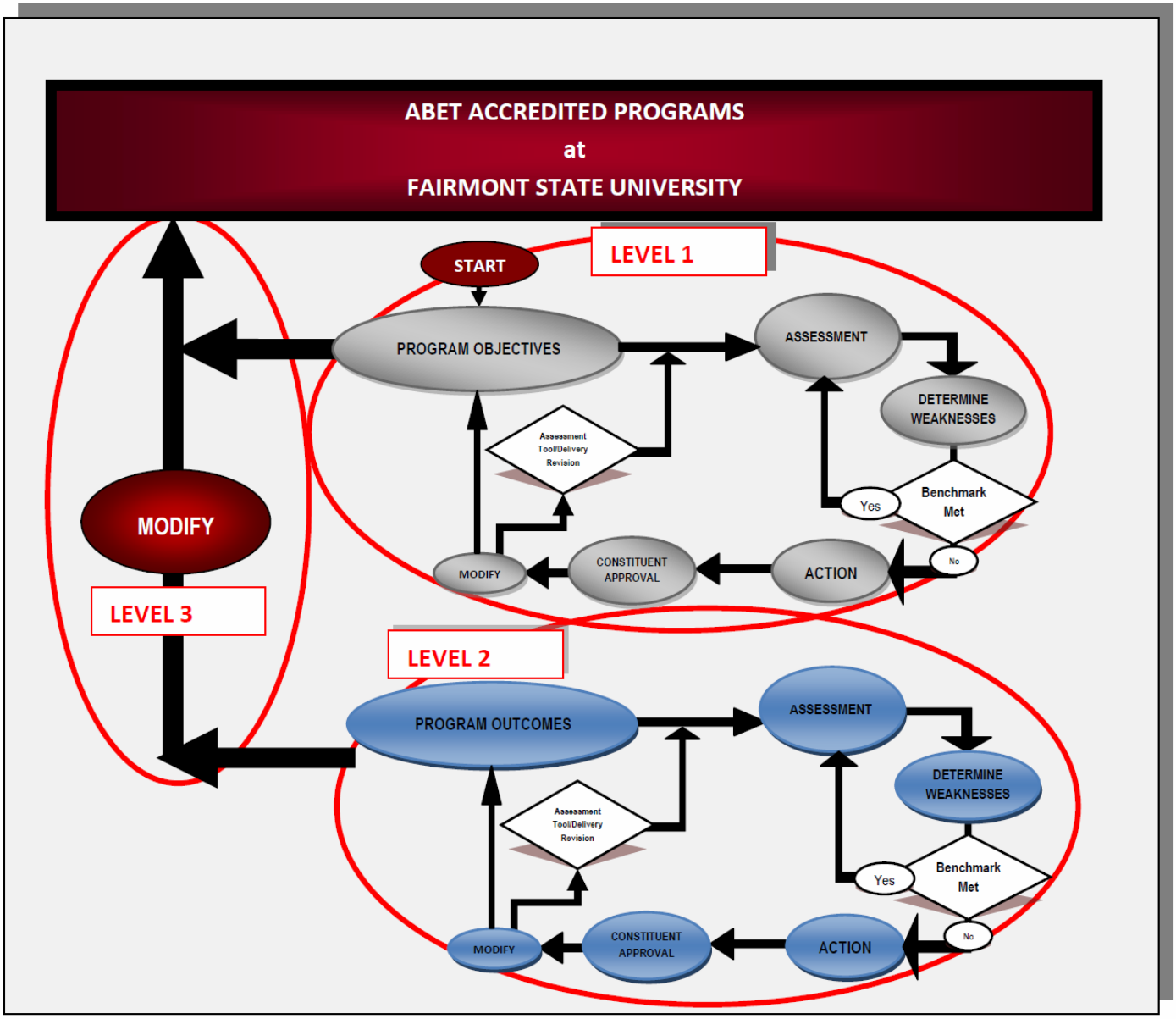
The remaining sections of the CIP allow for closing the loop regarding Program Objectives and Program Outcomes.

In Level 3, assessment is achieved by recommending and implementing academic program changes initiated by the constituencies' (Faculty and IAC members) review of the assessed Program Objectives and Program Outcomes.

The CIP is implemented at the freshman level and continues into post-graduation activities.

Appendix A contains a copy of the complete Continuous Improvement Plan for all ABET Accredited programs in the Department of Technology.

Figure 1: Assessment Methods for Electronics Engineering Technology



Adjunct use

The Electronics Engineering Technology Program did not utilize any adjuncts to teach during the 5 Years included in the program review.

Graduation/Retention Rates

Graduate Data:

Over the past five (5) academic years, the Electronics Engineering Technology program has averaged 9.4 graduates per year including graduates obtaining a BSET or AS.

Academic Year	Number of Graduates
2006-2007	10
2007-2008	11
2008-2009	8
2009-2010	11
2010-2011	7

Previous Program Review Results

The previous program review for Electronics Engineering Technology program was submitted using the ABET program review self-study report format. The results of this ABET review indicated that all current practices, assessment methodologies and resources were sufficient for the maintenance of a successful Electronics Engineering Technology program.

ADEQUACY (§ 4.2.4.2)

Program Requirements:

Liberal Studies	32-42	_44_hrs	ENGL 1104 – 3 hrs ENGL 1108 – 3 hrs COMM 2202 – 3 hrs COMP 1101 – 3 hrs MATH 1102 – 3 hrs PHYS 1101 – 4 hrs (Scientific/Discovery) PHYS 1102 – 4 hrs. (Scientific/Discovery) Artistic/Creative – 6 hrs. Society/Human – 6 hrs. Cultural Civilization - 9 hrs	
Major	32-65	_76_hrs	MATH 1101 – 3 hrs DRFT 1100 – 3 hrs ECON 2200– 3 hrs SFTY 1100 – 3 hrs ENGL 1109– 3 hrs TECH 3300– 4 hrs MANF 2250– 3 hrs MATH 1113– 4 hrs CHEM 1101 – 4 Hours	ELEC 1100– 3 hrs ELEC 2200– 3 hrs ELEC 2210– 3 hrs ELEC 2215– 3 hrs ELEC 2220– 3 hrs ELEC 2250– 3 hrs ELEC 2230– 3 hrs ELEC 2240– 3 hrs ELEC 2260– 3 hrs ELEC 2270– 3 hrs ELEC 2280– 3 hrs ELEC 3310 – 3 hrs ELEC 3300 – 3 hrs ELEC 4400 – 3 hrs ELEC 4410 – 4 hrs
Electives	min 21	__9__hrs	Students are permitted 9 credit hours of approved Technology electives.	
TOTAL	max 128	_129_hrs		
Programs not meeting the above requirements must request a continuation of their exception with a justification below:				

Electives Exception Continuation Justification:

Due to program mandates by the accreditation criteria (ASAC of ABET) the Electronics Engineering technology program does not have the flexibility to permit students to complete 21 credit hours of free electives. This exception has been approved within the institution in order to maintain national accreditation approval for the Electronics Engineering Technology program.

Faculty Data

The Electronics Engineering Technology Program at Fairmont State University maintained three (3) full-time faculty members during the 5 years included in this program review.

Full –time Faculty:

Larry Allen, PE., Associate Professor, Program Coordinator

James Goodwin, PE, Professor

Ronald Turchin, Assistant Professor

A faculty data sheet has been completed for each faculty member and provided in Appendix B of this document.

Accreditation/national standards

The Electronics Engineering Technology program has obtained full accreditation under the Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET) after a complete program review in 2007 and 2009.

NECESSITY (§ 4.1.3.3)

Placement and Success of Graduates

Based on Electronics Engineering Technology exit interviews, graduate contacts and graduate surveys almost 100 percent of the students are successfully employed in the field of electronics. In addition, approximately 80 percent of the graduates are employed in West Virginia.

Similar Programs in WV

All similar program offerings are listed below:

- Bluefield State University, Electrical Engineering Technology (AS) and (BS)
- West Virginia State College, Electronics Engineering Technology (AAS)
- West Virginia Institute of Technology, Electrical Engineering Technology (AS) and (BS)
- West Virginia University, Electrical Engineering Technology (BS)

CONSISTENCY WITH MISSION (§ 4.1.3.4)

Fairmont State University has established the following mission statements:

MISSION STATEMENT: The Mission of Fairmont State University is to provide opportunities for individuals to achieve their professional and personal goals and discover roles for responsible citizenship that promote the common good.

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.

College of Science and Technology's Mission:

Our mission is to promote effective student learning in science, math and technology and to prepare top-quality graduates for their future endeavors, including graduate study, employment or other personal goals.

Electronics Engineering Technology Program Objectives:

The Program Objectives, as determined by the Electronics Engineering Technology Program's constituencies are intended to dynamically promote professional competencies and continued professional growth.
Below are the Program Objectives for the Electronics Engineering Technology program at Fairmont State University.

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.

University's Mission & Program Objectives

The Program Objectives are designed to address the professional competencies and development of students and graduates as well as emphasize the continued improvement and evolution of the individual after his/her exit from Fairmont State. Fairmont State's mission emphasizes the same desires and standards for students of the University.

In comparing Fairmont State's mission and core values to the Electronics Engineering Technology Program's Objectives, the consistencies are easily discernible. The mission of the University advocates three goals. These goals are; provide opportunities for individuals to achieve **professional goals**, provide opportunities for individuals to achieve **personal goals**, and provide opportunities for individuals to discover **roles for responsible citizenship** that promote the common good. These goals are further explained through relating the adopted core values.

The first goal of professional development incorporates the core values of scholarship, achievement and responsibility. The Program Objectives 1 through 5 directly link to this goal and these values through the professional development of the students via academic competencies in the field of safety, emphasis on effective communication skills, advocating team work, recognizing the importance of global and societal impact of the profession, and the importance and benefits of lifelong learning.

The Program Objectives foster professional growth through mandating that students successfully apply academic competencies and methodologies in addressing and solving problems as a Safety professional. This is accomplished through senior level projects, an exit exam, and tracking the post-graduate to determine level and competency of work performance.

The second goal of the Mission is the opportunity for attaining personal goals. The Program Objectives indirectly advocate personal development through intrinsic motivators such as communication skills, team work skills, global and societal emphasis and a desire for lifelong learning. Progress in any of the aforementioned areas can assist in achieving personal goals.

Lastly, the Program Objectives can link directly to the goal of providing opportunities for individuals to discover roles for responsible citizenship that promote the common good. This University mission goal marries very well with the purpose of the field of safety. As safety professionals, students and graduates should strive to better the community and the world. This can be accomplished by:

- applying academic competencies and methodologies in addressing and solving problems as a Safety professional,
- communicating effectively to audiences of varying demographics and agendas through the practice and application of learned technical and non-technical methodologies,
- performing all professional responsibilities (independently, as part of a team, or as part of a multi-disciplinary team) ethically, morally and respectfully,
- recognizing the societal and global impact of professional decisions and practices,
- and fostering a desire for lifelong learning through professional development.

Relationship with Other Programs

The Electronics Engineering Technology program has an excellent relationship with the other technology programs due to the coordination of various ABET activities adopted by all ABET programs. This includes partnerships on student projects and co-sponsorship of guest speakers, lecture series etc. The Electronics Engineering Technology program has also worked with other faculty and programs to allow students to earn professional development credits (bonus points for exams) for participating in various departmental activities.

As students participate in various projects at the institution, Electronics ET faculty encourage them to consult other faculty in their areas of expertise. The Electronics ET faculty continues to express the importance of multidisciplinary knowledge and resources for all students.

Facilities made readily available to students within the program include a classroom shared with other ET programs including, but not limited to; Civil ET, Mechanical ET and Occupational Safety. In addition an Electronics Engineering Technology lab adjoins the primary classroom for student projects. Faculty incorporates a large variety of laboratory activities into all courses. This lab also contains fifteen desktop computers for student usage. These computers are occasionally used by other ET students for general word processing and internet access.

Signatures and Recommendations

The required sheet with signatures and recommendation are provided on page 1.

Appendix A

Electronics Engineering Technology
Department of Technology
Continuous Improvement Plan

Appendix B Faculty Data Sheets

Bio Summary

BIOGRAPHICAL DATA SHEET

INSTITUTION
Fairmont State University

NAME
Larry Allen

DEPARTMENT
Electronic Engineering Technology

ACADEMIC RANK, YEAR OBTAINED
Assistant Professor, 2000

DEGREES

BSEE	Electrical Engineering	West Virginia University	1973
MSEE	Electrical Engineering	West Virginia University	1977
WVSecEdCert	Math/Science	West Virginia University	1984

DATE HIRED
Fall 2000

NUMBER OF YEARS ON THIS FACULTY
7

OTHER TEACHING EXPERIENCE

- 1985-2000 Secondary Public Education – Math and Science Morgantown High School
  Taught a variety of math subjects; general math, applied math, geometry, algebra I, algebra II.
- 1999-2000 Instructor WVU College of Engineering Freshman Orientation Circuit Analysis II

FULL-TIME INDUSTRIAL EXPERIENCE

- 1977-1982 Harrison Power Station of Allegheny Power Company as Plant Engineer
  Chemical Cleaning of Boilers:
  - Full responsibility for overseeing safe addition, removal, nuetralization, defoaming of boiler cleaning chemicals.

  Electrical and other Engineering Blueprints:
  - Read and interpret.

  Fuel Oil Metering:
  - Full resonsibility for specifying, purchasing installing fuel oil meter for vendor verification.

  Coal Tunnel Smoke Evacuation Fan:
  - Full repsonsibility for specifying, purchasing, installing coal tunnel smoke ventilation fan.

  Rotating Machinery Vibration:
  - Full responsibility for measuring vibration, determining balance weights and installing to reduce vibration.
  - Full responsibility for upgrading vibration monitoring equipment.

  Boiler/ Turbine Drain Valves:
  - Full responsibility for modifying drain scheme.

  Car Wash:
  - Full responsibility for designing, installing employee car wash to protect automobiles in case of flyash fallout.

  Instrument Compressed Air Dessicant Alarm:
  - Full responsibility for designing, installing moisture alarm to prevent pneumatic instrument freeze up in cold weather.

  Flue Gas Opacity Monitor:

- Full responsibility for installing, calibrating, maintaining flue gas opacity monitor.

Lime Neutralizing Station:

- Full responsibility for operating, maintaining, lime addition, and mixing station to neutralize acidic chemicals discharged from the Power Plant.

Sewage Plant Dissolved Oxygen Control:

- Shared responsibility for designing, maintaining sewage treatment dissolved oxygen controls.

PART-TIME INDUSTRIAL EXPERIENCE

None

CONSULTING WORK

None

PROFESSIONAL RECOGNITION

PE WV 2007 attained

PRINCIPAL PUBLICATIONS

None

PROFESSIONAL SOCIETIES OF WHICH A MEMBER

IEEE

HONORS AND AWARDS

None

PROGRAM AND ACTIVITIES TO ENHANCE PROFESSIONAL COMPETENCE

- February 2001 & October 2000 Attended two Fairmont State College Conferences on Teaching and Learning
- Spring 2001 Attended Rose Hulman Institute of Technology Conference on Accreditation
- Fall 2001 Harmarville PA Digital cell phone technology conference
- Fall 2002 Recruitment at Morgantown High School
- Fall 2004 Microcomputer Educators Conference, Brecksville Ohio
- Fall 2004 WV Tech visit to examine the microcontrollers used in their microcontroller classes
- Fall 2006 Sat for the FE exam for the first time and passed
- Spring 2007 Sat for the PE exam. Currently awaiting results.

Attended the following training schools 1977-1982 Allegheny Power:

- IRD vibration monitoring
- Bailey boiler controls
- Westinghouse electro-hydraulic turbine steam valve controls
- Flue gas opacity visual monitoring

OTHER DUTIES PERFORMED DURING THE ACADEMIC YEAR

- Program Coordinator for Electronics Engineering Technology
- Math, Science, Technology Dean Search Committee
- Admissions and Credits Committee
- Faculty Senate
- Technology Personnel committee

OTHER DUTIES PERFORMED FOR EXTRA COMPENSATION

2007 ABET Self Study Questionnaire

RECENT SUMMER ASSIGNMENTS

OTHER PERTINENT INFORMATION

Accomplishments at FSU

A list of teaching epxerience by course title and topics follows;
Full responsibility for all classes taught except ELEC 4400 Senior Project. ELEC 4400 is a shared responsibility

- ELEC 1100 Circuit Analysis 1
  Lecture, computer applications Ohm's law, kirchoff's laws, power, energy, DC parallel circuits, DC series circuits, Multi-sim simulation software, Visio drawing software.
- ELEC 2200 Shop Practices.
  Lab, lecture, computer applications. Building, troubleshooting, testing of Analog/Digital lab trainer. Basic breadboarding, component identification.
- ELEC 2210 Circuit Analysis 2.
  Lecture, computer applications Continuation of ELEC 1110. AC/DC parallel circuit, series circuits, network theorems, phase shift, frequency analysis, loop currents, RC time constants, Multi-sim simulation.
- ELEC 2215 Basic Transistors.
  Lab, lecture. Semiconductor basics, diodes, rectifiers, switches, transistors, biasing, amplifiers. ELEC 2220. Linear Electronics. Lab, lecture, computer applications. Amplifier fundamentals, op-amps, timers, comparators, oscillators, frequency response.
- ELEC 2230 Digital Electronics.
  Lab, lecture. Binary number system, boolean algebra, basic gates, karnaugh maps, flip flops, counters, registers, decoders, displays.
- ELEC 2240 Industrial Electronics.
  Lab, lecture. CDA's, instrumentation amplifiers, bridge measuring, thyristors, unijunction transistors, stepper motors.
- ELEC 2250 AC/DC Machineery.
  Lab , lecture, computer applications. Basic magnetism, transformers, AC/DC ammeters, voltmeters, wattmeters, AC machines, DC machines.
- ELEC 2260 Communications Systems.
  Lab, lecture. Noise, resonance, oscillators, AM, FM, bandwidth, Digital techniques.
- ELEC 2270 Micro computers.
  Lab, lecture, computer applications. Single Board Computer building, trouble shooting, testing, programming.
- ELEC 3300 Advanced Linear Electronics.
  Lab, lecture. More op-amps, current sources, timers, oscillators, active filters, bandpass, low pass, high pass, different filter configurations.
- ELEC 3310 Advanced micro computers.
  Single Board Computer troubleshooting programming, interfacing. BS2 microcomputer, programming, tachometer, counting, I/O interfacing, PID controller programming, robotics.
- ELEC 4400 Senior Project. Capstone course in 4 year degree.
  Lab, technical advising, design, troubleshooting, written report editing, grammatical and technical, oral presentation. Involvement with the following projects in varying degrees. Robotic card dealing arm with three preprogrammed card games. English text programmable scrolling LED message board. Joystick controlled 3 axis motion model crane. Maze navigating and RF remote mapping robot. Fire seeking and extinguishing robot. Residential alarm systems using both IR and ultrasonics. Drag race start, timer, winner system (fully done with hardware). Automatic, data logging, remotely mounted wildlife camera. Ultrasonic distance measurement. Color detection and object sorting robotic arm. Path following, and object retrieval, color sorting robot. Remote control model car testing platform. Guitar amplifier. RF voting circuit. Remote home phone message retrieval device. Independent pre-programmed vacuuming robot. Free roam object avoidance model boat. Camera object sensing/ automated firing tennis ball cannon.

Additional courses beyond Masters Degree (All taken at WVU)

- Intro to Microprocessors 77-78
- General Biology 4 credits 82-83
- Intro to Modern Algebra for Teachers 3 credits 82-83
- Secondary School Curriculum 3 credits 82-83
- Human Development & Learning 3 credits 82-83

- Human Development & Behavior 3 credits 82-83
- General Biology 4 credits 82-83
- Geometry for Teachers 3 credits 82-83
- Descriptive Astronomy 3 credits 82-83
- Advanced Teaching Strategies 3 credits 82-83
- Philosophic Systems & Education 3 credits 82-83
- Physical Geology 3 credits 83-84
- Physical Geology Lab 1 credit 83-84
- Historical Geology 3 credits 83-84
- Historical Geology Lab 1 credit 83-84
- Applied Linear Algebra 3 credits 83-84
- Teaching Mathematics in the
- Secondary School 3 credits 83-84
- Reading Instruction in Secondary Ed. 3 credits 83-84
- Student Teaching in Secondary Ed. 12 credits 83-84
- Workshop on Problems in Student
- Teaching 3 credits 83-84
- Geology of Planet Earth 3 credits 85-86
- Workshop on Computer Literacy 3 credits 86-87
- Special Topics: Elements of Effective Instruction 3 credits 90-91

BIOGRAPHICAL DATA SHEET

INSTITUTION
Fairmont State University

NAME
Goodwin, James C.

DEPARTMENT
Technology / Electronics Engineering Technology

ACADEMIC RANK, YEAR OBTAINED
Associate Professor, 1977

DEGREES

MSME	Mechanical Engineering	West Virginia University	1969
BSME	Mechanical Engineering	West Virginia University	1965

DATE HIRED
1971

NUMBER OF YEARS ON THIS FACULTY
36

OTHER TEACHING EXPERIENCE
1965-1970 Part-time Instructor West Virginia University

FULL-TIME INDUSTRIAL EXPERIENCE

- Summers 1985-1994 Engineer Consolidated Gas Transmission Corp.
  Wrote computer programs to solve gas compression problems
- Summer 1978 Engineer United States Department of Energy
  Worked on design problems related to Fluidized Bed Test set-up
- Summer 1966 Engineer FMC Corporation
  Worked on layout and design of railroad cars
- Summers 1961-1964 Draftsman Celanese Fibers Corporation
  Worked as a general draftsman on various projects for the company

PART-TIME INDUSTRIAL EXPERIENCE
None

CONSULTING WORK

- Federal Energy Technology Center (FETC) - PLC Workshop
- 1997 & 1998 ` Consol PLC Workshops
- 1985 ASCET - Wrote Industrial Electronics Test
- West Virginia Flat Glass - Wrote Electronics Qualifying Test
- Fourco Glass - Ran Training Seminar for Electricians & Technicians

PROFESSIONAL RECOGNITION
None

PRINCIPAL PUBLICATIONS

- The S-100 and Other Microbuses – 1st & 2nd Eds., 1979 & 1981

PROFESSIONAL SOCIETIES OF WHICH A MEMBER

- IEEE, since 1980
- Epsilon Pi Tau, since 1978

HONORS AND AWARDS

- 1980 Selected to a nationwide committee of the EIA to develop educational guidelines for teaching servicing consumer electronics.

PROGRAM AND ACTIVITIES TO ENHANCE PROFESSIONAL COMPETENCE

- April 2007 Attended "Best Assessment Processes IX" at Rose-Hulman Institute of Technology
- Dec 2006 National Instruments Technical Symposium in Pittsburgh, PA
- February 2004 Attended Academic Chairpersons Conference, Orlando, FL
- May 30, 2002 TAC of ABET Program Evaluator Training at Univ. of Pittsburgh at Johnstown, PA

OTHER DUTIES PERFORMED DURING THE ACADEMIC YEAR

- Served as Chair of the Department of Technology
- Industrial Advisory Committee (Chair)
- Advisor to 45 Electronics Majors
- Represented School of Technology at Career Fair
- Represented School of Technology at College Day

OTHER DUTIES PERFORMED FOR EXTRA COMPENSATION

None

RECENT SUMMER ASSIGNMENTS

- Administrative duties as Chair

OTHER PERTINENT INFORMATION

None

BIOGRAPHICAL DATA SHEET

INSTITUTION
Fairmont State University

NAME
Ronald Gene Turchin

DEPARTMENT
College of Science and Technology/Electronics Technology

ACADEMIC RANK, YEAR OBTAINED
Assistant Professor, 2001

DEGREES

MS	Software Engineering	West Virginia University	2002
BS	Vocational-Technical Education	West Virginia Institute of Technology	1979

DATE HIRED
August 2001

NUMBER OF YEARS ON THIS FACULTY
6

OTHER TEACHING EXPERIENCE
- 1975 to 1981 United Technical Center, Gore , WV,

FULL-TIME INDUSTRIAL EXPERIENCE
- 1997 to 2001 Communications Specialist and Senior Consultant (Network and Communications) Xerox Connect, WV and PA
- 1981 to 1997 Telecommunications and SCADA Specialist. Equitable Resources, WV and PA

PART-TIME INDUSTRIAL EXPERIENCE
None

CONSULTING WORK
- 2000 to 2001 Network and Systems Consultant/Engineer Neumedia, Inc.
  As an onsite employee for Xerox Connect, performed network security assessments, design and consulting for ISP and Neumeida clients

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PROFESSIONAL RECOGNITION
- Cisco Certified Network Associate
- Microsoft Certified Professional
- Comp TIA A+ Certification
- FCC General RadioTelephone License

PRINCIPAL PUBLICATIONS
None

PROFESSIONAL SOCIETIES OF WHICH A MEMBER
- American Society for Engineering Education member

HONORS AND AWARDS
- Several Xerox Connect Company letters and awards of recognition.

PROGRAM AND ACTIVITIES TO ENHANCE PROFESSIONAL COMPETENCE

- Basic Stamp Instructors course
- National Instruments Lab View basics course
- WebCT developer course
- National Space Grant Consortium Balloon Project grant and instructors' course, part of grant writing team and multi-disciplined course writing team.
- Cisco Border Gateway Protocols (1 week class)
- Microsoft 2K Professional and Server Classes (2 weeks)
- Sun Solaris Unix CBT
- Software Engineering Graduate level Classes and Certificate

OTHER DUTIES PERFORMED DURING THE ACADEMIC YEAR

- Financial Aid,
- Travel
- Participate as advisor for Electronics Senior project
- Participate in Science Bowl and various Gear-up days

OTHER DUTIES PERFORMED FOR EXTRA COMPENSATION

- Web CT mentoring, 4 hrs/week

RECENT SUMMER ASSIGNMENTS

- Summer 2006 Research Fellowship (National Science Foundation) at the Institute for Scientific Research (ISR)

OTHER PERTINENT INFORMATION

- Developed and taught on-line versions of both Circuits 1 and Circuits II classes.
- Assisted with beginning of LEGO Robotics class during Summer 2006