

PROGRAM REVIEW
Southern West Virginia Community and Technical College
Programs Without Specialized Accreditation

Summary of Findings
2011-2012

Program Name: Electrical Engineering Technology, Associate in Applied Science

Hours Required for Graduation: 60

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

A. Adequacy

- The curriculum has adequate requirements that meet the needs of business and industry.
- The program has established goals and objectives.
- Provides a variety of skilled job pathways.
- Entrance abilities for the students are within community college standards.
- The program has appropriately trained faculty.
- The program maintains appropriate assessment tools.

Conclusion: Program meets minimum adequacy requirements

B. Viability

- The program is at capacity for enrollment.
- Graduates are within expectations for the program.
- Previous history of the program indicates future students seeking the degree will increase.
- The program provides a smooth transition to bachelor degrees.

Conclusion: Program meets minimum viability requirements

C. Necessity:

- The program meets a validated industry demand.
- The graduates find successful gainful employment.

Conclusion: The program meets minimum requirements for necessity.

D. Consistency with Mission:

- The program does support the mission and vision of the institution.
- The program and core courses support the compact.
- There is limited impact on other programs.

Conclusion: The program is consistent with the mission of the college.

II. Plans for program improvement, including timeline.

Budget for the program is spent each year on upgrades for software and purchasing of additional simulators.

Additional efforts are being made on tracking and advising students to assist with completion of courses in sequence. Interventions are being made with regards to math courses to assist earlier. The math department is working with the program for “just in time” learning to enhance math background on the math courses. Additional efforts are being made to track students beyond graduation. Activities are ongoing.

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

The last program review was conducted in 2007. The program cited a recognized weakness due to faculty turnover. A follow-up was completed in 2008 and the program was continued with no further corrective actions. Since the last review, the program has maintained consistent faculty, purchased new lab equipment, and has the highest enrollment for the program.

IV. Five year trend data on graduates and majors enrolled

Program enrollment has typically been cyclical however the past three years have shown steady growth. It is expected that the program will maintain a steady stream of students. The program has a higher than usual attrition rate. The majority of students are not permitted to continue in the program on schedule due to failure to complete the next level math requirement or have job demands that require part-time attendance. Graduates tend to aggregate every four years as shown in graduation rates.

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

The assessment model contains a variety of measurements for classroom performance. Student advising and progress toward graduation is monitored by the department chair along with regular consultation with the program faculty. Outcomes are discussed at each department meeting and changes in delivery and content are made accordingly. Formal curriculum changes are presented in accordance with the established institutional policy and procedures for curriculum and instruction.

VI. Data on student placement

Graduates who actively seek electrical related jobs have obtained high quality jobs that pay good wages and have reasonable benefits. The majority of graduates are employed in the mining industry and obtained higher than usual starting salaries. Average starting salary is approximately \$52,000.

VII. Final Recommendation Approved by the Governing Board

See the attached resolution for Board of Governors final recommendation and signatures.

PROGRAM REVIEW
Southern West Virginia Community and Technical College
Programs Without Specialized Accreditation
2011-2012

Program: Electrical Engineering Technology, Associate in Applied Science
Date of Last Review: 2007 Program Review with a 2008 Follow-up Report

I. PROGRAM DESCRIPTION

The Electrical Engineering Technology (EET) Program is a broadly based technical program. The program has been in existence at Southern since fall 1993. The program's mission is to provide students with an academic and technical education with sequential/practical instruction for the development of the student as a mature, responsible engineering technician who is eligible to take the National Journeyman Licensure Exam. The curriculum incorporates basic and advanced courses in electricity, electronics and electrical machinery with a focus on the mining and mining support industry. Students are offered a variety of specialized electives to meet current job market demands.

II. SPECIALIZED ACCREDITATION INFORMATION

This program does not have any specialized accreditation information. ABET accreditation is available to the program. After review of the cost and requirements, a decision was made not to seek accreditation.

III. PROGRAM STATEMENT on Adequacy, Viability, Necessity and Consistency with College Mission.

A. Adequacy

1. Curriculum

The curriculum for the Electrical Engineering Technology, Associate in Applied Science degree currently consists of 62 credit hours. These include 23 credit hours in a general education core, 23 credit hours in a technical core, and 16 credit hours in a specialization courses. The curriculum was changed in 2008 combining the two options of mining and electrician. The new program design allows for flexibility in the specialization courses. The electives for this area are offered based on job demand. A current emphasis has been in mining and the use of PLC's (Programmable Logic Controllers). The program is a broad-based study of electronics and is a result of assessment of our community employer's skilled worker requirements. Material is taught from a practical view and blends theory and academics into the program. The objective of this instruction is to prepare students for entry level positions in our local job market while including options of employment within industries with similar job requirements. All electrical courses in the technical core have

a laboratory as an integral component and incorporate a hands-on philosophy within all the core courses. These laboratories provide hands-on experience in constructing, testing, analyzing and troubleshooting circuits and systems. The curriculum is currently being reviewed to find ways to reduce the hours to 60 credit hours to comply with new guidelines. The curriculum can be found in Appendix I.

2. Faculty

The program utilizes full-time faculty to teach the general education course requirements. In addition, the program utilizes one full time faculty member and adjuncts as needed for the technical courses. During the last review the program had suffered problems due to faculty turnover. In 2007, William Moseley, a retired engineer from American Electric Power, was hired. The program now maintains a steady enrollment often reaching capacity. Faculty data sheets can be found in Appendix II.

3. Students

A. Entrance Abilities

Southern maintains an open door policy for admissions. Any prospective student with a high school diploma or GED may take classes at Southern. All entering students must satisfy a general math and English requirement or take Transitional Studies courses to bring their skills to prerequisite levels of performance. The ACT test can be used to evaluate student placement or performance or the ACCUPLACER test can be taken on campus. Students are expected to start college level math during their first semester. Students requiring transitional studies math will require additional semesters to graduate.

B. Exit Abilities

Upon completion of the degree requirements, students will have acquired the necessary skills to qualify for most entry level positions in the electronics industry that require a 2-year degree. Students leave the program with an understanding of the need to continually upgrade their skills and further their knowledge and abilities through on-the-job training, continuing education, seminars, and advanced studies. The breadth of the program of instruction allows individuals to be able to move from jobs in one area of electrical engineering to another without the need of comprehensive retraining. Job specific needs and knowledge can quickly be associated from previous knowledge, and further learning can be self-taught because of their educational background. Students are also required to sit for the national Journeyman's licensure exam during the capstone course for the program.

Specific Exit Abilities of Graduates include:

- exhibit ethical, responsible and dependable behavior
- communicate effectively with employees and customers
- work cooperatively with others in a team environment
- analyze, construct and test DC circuits using both fundamental and advanced techniques
- analyze, construct and test AC circuits using both fundamental and advanced techniques
- use computer programs to model, analyze and design electronic and electrical circuits
- analyze, design and construct fundamental semiconductor circuits
- calculate and analyze power industry circuits and recommend potential solutions for power system problems
- analyze, construct and design fundamental digital circuits
- use skills to critically analyze practical troubleshooting problems and situations
- incorporate various aspects of a well-rounded academic background into workplace situations

4. Resources

A. Financial

This program received a WV Advance grant in 2007 in the amount of \$220,000.00. The grant provided purchasing a state-of-the-art set of lab simulators. The program also receives a yearly budget dedicated to the program. Between the grant and budget the financial support has been adequate to cover any necessary needs for the program.

B. Facilities

This program has one dedicated lab on the Logan campus in the Allied Health and Technology Building. The lab has a variety of simulators including electrical, motors, high voltage, low voltage, and PLC's. It is set up for a capacity of 18 students.

5. Assessment Information

The EET program utilizes a variety of assessment measures. Students must pass a capstone course which includes a program assessment exam. The majority of technical core courses also utilize a pre/post course exam. Student achievement in the general education and support courses is assessed in accordance with the institution's plan for assessment for such courses/programs. All students are required to take the Journeyman's licensure exam. The program maintains a 95% passage rate for the past 5 years.

Graduate follow-up data is limited. Many graduates have moved and do

not provide forwarding addresses for follow-up data, or simply do not return written surveys. Attempts are made each year to contact students by phone, email, and letters. Overall, students replying to the surveys have expressed satisfaction with the program. Specific comments have been made about the satisfaction with the upgrade in equipment resulting from the WV Advance grant for the program.

There is also limited feedback on employer satisfaction. A majority of the students who respond prefer not to include employer or salary information. Most information is informal from contact with the local industry and known employers. Overall, employers are satisfied with the graduates. The program receives numerous requests each semester for referrals of graduates for job openings.

6. Previous Program Reviews

The last program review was conducted in 2007. The program cited a recognized weakness due to faculty turnover. A follow-up was completed in 2008 and the program was continued with no further corrective actions. Since the last review, the program has maintained consistent faculty, purchased new lab equipment, and has the highest enrollment for the program.

7. Advisory Committee

The advisory committee has been expanded over the past 3 years. It operates on a more informal basis, working with local business and industry on a regular basis to identify market demands for specialization elective offerings.

8. Strengths and Weaknesses

STRENGTHS

- Student interest as evidenced by enrollment increase
- Solid, hands-on curriculum
- Transfer opportunities
- State-of-the-art lab equipment
- New computer software and simulators

WEAKNESSES

- Limited capacity due to lab space.
- Student skills in math result in a longer than expected completion time.

B. Viability

1. Program Enrollment and Graduates

Number of Majors per year for previous 5 years

<u>Year</u>	<u>Enrollment</u>
2005-2006	5
2006-2007	9
2007-2008	12
2008-2009	23
2009-2010	39

Enrollment Trends for previous 5 years

Program enrollment has typically been cyclical however the past three years have shown steady growth. It is expected that the program will maintain a steady stream of students.

Number of Graduates for previous 5 years

<u>Year</u>	<u>Graduates</u>
2005-2006	2
2006-2007	1
2007-2008	6
2008-2009	13
2009-2010	2

The program has a higher than usual attrition rate of close to 60%. The majority of students are prohibited from continuing in the program or graduating within the two years due to failure to complete the math requirements or job demands that do not permit them to take all classes on schedule. This is shown in the graduation rates with the higher than usual number in 2008-2009. Based on advising records, it is expected that 2011-2012 will again be higher than usual.

Graduates have obtained high quality jobs that pay good wages and have reasonable benefits. They are diversely employed in service companies and the coal industry. Average starting salary is approximately \$40,000 in the mining industry with the other industries listed within \$25,000 to \$30,000 range.

Enrollment Projections

Although we cannot predict large increases in enrollment in the future, there is a community employment need delivered by this program which we believe drives enrollment. Area job markets indicate a high need for electricians, especially in the mining emphasis. At present all graduates of the EET program can find employment within the local mining community, if they so desire. Projections for the future based on the current enrollment and student interest indicate the program will meet or exceed program expectations and capabilities of 15-20 students per cohort. Enrollment often declines within each cohort due to academic difficulties.

2. Program Course Enrollments

This program offers a variety of specialized courses designed specifically for the program. Courses are open to all students however the majority are taken by majors only. A complete listing of courses for the past 5 years can be found in Appendix III.

3. Service Courses

This program does not have any courses offered specific to the program that are used by other programs.

4. Off-Campus/Distance Delivery Classes

This program does not have any courses that are currently offered off-campus or by distance delivery.

5. Articulation Agreements (2+2 etc.)

Although we have no signed agreement as such with West Virginia University Institute of Technology (WVUIT), we negotiated an informal agreement in 1995. WVUIT agreed to take up to 72 hours of our class work and electives into their 4 year Bachelors in Science Electrical Engineering Technology program. Southern's EET program was modeled after WVUIT's program with similar course numbering and text books. Meetings have been held with Bluefield State and Fairmont State to create specific 2+2 agreements. These agreements are still under development.

C. Necessity

The recent resurgence of the coal industry has generated much interest in our current electrical program. Presently, our region has only one major industry, Coal, for regional employment and economic growth in the electrical industry. We must be receptive to the coal industry needs for the future. Presently the coal business needs quality maintenance workers as discussed at advisory meetings for the mining program and as evidenced in local help wanted ads. One of the major criteria for employment for electricians in the coal industry is the miner's electrical certification. Most of our graduates are working in the service region of the college.

D. Consistency with Our Mission

This program directly supports the institution's previous compact and mission in a variety of areas. Major areas of support for the previous compact include the following:

- Courses are offered as dual credit at a number of locations. This supports compact Goal I.B.3.
- Articulation agreements exist with each of the vocational/career centers that offer comparable courses. This supports a number of compact goals including I.C.3, III.A.1, and III.D.1.

- This program provides scholarship opportunities to qualified students through the WV Science Engineering and Technology Scholarship. This supports compact goal I.D.2.
- The program was developed to address identified local/regional needs and provides academic as well as non-academic training in technical areas. This supports compact goals II.A.2. and IV.A.1.
- The program emphasizes citizenship and lifelong learning as instructed in OR 105 and supports compact goal III.E.

This program directly supports the institution's new compact and mission in a variety of areas. Major areas of support for the new compact include the following:

- Produce more graduates
 - Program advising encourages completion of degree and graduation.
- Promote Strong Employer Partnerships
 - The program is a high demand occupation needed by employers.
 - Courses provide opportunities for employers to send employees for training
- Serve More Adults
 - Includes program recruitment for older students for skills enhancement.
- Build and Maintain Facilities
 - Courses use technology

IV. Recommendation

Based on the program review, the continuation of the program at the current level of activity without corrective action is recommended. The program meets a need in the community and has sufficient enrollment and graduates to be a viable program.

APPENDIX I - Curriculum

Electrical Engineering Technology

Associate in Applied Science

60 Credit Hours

Purpose

The Electrical Engineering Technology Program has the mission to provide an academic and technical education with sequential/practical instruction for the development of the student as a mature, responsible electrical technician. The curriculum incorporates basic and advanced courses in electricity, electronics and electrical machinery. In addition students must take technical specialization electives in fields that are of particular interest to them.

The full Electrical Engineering Technology Program is available on the Logan Campus. The Boone/Lincoln, Williamson, and Wyoming/McDowell campuses offer the program support courses only.

Dept/No.	Title	Credit Hours
Support Courses		
CS 102	Computer Literacy	3
EN 101	English Composition I	3
MT 124	Technical Math	3
MT 125	Trigonometry	3
OR	OR	
MT 130	College Algebra	
OR 105	Orientation to Technical Programs	1
PH 200 OR higher	Introduction to Physics	4
	Social Science Elective	3
SP 103	Speech Fundamentals	3
Major Courses		
DR 203	Electrical Schematics	3
EG 103	Electrical Calculations	3
EG 105	Industrial Safety	1
EG 107	Introduction to Circuits	4
EG 171	Circuit Analysis I	4
EG 172	Circuit Analysis II	4
EG 297	National Electric Code	1
EG 298	Capstone	1

Specialization Courses (minimum of 16 credit hours):

Student must complete a series of restricted electives. Courses offered to fulfill the electives will be structured around current business and industry demands. Courses are limited to EG courses not already required by the program and other related courses as approved by the Department Chair for Technology and Engineering.

APPENDIX II – Faculty Data Form

Name William W. Moseley, Jr. Rank Instructor

Check one: Full-time x Part-time _____ Adjunct _____

Highest Degree Earned BSEE
Date Degree Received May, 1973
Conferred by West Virginia Institute of Technology
Area of Specialization Electrical Engineering

Professional registration/licensure _____
Years of employment at present institution 4 years
Years of employment in higher education 4 years
Years of related experience outside higher education 30 years
Non-teaching experience 30 years

To determine compatibility of credentials with assignment:

- (a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught). For each course include year and semester taught, course number, course title and enrollment.

<u>Year/Semester</u>	<u>Course Number & Title</u>	<u>Enrollment</u>
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See page 2 for course listing

- (b). If degree is not in area of current assignment, explain.

Degree is in area of current assignment

- (c). Identify your professional development activities during the past five years.
Blackboard and online course development professional development
SoftChalk software professional development

Faculty Course Loads

Faculty	Term	Course	Title	Enrolled
Moseley, William W.				
	201002	EG 171	Circuit Analysis I	17
	201002	EG 172	Circuit Analysis II	16
	201002	EG 181	Analog Electronics I	4
	201002	EG 214	Electrical Control Systems	19
	201002	EG 220	Machines and Power Systems	4
	201001	EG 103	Electrical Calculations	19
	201001	EG 105	Industrial Safety	20
	201001	EG 107	Introduction to Circuits	16
	201001	EG 171	Circuit Analysis I	4
	201001	EG 172	Circuit Analysis II	4
	201001	EG 210	Troubleshooting Lab	18
	200902	EG 103	Electrical Calculations	8
	200902	EG 106	National Electric Codes	9
	200902	EG 107	Introduction to Circuits	8
	200902	EG 210	Troubleshooting Lab	8
	200902	EG 220	Machines and Power Systems	6
	200902	EG 290	Digital Electronics	7
	200901	DR 203	Electrical Schematics	9
	200901	EG 105	Industrial Safety	11
	200901	EG 106	National Electric Codes	1
	200901	EG 181	Analog Electronics I	7
	200901	EG 210	Troubleshooting Lab	6
	200901	EG 298	Capstone	4
	200901	EG 299	Internship Work Experience	2
	200901	MT 90	Basic Mathematics	22
	200802	EG 106	National Electric Codes	15
	200802	EG 171	Circuit Analysis I	12
	200802	EG 172	Circuit Analysis II	12
	200802	EG 220	Machines and Power Systems	9
	200802	EG 275	Circuits Review	9
	200801	MT 90	Basic Mathematics	23
	200602	MT 95	Introductory Algebra I	27
	200602	MT 95	Introductory Algebra I	25
	200601	MT 90	Basic Mathematics	22

APPENDIX III - Course Enrollments

Term	Subject	Course	Title	Enrolled
200601	DR	204	Computer Aided Design & Drf I	9
200601	EG	103	Electrical Calculations	12
200601	EG	105	Industrial Safety	16
200601	EG	106	National Electric Codes	15
200601	EG	107	Introduction to Circuits	13
200601	EG	298	Capstone	1
200601	EG	299	Internship Work Experience	1
200602	DR	203	Electrical Schematics	12
200602	EG	298	Capstone	2
200602	EG	299	Internship Work Experience	2
200701	DR	204	Computer Aided Design & Drf I	6
200701	EG	103	Electrical Calculations	18
200701	EG	105	Industrial Safety	15
200701	EG	171	Circuit Analysis I	1
200701	EG	172	Circuit Analysis II	1
200701	EG	210	Troubleshooting Lab	1
200701	EG	298	Capstone	3
200701	EG	299	Internship Work Experience	1
200702	DR	203	Electrical Schematics	15
200702	EG	171	Circuit Analysis I	14
200702	EG	172	Circuit Analysis II	14
200702	EG	210	Troubleshooting Lab	11
200801	EG	106	National Electric Codes	1
200801	EG	290	Digital Electronics	10
200801	EG	298	Capstone	1
200801	EG	299	Internship Work Experience	1
200802	EG	106	National Electric Codes	15
200802	EG	171	Circuit Analysis I	12