

**Subject Matter Expert Review**  
**TAACCCT Grant – Round 3**  
**Findings & Report**

**Program:** Electromechanical Engineering Technology

**Program Courses:**    **CEN 126 Industrial Networks**  
                              **EDD 131 Engineering Graphics w/CAD**  
                              **ELC 125 Electrical Circuits I**  
                              **ELC 127 Digital Electronics**  
                              **ELC 243 Programmable Logic Controllers**  
                              **ELM 130 Industrial Electricity**  
                              **ELM 205 Mechanisms and Design**  
                              **ELM 250 Industrial Automation**  
                              **ELM 252 Fluid Power**  
                              **ELM 290 Electromechanical Internship**

**Faculty Developer(s)/Instructional Designer(s):** Jeff Hall (Contact)

**Subject Matter Expert:**        **Joseph S. Konrad, Jr.**

**Subject Matter Expert Credentials:**

Del Tech Academic Advisory Board Member (Advisory Board Chair 2017)  
Please see attached resume for additional info

**Date of Review:**        **July 2017**

**Synopsis of Findings:** I am in the unique position of evaluating the course curriculum for which I have played a part in helping to modify over the past several years through my serving on the academic advisory board that Jeff Hall created in 2015. One of the challenges faced, as with any aggressive Associate's Degree Program, is how to best tailor the core curriculum such that it meets the requirements of future employers while maintaining the necessary pre-requisite breadth requirements to confer a collegiate degree upon graduation. As with any college degree program there needs to be emphasis on other content that differentiates Delaware Tech's Associate's Degree from what could be considered purely technical certificate type programs offered elsewhere. The time and credit hour limitations that occur have made it somewhat challenging to say the least.

Overall, the breadth and depth of the core curriculum is appropriately geared toward ensuring the student will be sufficiently "well rounded" in all phases of electro-mechanical basics such that they can meaningfully contribute to the workforce upon graduation. I see the program curriculum as spending equal parts on the theories as well as the practical applications of such. This lends the ability to the student to utilize this education in either a practical, hands on, industrial manufacturing setting or in a more classic research and development type of environment.

Further, through placing one of their program's recent students into an internship here at my place of employment I could see firsthand the benefits of the Del Tech program and how well it prepares the student for gainful employment in the electromechanical field. I found that in our case the intern we employed was capable from day one. Once given proper orderly direction with a clear scope of what the deliverables of the assignments were the intern was dutifully engaged and performing tasks that most entry level electromechanical technicians would be expected to perform. While some of that no doubt resides with the student a large part of his/her performance is related back to how well the subject matter was presented as well as how relevant it was. In this regard, I think Delaware Tech has done an excellent job with their program content and structure.

Any specific recommendations for individual courses reviewed as part of this evaluation will be listed in the following sections of this review.

<b>1. PROGRAM AND COURSE OVERVIEW AND OBJECTIVES</b>	The overall design and purpose of the program and each course is made clear to the student. Core Course Performance Objectives (CCPO's) build upon knowledge and skills through the sequence of the program and align to the Program Graduate Competencies (PGC's).
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<i>Specific Review Standard</i>	Accomplished	Satisfactory	Not satisfactory
1.1 The program graduate competencies are clearly stated.	<b>X</b>		
1.2 The goals and purpose of each course are clearly stated.	<b>X</b>		
1.3 Prerequisites and/or any required competencies are clearly stated.	<b>X</b>		
1.4 Learning objectives for each course describe outcomes that are measurable.	<b>X</b>		
1.5 Learning objectives are appropriately designed for the level of each of the courses.	<b>X</b>		
1.6 Instruction, activities, and assignments in courses are scaffolded from course to course, and throughout the program.	<b>X</b>		
<p><b>Comments:</b></p> <p>The stated objectives for each course are clear and the methods to determine a student's competency in each subject area are all well stated. The progression of topics within each course are set up such that they act as building blocks for the next segments learned. One of the challenges faced often in programs such as these is the ability to transfer the "book knowledge" into practical application. In this regard, I found that the labs and assignments in all cases clearly relate to subject matter taught in the classroom.</p> <p>Regarding the progression of courses, the program does an excellent job of providing the foundational learnings in early courses such as ELC 125 Electrical Circuits and ELM 130 Industrial Electricity. These courses expose the student to core theories that are then built upon further in later courses such as ELM 230 Industrial Electronics, ELC 127 Digital Electronics and ELC 243 Programmable Logic Controllers. The recent additions of ELM 175 Process Control &amp; Instrumentation as well as ELM 253 Advanced PLC's further strengthen the graduate's ability to transition into a full-time technician level job in any manufacturing environment.</p> <p>Overall, this area of the program (scaffolding and progression of courses) is excellent in my view particularly as a potential employer of a graduate of this program.</p>			

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<b>2. RELEVANCY</b>	Program Graduate Competencies (PGC's) and Core Course Performance Objectives (CCPO's) are relevant to students, industry, and employers.
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<i>Specific Review Standard</i>	Accomplished	Satisfactory	Not satisfactory
2.1 Program Graduate Competencies (PGC's) represent industry's expectation of the overarching knowledge, skills, and abilities an associate-degree level student should have.	<b>X</b>		
2.2 Program competencies (PGC's) and core course competencies (CCPO's) are relevant to <b>industry and employers.</b>		<b>X</b>	
2.3 Instruction, activities, and assignments in individual courses are relevant and engaging to <b>students.</b>	<b>X</b>		

**Comments:**

In regards to this section of the review, I have first-hand knowledge of the overall course relevancy to industry's expectation of the knowledge, skills and abilities the graduates of this degree program should have. Our experience with one of the students of this program was excellent and showed the breadth of knowledge required. The foundational courses of the program are excellent and provide the necessary understanding of electrical circuits and components. While many of today's systems are designed such that board level troubleshooting of problems is not required, there is still the need to have a full understanding of how electronic components behave in a circuit and what their purpose is.

The ability of graduates of this program to be able to utilize voltage meters to test circuitry and system components is excellent due to the time well spent on courses such as ELC 125, ELC 127 and ELC 130. The addition of courses in industrial automation and programmable logic controllers combined with courses on fluid power, motor protection and mechanical systems prepare the graduate for the ability to "hit the floor running" in any industrial environment. Again, we've seen this first-hand with our experience of providing a student of this program an internship opportunity this past year. Overall, the program does an outstanding job of tying all aspects of what one would expect to encounter as an entry level industrial electronic technician.

This is not to say that the program is slanted toward only providing graduates the opportunity to work in a manufacturing environment. Equally impressive is the fact that the courses of this program would enable a graduate to also contribute immediately in more of a research and development type of position as well. Much of that is left to each individual student's preference as to what he or she would like to pursue as a career upon graduation which again speaks very well to the overall program structure and content.

One additional comment I'd like to make is about EDD 131 Engineering Graphics with CAD. While it is understood that there is a need to ensure the graduate is well rounded in all aspects in which they might encounter the need to interpret blueprints and drawings, I felt that the course may be a bit too aggressive in terms of all that it tries to expose the student to. It would appear as though the course is more tilted to the mechanical side of the equation and perhaps not enough toward the electrical/electronic side. If this course could be tweaked slightly to include a section on creating, reading and interpreting electrical schematics and less toward producing mechanical drawings I feel students would be even better prepared to enter a role of an electronic technician. I realize that this is an electro-mechanical program. However, most students who graduate will find the need to properly read, interpret and, in some cases, create electrical prints/schematics.

<b>3. RESOURCES AND MATERIALS</b>	Instructional materials being delivered achieve stated course objectives and learning outcomes ( <i>note: not all program/course materials are deliverable under CC BY licensing</i> ).
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<i>Specific Review Standard</i>	Accomplished	Satisfactory	Not satisfactory
3.1 The instructional materials contribute to the achievement of the stated course learning objectives.	<b>X</b>		
3.2 The purpose of instructional materials is clearly explained.	<b>X</b>		
3.3 The instructional materials present a variety of perspectives and approaches on the course content.	<b>X</b>		

3.4 The instructional materials are appropriately designed for the level of the course.	<b>X</b>		
<p><b>Comments:</b></p> <p>Each course clearly establishes what the purpose of the instructional materials are as well as their relevancy once the CCPO's and MPO's are read. For example, in ELC 125 Electrical Circuits I, the CCPO's and MPO's clearly show that the proficient use of a multi-meter will need to be clearly demonstrated throughout the course.</p> <p>I felt that all labs were challenging and that the specifics of the lab tied in very well with what was taught in the classroom. It is apparent that these hands-on activities do very well to reinforce the technical theories from the text books. The progression and structured content are clearly defined within each course syllabus.</p>			

<p><b>4. ASSESSMENT AND MEASUREMENT</b></p>	<p>Assessment strategies use established ways to measure effective learning, evaluate student progress by reference to stated learning objectives, and are designed to be integral to the learning process.</p>
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<i>Specific Review Standard</i>	Accomplished	Satisfactory	Not satisfactory
4.1 The course evaluation criteria/course grading policy is stated clearly on each syllabus.	<b>X</b>		
4.2 Course-level assessments (those that can be delivered) measure the stated learning objectives and are consistent with course activities and resources.	<b>X</b>		
4.3 Specific and descriptive criteria are provided for the evaluation of students' work and participation and are tied to the course grading policy.		<b>X</b>	
4.4 The assessment instruments (that can be delivered) are sequenced, varied, and appropriate to the content being assessed.	<b>X</b>		

**Comments:**

All material which I reviewed was consistent with the stated objectives of the program. Each course syllabus outlined the measurable objectives required to attain as well as any materials required above and beyond the standard text book for each.

The grading system is excellent with no opportunity for a "D" level grade. To truly display the ability to master the course material and get an "A" the bar is set high with the low end being a 92. While this may seem aggressive it clearly implies that the student needs to apply themselves fully to distinguish themselves. I find this approach to be refreshing. The apparent pace of learning is steady and challenging which tends to separate the students who really are driven to learn from those who might just "go through the paces". What I mean by this is that there does not appear to be room for anyone to slack their way through courses – a student must put in the work and demonstrate proficiency to progress. If he or she does not, there is no escaping that at the next course in the progression.

The only comment I can make is that it is not quite clear from the syllabi how much weight is given to chapter tests and any quizzes verses lab activities. I would think that it would be helpful for the student to know that each assessment type (quiz, test, lab) has a certain weight to the overall course grade and state it as such up front in each course syllabus.

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