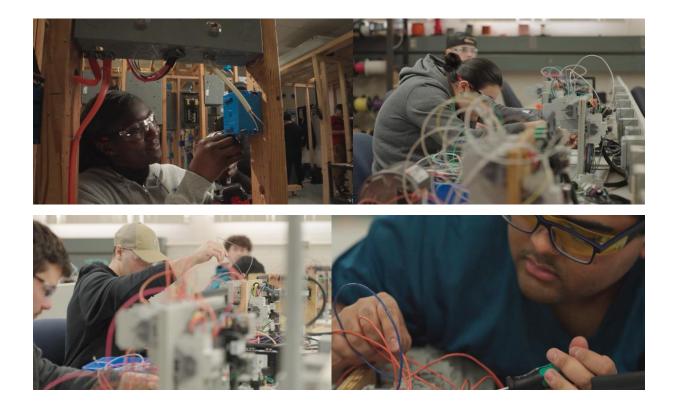## Northampton Community College

Electrical Technology

Academic Program Review
2018-2022

Ron Fornarotto, Program Manager, Electrical Technology
Ken Nasatka, Director, Automotive, Industry & Manufacturing

March 2023

Table of Contents

I. Introduction

Provide the current purpose of the program.

The Electrical Technology program includes a degree, certificate and specialized diploma program that is intended to prepare graduates for employment in the electrical construction market. Local construction and electrical companies were engaged to provide input & insight to assist Northampton in developing a curriculum that will keep students competitive and knowledgeable in today's latest electrical technology practices. Those new to the program will pick up vital hands-on operating skills; those returning to the program will gain a new set of skills that will help them to advance in the workforce.

Graduates who are new to this field of study will gain a new set of skills and knowledge to qualify them as electrical technicians who install, service and maintain electrical equipment such as distribution equipment for commercial buildings, install and maintain electrical distribution for residential occupancies, install and maintain cable systems such as CATV, telephone, alarm, and internet systems. Students are also prepared to install and maintain solar photovoltaic systems, install and maintain industrial control systems, and install the electrical components of HVAC/R equipment. It is an occupation required in the construction industry, particularly residential and commercial construction and sometimes in industrial plants. Existing electrical personnel who graduate from this program will improve their qualifications as electrical technicians, supervisors, and managers of electrical construction technology.

A. How does the program advance the mission or strategic focus areas (SFAs) of the college? (Reflect on the program's curriculum, success rates, etc. to highlight where the program specifically promotes one or more of the SFAs)

Inspiring Academic Excellence: The textbooks used for the Electrical courses are updated every three years to mirror national code changes. Instructors have years of industry experience in the discipline they teach.   Advisory committee meetings are held with industry experts to provide feedback and suggestions to improve the Electrical Technology Program.

Advancing Excellence in Technology: Lab equipment is modern and plentiful enough for each student to use during class. Lab instruction is constantly improving to keep up with evolving industry standards.

Increasing Student Retention, Completion & Transfer: Electrical courses are offered in multiple sections throughout the year to accommodate different student schedules and needs. Most students find gainful employment prior to graduating the program.

B. Comment on awards, honors, noteworthy accomplishments, or unique features related to the program during the review period.

In 2019 a student competed in the "Motors and Controls" category for the SkillsUSA competition and placed 1st in the Country

Catalog Description

1. The current program catalog description is included in [Appendix A](#).

2. Does this description accurately describe the current program?

        Yes   X   No _____

    If No, what changes does the program review committee recommend?
    Explain reasons for any recommended changes.

F. Previous Program Review

1. Provide the date of the last program review: 3/10/2018

2. List the recommendations from that review and indicate the extent to which these recommendations have been implemented. Indicate "I" for recommendations implemented, "IP" for those in progress, and "NI" for those not implemented. For those recommendations not implemented, please explain the circumstances.

    Table 1. Status of Recommendations from Last Program Review

Recommendation	Status
Investigate current and future articulation agreements with key local vocational schools to accept at least a few credits from overlapping curriculum topics.	I
Add one line with a summary of the PLC exposure from EMEC240, which is a critical class to this program.	I
Strongly agree with the decision to add OSHA 100 "Course, Industry Outreach Safety" to the first semester.	I
Possibly offer an introductory course from the new "Instrumentation Process Program" as one of the possible electives for this AAS degree.	I

What is the status of the prior recommendations? Are these connected to action plan?   All four recommendations from the previous audit have been implemented into the problem. The line item about the articulation is an ongoing review every two years.

II.   Program Outcomes

A. Program-Level Student Learning Outcomes (see Appendix B).

1. Have the PLOs been updated or revised since the last program review?

Yes _____   No ___X___

If yes, briefly explain the rationale for the changes (e.g., improving assessability, conforming to best practices, etc.)

B. Program-Level Performance Indicators

1. Describe the key indicators used to assess the quality and effectiveness of your program relative to its core purpose and the college mission. Best practice is to utilize 8-10 key performance indicators.

At a minimum, provide data related to retention, persistence, completion, and transfer/job-placement/licensure in Appendix C (year over year trend data for the last five years). Then select four to five other indicators as applicable to include in Appendix C as well. Suggestions include:

- Indicators of Student Success
- Transfer/job-placement
- National, state, or disciplinary benchmarks
- Student Satisfaction/Feedback, including CCSSE data
- Alumni Survey (conducted by Institutional Research)
- Employer Feedback/Placement Reports (Career Services)
- Other benchmarks as appropriate

2. Please consult the data provided through the program review website and discuss the unique indictors that demonstrate how your program is fulfilling its purpose as well as supporting the overall institution and/or other programs (i.e., STEM courses supporting Allied Health programs).

Students are required to compete the ELTC211 National Electrical Code course. This course prepares the students to take the Masters License Examination, although passing the test is not a requirement of the course.

On average 40 to 45 percent of the students opt to take the Maters License Examination. The pass rate of these students is 80 percent.

III.   Environmental Scan

A.   Identify current trends in the program's field or discipline.

Ground Fault Circuit Interrupter (GFCI)/Arc-Fault Circuit Interrupter (AFCI) Protection: Over the past few years, the National Electrical Code (NEC) has increased the requirements for GFCI and AFCI installation and protection.

Smart Home Technology: The advancement of technology has led to an increase of smart devices and wireless devices being installed in new construction as well as remodeling projects.

Variable Frequency Drives: The use of VFD's for motor control functions are increasing with modern equipment installations.

B.   What has the program done to respond to these trends?

ELTC107 (Wiring 1): New equipment has been purchased and incorporated to expand instruction regarding GFCI/AFCI protection and Smart Home Technology. This equipment includes plug on neutral main breaker panels as well as sub panels, GFCI devices and breakers, combination AFCI breakers, generator interlock kits, generator power inlet boxes, circuit breakers and consumables to support laboratory instruction. Textbooks have been updated to the most current editions that focus on the latest building and wiring procedures.

In an effort to maximize the effectiveness of lab instruction during each semester, portable/mobile wall space on wheels were built for this course. This now gives us the capacity to allow up to 36 students a semester with their own individual area and equipment to learn on. Each student now has their own space with the above mentioned equipment for the duration of the semester, and will not have to share with other classes or students.

ELTC135 (Motors and Controls): Like above, new equipment has been purchased and incorporated to expand instruction regarding VFD technology. New pushbutton boards (enough for every student) have been custom built with new pushbuttons, terminal blocks, relay bases, relays, switches and indicators. A 120v/24v/12v power supply board (enough for every student) was also custom built to aid course instruction. Custom made motor starter boards were also built and enough made for every student to use during class. More motors and VFD's were also purchased so every student has their own to use during class. Textbooks were also updated.

C.   Does the program have any external transfer articulation or joint admissions agreements?

Yes   X   No _____

If yes, complete Table 2.

Table 2. Top five program-to-program articulation agreements.

Name of the Institution	Type of Agreement	Average number of student who transfer here each year	Date agreement was last reviewed or updated
Bloomsburg University	Bloomsburg partnership program for their "Bachelor of Applied Science in Technical Leadership"	N/A <5	2021
Pennsylvania College of Technology	Transfer Course Equivalency ELTC101 ELTC107 ELTC135	N/A <5	2014

Have any problems been encountered concerning the transferability of courses?

Yes _____   No ___X___

D. Does the program have any inbound articulation agreements?

Yes ___X___   No _____

If yes, complete Table 3.

Table 3. Inbound articulation agreements.

Name of the Institution	Type of Agreement	Average number of student who transfer here each year	Date agreement was last reviewed or updated
Bethlehem Area Vocational-Technical School	Signed articulation for 9 credits		1/27/2022
Career Institute of Technology	Signed articulation for 9 credits		2/27/2022
Lehigh Carbon Technical Institute	Signed articulation for 9 credits		1/27/2022
Monroe Career and Technical Institute	Signed articulation for 9 credits		1/27/2022

E. Provide regional workforce data with respect to (1) the number of people currently employed in the field; (2) projections for employment growth or decline; and (3) the current salary range. Discuss the implications of these numbers for the program.

Occupation Title: Electricians

Occupation Code: 47-2111

Location	Estimated total employment (excludes self-employed)	Median Hourly Wage	Median Annual Wage	Mean Hourly Wage	Mean Annual Wage	Job Outlook 2021 - 2031
National	711,200	$28.87	$60,040	$30.44	$63,310	7% (As fast as average)
State - PA	19,390	$29.63	$61,630	$33.01	$68,660	
Local Area*	1,100	$29.93	$62,620	$33.07	$66,780	

*Local Area: Allentown-Bethlehem-Easton, PA-NJ (includes Carbon, Lehigh, and Northampton PA Counties and Warren County NJ)

F. Does the program have any community partnerships or other associations or memberships of note?

           Yes _____   No   X

   If yes, describe the nature of these relationships

G. Does the program have an advisory committee?

           Yes   X   No _____

   If yes, list the names and affiliations of the advisory committee members

   Vincent Beller, Operations Technical Training Mgr., B.Braun Medical Inc.

   Bradley Jacoby, Mgr. of Engineering & Maint., Lehigh Heavy Forge Corp.

   Phil Werkheiser, Vice President, Werkheiser Electric.

   Ryan Camody, Tech Services Manager, Sanofi Pasteur.

   Tom Shafnisky, President, Shafnisky Electric Inc.

Linda Eberly, Training Manager, Nestle Purina.

Kevin Strawn, Retired Instructor, BAVTS.

Robert Franklin, Training & Safety Manager, IBEW Local Union 375.

Al Wallitsch, Sr. Talent Development Specialist, Just Born Inc.

H. How often does the advisory committee meet? ___Biannually_____
Minutes from the last meeting is in Appendix D.

I. Specify advisory committee contributions to the program's growth and development, including recommended curricular changes.

No meetings have taken place yet.

IV.   Curriculum

A. Curriculum Matrix

1. The program's most recent curriculum matrix for the program's learning outcomes can be found in Appendix E.

2. The key abilities matrix (see Appendix F) indicates how the program satisfies NCC's general education core requirements.

3. Based on the curriculum matrix and general education core review, are there any changes that need to be considered?

Yes _____   No   _X_

If so, describe these changes.

B. Program and co-curricular maps are in Appendix G and Appendix H.

1. Based on the program map, validate the adequacy of the organized, intentional, sequential learning experiences.

The sequential learning experiences are aligned to expose the students to the required program fundamental skills and knowledge. Starting in the first semester the students are taught the basics of electric and safety when working with it. With each subsequent semester, the students are exposed to a new set of skills expanding on the previous skills.

2. Based on the co-curricular map, discuss the relationship between student learning and co-curricular experiences.

    Much of the student's co-curricular experience helps and guides a student towards successful employment after graduation. Starting in the first semester, students are exposed to skills and activities necessary for the student's growth during their time here. Some examples include attending a career service session, attending on-campus career fairs, joining student clubs, seeking out community service opportunities, exploring internships via career services and job shadowing. These early experiences provides students the opportunity to be well prepared for life after graduation when the time comes.

3. Are there any changes to the program map or co-curricular map that need to be considered?

    Yes ___X___   No _____

    If so, describe these changes.

    I will consider making ELTC265 and ELTC222 required courses for the program. Tech electives or the elective may be replaced with these in the program. ELTC265 is the low voltage cabling course and ELTC222 is the Solar Photovoltaic course and both of these are currently "Tech Electives". Low voltage cabling knowledge is a skillset that every Electrician uses throughout their career. A push for sustainable green energy has been increasing every year, and therefore I am also considering making ELTC222 a required course for the program.

C. Discuss career development and experiential opportunities for students within your program (e.g., internship, capstone, career research courses, service learning, etc.). Students can use resources and information provided by the school's career service office. Here the student can learn about job opportunities, job fairs, available internships, resume building, and other services to help the students with career opportunities.

1. Based on a review of these opportunities, are there any changes that need to be considered?

    Yes _____   No ___X___

D. Modality Awareness

1. If courses are being offered in online or hybrid formats, discuss the assessment of the effectiveness of these formats.

    Currently, only one program required course is offered online.   This is the code class ELTC211. Since there is no lab work required for this course, we run this course in a hybrid format. This allows more flexibility for the students while still meeting course requirements. The last completion of this course shows positive results, with 8 out of 8 students successfully completing the course, and the overall class average was 89%. The current course running now as I write this, is doing even better with 17 out of 17

students passing and the average for the class is currently at 93%. These results show positive effectiveness of this hybrid format. At this time, ELTC211 will remain the only program required course that is not onsite. This is primarily because every other required course involves hands on lab instruction.

2. Are there any changes to these formats that need to be considered?

Yes _____   No ___X___

V.   Assessment

A.   Append the current version of the program's Assessment Plan (Appendix I).

B.   Using Table 4, provide a summary of the assessment activity that has occurred since the last program review. Table 4 PLO Assessment

Program Learning Outcomes (include all program outcomes that are listed in the College Catalog)	Describe how the outcome has been assessed in the last five-year period.	What were the results of that assessment? Acceptable =>75% or > Significant or Fail = <75%
PLO#1. Demonstrate an ability to work independently and collaboratively.	Students in ELTC101 were asked to come up with ten real world ethical questions or problems that an electrician may face while working in the industry.	20 students participated. They averaged **92%.** Students discussed the importance of always doing the right thing regardless of the consequences. Students learned, in the Electrical Industry, taking shortcuts or performing improper installation and wiring procedures can harm both property and life.
PLO#2. Demonstrate competent speaking skills when working with diverse groups.	Students in ELTC135 were asked to pair up and work together on the Variable Frequency Drive (VFD) Lab. The students were graded on how well each pair worked together reading instructions, communicating to each other their understanding of the lab, developing a plan for completing the lab together, executing the lab and reporting the results to each other.	12 students participated. They averaged **94%.** We discussed the importance of being able to collaboratively work with others to achieve success during each project you may face on any given day. I have decided to keep this lab in the curriculum because it gives the students a real view of working with teammates and the importance of being able to communicate with other people.
PLO#3. Demonstrate skills in collecting, analyzing and applying technical information. **PLO#4.** Explain basic electrical theories, including Ohm's, Kirchoff's, and Watt's laws.	Students in ELTC135 were asked to design and build a real world parking lot lighting circuit controlled by a photo sensor. Scores were based on designing a circuit to match parameters of the lab, and also building and wiring the lab to perform as expected.	7 students participated, 4 passed with an average of **89%** and 3 failed to complete the assignment. The results of this lab reflect on the students' participation in the class and willingness to excel. This type of lab demonstrates to the students the type of work an electrician is tasked with on a daily basis. Students were shown how to take a complicated project and be able to simplify it into several components and eventually complete the task. This skill is necessary for a successful career in the industry and we will continue to do labs like this in the future.

C. What programmatic changes have been implemented as a result of recent programmatic assessment activities?

Lab equipment and work stations were created, built and deployed to allow students to work independently. These include power supply boards for ELTC101 Electrical Fundamentals, power supply boards and motor control boards in ELTC135 Motors and Controls, and portable wooden walls in ELTC107 Electrical Wiring I (Residential).

D. Identify desired changes as a result of programmatic assessment that have yet to take place.

ELTC109 Electrical Wiring II (Commercial), is in desperate need of more lab space and equipment. Currently, there is insufficient space and equipment needed for this course.

VI. Students

A. Describe full-time and part-time enrollment trends since the last program review or the past five years.

Table 5. Student Enrollment Data

Academic Year					
FALL	2018	2019	2020	2021	2022
Full-Time	13	26	27	19	28
Part-Time	33	34	23	42	55
Total Fall	46	60	50	61	83
SPRING	2018	2019	2020	2021	2022
Full-Time	16	17	24	23	15
Part-Time	44	47	39	27	47
Total Spring	60	64	63	50	62

More than half of the enrolled students are part time. This is largely in part due to these students working part time or fulltime while attending NCC. These students do enroll in courses each semester, and most are actively seeking a degree.

B. Describe any concerns the program review committee has regarding: (1) any enrollment trends mentioned above or (2) other enrollment-related issues.

> Industry has been hiring graduating students directly from the local CTEs to fill open entry level positions. Doing this has resulted in fewer students articulating into a degree program at NCC. Our focus should be working with these companies to create a customized training program to allow these employees to at NCC and complete a degree.

C. Has the program instituted any methods or materials to encourage and increase applications by <u>new</u> students since the last program review or the past five years?

<div align="center">
Yes   X   No
</div>

If yes, please describe any initiatives.

> Additional marketing material has been created to explain the benefits of the program, potential salary based on degree completed, companies that have hired our graduates in the past and documents to explain how CTE student can be awarded college credit for work completed. A program video will be completed by June 2023.

D. Has the program instituted any methods or materials to encourage and increase the recruiting of <u>continuing</u> students to choose this program major or emphasis?

<div align="center">
Yes   X   No
</div>

If yes, please describe any initiatives.

> Marketing material has been created to increase awareness of CTE articulation and industry experience Prior Learning Assessment opportunities.

E. Comment on graduation rates since the last program review or the past five years.

> Graduation rates have been lower, in part due to low enrollment and students who chose full-time work over the completion of their degree, with the intent for completion as a part-time student.

F. Comment on transfer rates for students who have and who have not graduated from the program.

> Since the last audit we are unaware of any students who have not graduated transferring to another college.

G. Discuss your program's engagement with and impact of new student orientation, advising, tutoring support, library services, disability support, student life, and career services.

Students are assigned to a Success Navigator during their first and sometimes second semester. The Success Navigator handles all the above mentioned duties until they are handed off to me as their Advisor. I then become the students' primary advisor.

VII. Physical and Financial Resources

A. Comment on the availability, adequacy, and use of learning tools, such as computer software, instructional media, laboratories, studios, etc.

Tools, supplies and equipment are provided for students during hands on laboratory instruction.

B. Discuss the adequacy of (1) instructional space, (2) office space, (3) instructional supplies, and (4) equipment for the program.

There have been gradual improvements and increases in lab equipment and tools thanks to Perkins funding. Additional space is the primary reason holding up any major improvements. There isn't enough space currently in Hartzell Hall to implement additional equipment and trainers in the classrooms. Lab space that needs to expand for ELTC107 Electrical Wiring I, ELTC109 Electrical Wiring II and ELTC265 Electrical Cabling Systems I as well as increasing fit-out of equipment and tools.

C. Discuss library resources.

None used. Students purchase textbooks or online e-books for each course. Additional resources are provided in Blackboard. Students are made aware of the resources available to them.

D. Comment on the role of marketing and public relations in supporting the program.

More awareness needs to take place in public schools, not to mention I personally do not recall ever seeing public advertising of Industry and Manufacturing Programs offered at NCC.

E. Program costs and income.

Table 7. Financial Data

Academic Year	FY2018	FY2019	FY2020	FY2021	FY2022
Program Income					
Tuition	>162,869	121,605	172,814	186,016	208,023
Local Reimbursement	>26,722	20,664	29,216	34,935	42,476
Operating Reimb.	>61,461	48,339	70,858	85,508	100,133
Total Income	>251,052	190,608	272,888	306,459	350,632
Program Costs					
Direct Costs	DNA	121,489	191,306	288,155	301,470
Indirect Costs	DNA	94,363	129,587	149,421	186,093
Total Costs	>298,469	215,852	320,893	437,576	487,563
FTE	>34.47	24.59	33.98	35.32	38.14
Income per FTE	+7,283	7,750	8,031	8,676	9,193
Cost per FTE	+8,658	8,777	9,444	12,388	12,783
Inst. Avg. Cost per FTE	+6,703	7,933	7,820	8,901	10,058
Rank	44 of 126	48 of 133	38 of 135	23 of 138	33 of 126

2018 the Electrical Construction Technology program was changed to the Electrical Technology program. Program costs and income data for the older program is not available. DNA = Data Not Available.

Describe how the program is financed, including college budget (if any) as well as any grants that have been received over the past five years, and outline any major expenses over the past five years.

College Capital and Operating budgets primarily fund the programs consumables. Replacing aging equipment and lab upgrades have been the major expenses in the program over the past five years. Some of these items include new VFD's, new pushbutton boards, new power supplies, new breaker panels, and new tools.

1. If possible, analyze the program's cost-effectiveness (i.e., does current/projected student enrollment cover the cost of faculty, supplies, etc. and/or are the faculty staff, space and/or facilities appropriate for the current/projected enrollment).

    Enrollment is steadily increasing primarily for part time students in the Electrical Program and new major purchases will decrease since most purchases have been completed during the past few years. We can now focus on implementing the new equipment into the program. Consumables will be the major purchases from the Operating budget. As Capital or Perkins grants become available will additional equipment and tools be purchased.

    Enrollment trends may require additional options for course offerings such as Friday and Saturday. This may also require additional instructors to meet the demand.

    ELTC109 Electrical Wiring II and ELTC265 Electrical Cabling Systems I are in need of lab space and equipment, lack of space being the major issue.

2. Are you getting additional funding from grants or donors?

    A grant was received from Provident Bank foundation to create program specific videos used at orientations, open houses and display screens within Hartzell Hall.

VIII. Human Resources

A. Briefly describe Program Leadership and oversight.

One program manager oversees the hiring and training of eight adjunct instructors as well as curriculum updates, technology updates, lab space/equipment updates, and program growth. There are currently 15-18 program related classes per given semester (Spring & Fall) and 2 during the summer semester.

B. Report the numbers of full-time and part-time faculty, professional staff, and clerical staff currently associated with the program.

Table 8. Faculty Demographic Data

Academic Year	Last Review	Current Review
2018-2023	1 Program Manager 7-8 adjunct instructors 1 fulltime clerical/admin 1 part-time clerical admin	1 Program Manager 7-8 adjunct instructors 1 fulltime clerical/admin 1 part-time clerical admin (2018-2022)

1. Note any changes that have occurred in these numbers since the last program review or the previous five years.

    There have been five new adjunct instructors hired in the past five years, two quit and three are still actively teaching for us. Two other adjunct instructors hired prior to this audit cycle are no longer teaching.

2. Briefly explain how these changes have affected the program.

    Additional instructors allow for additional course offerings during each semester, for example, we generally offer four sections of ELTC101 Electrical Fundamentals each semester and sometimes need to run five or six depending on enrollment. ELTC107 Electrical Wiring I is another example where we may add an additional section depending on enrollment. Both of these courses are required in other programs (HVAC, EMEC, and INMM) so as their enrollment increased so does the need for additional sections and instructors.

C. What is the ratio of full-time to part-time faculty? What percentage of (1) day sections, (2) traditional evening/weekend sections, (3) distance education/hybrid sections, and total sections are taught by full-time faculty. Comment on the levels of full-time, part-time faculty, and professional or clerical staff.

    The ratio of full time to part time is 1-8.

    Fulltime Program Manager - 11%, Adjunct Instructors – 89%

D. Faculty Expertise/Experience

1. Northampton hires faculty members who are well-credentialed (see Appendix J) and understand and embrace the open-access mission of the community college.

2. How do faculty in this program promote academic excellence through professional development, scholarship, and service?

All full-time and part-time members work or have worked in the electrical industry and share expertise and knowledge in the classroom. The electrical industry can be and is a challenging field to enter, with many different paths to take. We are able to share our experiences to guide students in deciding what path they may take, (residential, commercial, industrial). Talking with students and explaining the many differences in each path helps a student decide which tech elective will enhance their professional development.

IX.   Analysis of Findings

A. Based upon the data collected in this document, discuss the strengths and weaknesses of your program. *For example: do students' progress successfully through courses; are staffing/equipment/facilities needs filled; are assessment efforts successful; etc.*

Strengths: Students are exposed to a large amount of hands on instruction with modern equipment. The program stays current with industry standards related to electrical system installation methods and procedures. Textbooks are often updated every three years to follow code cycle changes. The program offers most course sections during the morning, daytime and evening in both Fall and Summer. This helps part time students and working students attend classes convenient to their schedule. Instructors are experts in their field.

Weaknesses: We still need additional space and equipment for ELTC109 Electrical Wiring II and ELTC265 Electrical Cable Wiring I. ELTC109 is the commercial wiring course and currently has very minimal lab space. ELTC265 is the low voltage wiring course and shares the same lab space as ELTC109 which is only one wall of metal studs. Both courses need more space, especially ELTC109.

B. Based on the data collected in this document, discuss the opportunities for improvement available to your program and the internal and external challenges your program faces. *For example: is the program in demand; are graduates employable/able to transfer; what is the future plan for this program; etc.*

Opportunities and ideas for improvement are discussed and noted within the department and met with positive feedback. I feel the ideas for improvement will eventually happen, but not as fast as I would like to see.

C. What additional data that is currently not available would have been helpful to evaluate this program effectively?

Without data being supplied by the IR department, it was very time consuming researching and compiling what data could be found.

X.   External Review Report

Refer to [Appendix K](#) for the external/accreditor review report.

XI.   Action Plan

A.   Identify 2-3 program goals for the future.

1.   Incorporate 12 new Variable Frequency Drive (VFD) trainers with lab into ELTC135.
     i.   **Timeframe: Within next two years.**
     ii. **Responsible Party(ies) Program Manager & Associated Adjuncts**
     iii. **Resource Implications: Time to implement components, Time to train instructors, and cost to purchase equipment/trainers.**

2.   Incorporate 12 new split phase motor trainers with lab into ELTC135 Motors and Controls.
     i.   **Timeframe: Within Next Three Years Timeframe**
     ii. **Responsible Party(ies) Program Manager and Associated Adjuncts**
     iii. **Resource Implications: Time to implement components, Time to train instructors, and cost to purchase equipment/trainers.**

3.   Update lab exercises in ELTC101 Electrical Fundamentals.
     i.   **Timeframe: Within Next Three Years.**
     ii. **Responsible Party(ies) Program Manager and Associated Instructors**
     iii. **Resource Implications: Time and costs to implement LABS now**

4.   Articulation agreements to NCC (CTE and high schools) and to 4 year institutions:
     i.   **Timeframe: Within next 18 months**
     ii. **Responsible Party(ies): Program Manager and Career Reading Specialists**
     iii. **Resource Implications: Time to implement components, Time to train instructors, and cost to purchase equipment/trainers.**

5.   Advisory Board Meeting needs to be convened:
     i.   **Timeframe: 6 months**
     ii. **Responsible Party(ies): Program Manager**
     iii. **Resource implications: None**

The Key –Assessment of the Electrical Program has been reviewed by Dean, Business and Industry. I concur with the aforementioned review regarding program. Based on the workplace industry needs: liability of programmatic expansion. The Electrical Program remains a viable program at this college. I support the continuation of the program as submitted.

**Denise François-Seeney
Dean, School of Business & Industry**

Appendix A: Program Description   ↰

Narrative

There has never been a more rewarding time to consider entering the electrical trades. With a large number of electricians approaching retirement age and the increasing technical complexity of new equipment, skilled electrical technicians are consistently in demand now and into the future. If you enjoy hands-on physical activities combined with complex problem solving opportunities, the electrical trade offers you a rewarding career path.

Northampton's electrical technology program offers a range of stackable degrees; starting with a specialized diploma that can be completed in one-year, a certificate requiring a minimum of 41 credits, and an AAS degree requiring a minimum of 63 credits.

All of our electrical programs are designed to be completed on either a full time or a part time basis, with most courses available in the evenings as well as during the day.

Features

The electrical technology AAS degree offers students an advanced technical credential for those interested in starting an electrical career in the construction trades or pursuing electrical technician positions in the advanced manufacturing sector. All students completing this program will gain a broad understanding of fundamental electrical principles, residential and commercial wiring practices, and basic PLC / VFD programming/operation. In addition, students may tailor their second year technical courses to focus on their specific career goals, selecting from more advanced electrical courses including solar PV systems design, advanced industrial control systems, or specialized wiring courses. The program is rounded out by including general education courses that will prepare you to better communicate and build teamwork at your organization, vital skills that are required to advance into supervisory positions.

Graduates from this program will have employment opportunities as electricians, electrical service technicians, and electrical maintenance personal in both the construction and advanced manufacturing sectors.

Transfer Information:
- While the program is not specifically intended for transfer, it will be considered on a case-by-case basis by Pennsylvania College of Technology.
- In addition, this program is eligible for the Bloomsburg partnership program for their "Bachelor of Applied Science in Technical Leadership" 4 year degree.

Appendix B: Program-Level Learning Outcomes

- Demonstrate an ability to work and independently and collaboratively.
- Demonstrate competent speaking skills when working with diverse groups.
- Demonstrate skills in collecting, analyzing and applying technical information.
- Explain basic electrical theories, including Ohm's, Kirchhoff's, and Watt's laws.
- Properly use test equipment to troubleshoot electrical circuits.
- Interpret technical information in the form of schematics and electrical specifications.
- Describe the function and application of electrical equipment as used in residential, commercial and industrial environments.
- Construct, analyze, and troubleshoot common industrial circuits used in control and distribution.
- Properly interpret and apply the National Electric Code in common residential, commercial, and industrial applications.
- Demonstrate electrical safety practices when working with electrical control and distribution equipment.
- Apply mathematics to prepare electrical system documentation.

Appendix C: Program-Level Performance Indicator Data ↰

DNA = Data Not Available

Year	Total Students	Withdrew	Withdrew and transferred	Retained in new major	Retained in same major	Graduated	Graduated and Transferred	% retention
2022	145	DNA	DNA	DNA	DNA	DNA	DNA	DNA
2021	111	DNA	DNA	DNA	DNA	12	DNA	DNA
2020	113	DNA	DNA	DNA	DNA	DNA	DNA	DNA
2019	124	DNA	DNA	DNA	DNA	DNA	DNA	DNA
2018	106	DNA	DNA	DNA	DNA	DNA	DNA	DNA

Appendix D: Advisory Committee Minutes

Advisory Board Meeting scheduled at a later date.

Northampton Community College

Appendix E: Curriculum Matrix

List all of the program learning outcomes for the program of study in the first column. List the program courses across the top row. Then make "**I**" for a learning outcome that is introduced (*addressed for the first time*), "**R**" for a learning outcome that is reinforced (*addressed again, but not emphasized in a major way*), and/or "**M**" for a learning outcome that emphasized (*addressed in a major way, emphasis toward mastery*) under each specific course.

Please note: Not every course will address every program learning outcome.

Program Learning Outcomes	COLS 101	CISC 101	ELTC 101	EMEC 114	ENGL 101	MATH 103	OSAH 101	CMGT 104	ELTC 107	ELTC 135	EMEC 140	CMTH 102	ELTC 109	EMEC 240	ENGL 151T	ELTC 211	PHYS 152
1.Demonstrate an ability to work independently and collaboratively.	I		I,R	I,R			I,R		R	R	R		R,M	R,M		R,M	
2.Demonstrate competent speaking skills when working with diverse groups.	I						I,R		R	R	R	R,M	R	R			

3.Demonstrate skills in collecting, analyzing and applying technical information.			I					I,R	R	R	R	R		R	R		R,M	
4.Explain basic electrical theories, including Ohm's, Kirchhoff's, and Watt's laws.			I						I,R	R	R		R	R		R,M	
5.Properly use test equipment to troubleshoot electrical circuits.			I						I,R	R	R		R,M	R,M			
6.Interpret technical information in the form of schematics and electrical specifications.			I					I,R	I,R	R	R		R,M	R,M		R,M	

Outcome																	
7.Describe the function and application of electrical equipment as used in residential, commercial and industrial environments.			I							I,R	R	R		R,M	R,M		
8.Construct, analyze, and troubleshoot common industrial circuits used in control and distribution.			I							I,R	R		R,M	R,M			
9.Properly interpret and apply the National Electric Code in common residential, commercial, and industrial applications.			I							I,R	R			R,M	R		R,M

10.Demonstrate electrical safety practices when working with electrical control and distribution equipment.		I				I,R		I,R	R	R		R,M	R		
11.Apply mathematics to prepare electrical system documentation.		I		I,R			R	R	R		R,M	R,M		R,M	

Appendix F: Key Abilities Program Matrix

The five Gen Ed Key Abilities help students navigate the world. In each class they take, they should expect to be challenged to develop and deepen their key abilities. After they graduate, these abilities will help them continue learning, adapt to change, and become citizens who can make wise choices and contribute to their communities.

1. *Communicate*
   o *Students are able to share their ideas powerfully and clearly.*
      ▪ *Uses appropriate, relevant, and compelling content and sources that illustrate knowledge and understanding of the topic.*
      ▪ *Assignment is organized and understandable. Distinct intro, body, and conclusion, as appropriate for the discipline.*
      ▪ *Language is clear and understandable. Executes assignment within conventions of a specific discipline, including source citation.*
2. *Analyze and Solve Problems*
   o *Students are able see and solve the problems around them, using solid data to draw and communicate reasonable conclusions.*
      ▪ *Identify and understand an issue, concept, or problem, any data needs, and constraints that have to be considered in order to analyze an issue or solve a problem. Students recognize multiple perspectives*
      ▪ *Use various tools, representations, notation, etc. to help them organize data and see relationships or identify assumptions related to the issue, concept or problem*
      ▪ *Evaluate any conclusions drawn, implications made, or plans for solving a problem, including evaluating any assumptions and any evidence gathered.*
3. *Use Technology*
   o *Students are able to select and ethically use appropriate technology to create, communicate and discover.*
      ▪ *Effectively select and use the appropriate technology applications or resources to accomplish specific goals.*
      ▪ *Be an active and responsible participant in online communities.*
      ▪ *Understand the legal and ethical facets of technology in a global society.*
4. *Understand Diversity*
   o *Students are able to understand how each individual's experiences shape our society, and how societies, in turn, shape the way local and global resources are used.*
      ▪ *Explain how the range of human differences shape the historical and current formation of artistic, economic, social, scientific, cultural or political institutions*
      ▪ *Explain how individuals experience equality and inequality with a society, its institutions or its cultures*
      ▪ *Analyze how individuals and institutions have addressed persistent global challenges, including physical resources and social values.*

5. *Understand Diversity*
   - *Students are able to understand how each individual's experiences shape our society, and how societies, in turn, shape the way local and global resources are used.*
     - *Explain how the range of human differences shape the historical and current formation of artistic, economic, social, scientific, cultural or political institutions*
     - *Explain how individuals experience equality and inequality with a society, its institutions or its cultures*
     - *Analyze how individuals and institutions have addressed persistent global challenges, including physical resources and social values.*
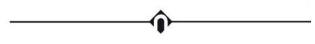6. *Engage in Ethical Questions*
   - *Students are able to identify ethical choices, consider alternatives and consequences, and choose actions and choose actions keeping in mind everyone affected.*

Indicate in the table below the program courses in which a key ability is assessed ("**A**"- Assessed) – if possible, identify the specific assignment/activity in which the key ability is assessed. Focus on the required courses and designated program electives.

Northampton Community College

Gen Ed (Key Abilities) Learning Outcomes	COLS 101	CISC 101	ELTC 101	EMEC 114	ENGL 101	MATH 103	OSAH 101	CMGT 104	ELTC 107	ELTC 135	EMEC 140	CMTH 102	ELTC 109	EMEC 240	ENGL 151T	ELTC 211	PHYS 152
Communicate: Students will be able share their ideas powerfully and clearly.			A						A	A			A			A	
Analyze and Solve Problems: Students will be able to see and solved the problems around them, using solid data to draw and communicate reasonable conclusions.			A						A	A			A			A	

Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Understand Diversity: Students will be able to understand how each individual's experiences shape our society, and how societies, in turn, shape the way local and global resources are used.			A														
Engage in Ethical Questions. Students will be able to identify choices, consider alternatives and consequences, and choose actions keeping in mind everyone affected.			A														
Use Technology. Students will be able to select and ethically use appropriate technology to create, communicate, and discover.			A	A					A	A	A		A			A	

Appendix G – Program Map

Electrical Technology - Associate in Applied Science (2022-2023 Catalog)

SEMESTER-BY-SEMESTER PROGRAM MAP FOR FULL-TIME STUDENTS
Courses are listed in preferred order of completion
Plans can be modified to fit student needs by adding more semesters
Choose your courses with your Advisor.

Developmental Education Courses (if required)

	Course #	Course Title		Course #	Course Title
☐	ACLS050	Introduction to Academic Literacy	☐	MATH020	Pre-Algebra
☐	ENGL027	Writing Skills Workshop	☐	MATH022	Elementary Algebra
			☐	MATH026	Intermediate Algebra

	complete	Course #	Course Title	Credits	Gen Ed	Pre-requisites / Co-requisites
Semester 1	☐	COLS101	College Success	1		
	☐	CISC101	Introduction to Information Technology	3		
	☐	ELTC101	Electrical Fundamentals	3		
	☐	EMEC114	Mechanical Skills for the Trades	2		
	☐	ENGL101	English I	3	Comm.	PRE: ENGL Placement Policy
	☐	MATH103	Technical Mathematics	3	QL	
	☐	OSAH101 or OSAH102	Construction Industry Outreach Safety Education or General Industry Outreach Safety Education**	1		
			Total Semester Credits:	16		
Semester 2	☐	CMGT104	Construction Print Reading	3		
	☐	ELTC107	Electrical Wiring I	3		PRE: ELTC101
	☐	ELTC135	Motors and Controls	4		PRE: ELTC101
	☐	EMEC140	Sensors, Wiring, and Troubleshooting	1		PRE: ELTC101
	☐	CMTH102	Introduction to Communication	3	Comm.	
	☐		AH, SIT, or SSHB Elective +	3	AH, SIT, SSHB	Depends on course selected
			Total Semester Credits:	17		
Semester 3	☐	ELTC109	Electrical Wiring II	3		PRE: ELTC107
	☐	EMEC240	Industrial Control Systems I	4		PRE: ELTC101; PRE or CO: EMEC140
	☐	ENGL151T	English II (Technical Writing)	3	Comm.	PRE: ENGL101
	☐		AH, SIT, or SSHB Elective +	3	AH, SIT, SSHB	Depends on course selected
	☐		Technical Elective++	2 or 3		Depends on course selected
			Total Semester Credits:	15-16		
Semester 4	☐	ELTC211	National Electric Code	4		PRE: ELTC109 or permission of instructor
	☐	PHYS152	Physical Science II	3		
	☐		Elective	3		Depends on course selected
	☐		Technical Elective++	3 or 4		Depends on course selected
			Total Semester Credits:	13-14		
			Total Degree Credits	61-63		

General Education Requirements

☐		Diversity (D)
☐		Writing Intensive (WI)

Notes: +For the General Education Electives, students must select one course from the list of approved courses in two of the following categories: Arts & Humanities (AH); Social Science: Societies and Institution over Time (SIT); Social Science: Scientific Study of Human Behavior (SSHB).

*One course should be designated as Diversity and Global Awareness (D) for degree completion.

*Completion of one General Education Elective in a Writing Intensive (WI) section satisfies the Writing Intensive (WI) requirement. GEOG121G (Environmental Sustainability) is recommended.

**OSAH 101 is the recommended course.

++Eligible Technical Electives: any ELTC, HVAC, CADM, EMEC,ELEC,ENGG, CHEM, CISC, or WELD. Ineligible electives: CADM100, CADM117, EMEC115, ENGG100, or ENGG117.

Appendix H: Co-Curricular Map

PROGRAM NAME: Electrical Technology
AY 18-19

	0 - 15 credits	16 – 30 credits	31 – 45 credits	46+ credits
Get the Courses You Need	Take the following courses: COLS101 College Success (1) CISC101 Introduction to Computers (3) EMEC118 Hand and Power Tools (1) **EMEC101 Electrical Fundamentals (3)** OSAH100 Industry Outreach Safety Education (1) EMEC117 Industrial Rigging (1) MATH140 College Algebra (3) ENGL101 English I (3) 16 Credits	Take the following courses: **ELTC107 Electrical Wiring I (3)** **EMEC135 Motors and Controls (4)** CMGT104 Construction Print Reading (3) **EMEC140 Sensors, Wiring, and Troubleshooting(1)** CMTH102 Introduction to Communication (3) AH, SIT, or SSHB General Education Elective (3) 17 Credits	Take the following courses: **ELTC109 Electrical Wiring II (3)** **EMEC240 Industrial Control Systems I (4)** ENGL151T English II (Technical Writing) (3) AH, SIT, or SSHB General Education Elective (3) Technical elective* 3/4 16/17 Credits	Take the following courses: PHYS101 Physics I (4) **ELTC211 National Electric Code (4)** **ELTC260G Electrical Technology Practicum (WI)** (2) Technical Elective* (2/3) Elective (3) 15/16 Credits
Engage with the Spartan Experience	*For details on course requirements, see the Program Map.* - Attend at least one campus recreation event - Attend Guest Speakers - Join student club(s) - Review academic plan - Seek out community service/ service learning opportunities	*For details on course requirements, see the Program Map.* - Attend Guest Speakers - Discuss elective/gen ed options - Explore internships via Career Services - Seek out community service/ service learning opportunities - Tour Fowler/Fab Lab	*For details on course requirements, see the Program Map.* - Attend Guest Speakers - Mentor new students - Research Center for Innovation & Entrepreneurship - Seek out community service/ service learning opportunities	*For details on course requirements, see the Program Map.* - Apply for student awards - Attend Guest Speakers - Mentor new students - Seek out community service/ service learning opportunities
Get Ready for Life after Completion – Career Readiness	- Attend Career Service Sessions - Attend on-campus Career Fairs – Fall & Spring semesters at both Bethlehem & Monroe campuses - Complete the career readiness GPS to help select a potential Business major	- Attend on-campus Career Fairs – Fall & Spring semesters at both Bethlehem & Monroe campuses - Attend sponsored company tours - Complete stackable credentials	- Arrange job shadowing experience - Attend on-campus Career Fairs – Fall & Spring semesters at both Bethlehem & Monroe campuses - Complete stackable credentials - Explore Internships, externships – list potential experiences - Explore job shadowing experience – list potential employers - Research practicum sponsors (list potential employers) - Resume Development - Social media creation or update	- Apply for FT jobs - Apply for graduation - Attend on-campus Career Fairs – Fall & Spring semesters at both Bethlehem & Monroe campuses - Complete practicum - Complete stackable credentials - Review and take certification testing
Get Ready for Life after Completion – Transfer Readiness	- Identify transfer colleges/universities – list transfer articulation agreements or other transfer opportunities	- Contact Transfer Advisor to gain knowledge of application process - Create list of potential transfer schools	- Attend college fairs/visits - View list of articulation agreements - Choose your transfer institution and gather application materials - Ask a professor(s) for an "excellent" reference	- Apply for graduation - Apply for transfer to a college or university at the beginning of the semester.

Appendix I: Assessment Plan

	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023	Fall 2023	Spring 2024	Fall 2024 (MSCHE Visit)	Spring 2025
Diversity Outcome	Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze	Evaluate & Plan
Ethical Qs Outcome		Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze
Communicate Outcome			Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess
Analyze Outcome				Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze	Evaluate & Plan
Technology Outcome					Evaluate & Plan	Assess	Analyze	Evaluate & Plan	Assess	Analyze

	Program Learning Outcomes (PLOs) (list the PLO # and the corresponding course # where PLO will be assessed)	Gen Ed / Key Ability Outcomes (list the Gen Ed Outcome and the corresponding course # where it will be assessed)
AY 2021-2022	1, 2 (Evaluation in lab, both independently and collaboratively in ELTC101, 107, 109, 135)	Communicate
AY 2022-2023	3, 4 (Written lab reports and hands on labs in ELT101, 107, 109, 135.) Exams and assignments in ELTC101)	Analyze & Solve Problems, Technology
AY 2023- 2024	5, 6 (Lab assignments in ELTC 107, 109, 135)	Diversity, Ethical Q
AY 2024-2025	7, 8 (Lab assignments in ELTC107, 109, 135)	Communicate, Analyze & Solve Problem
AY 2025-2026	9, 10, 11 (Evaluation in ELTC135 labs. Exams and assignments in ELCT211.	Technology, Diversity
AY 2026-2027		Ethical Q, Communicate

Northampton Community College

Appendix J: Teaching Faculty Credentials

Barry Russo: AS Electronic Technology, AAS Electromechanics.

Douglas DeLuca: AA Electrical Engineering.

Joseph Chickey: Electrical Inspector, IBEW.

Peter Izzo: IBEW, Cert Electrical Engineering, 34+ years Electrical Instructor.

Clair Williamson: BS Electrical Engineering, 21+ years Electrical Instructor.

Floyd Caiazzo: IBEW, 18+ years Electrical Instructor.

Robert Trate: AAS Business Admin/Management.

Ron Fornarotto: IBEW, NJ Electrical License, PA HIC License, FAA A&P License.

Paul Pruss: Cert Adult Education.

Northampton Community College

Appendix K: External Review Report

Schedule at a later date