Wyoming Community College Commission
Request for New or Modified Degree or Certificate Programs

A. College Laramie County Community College

B. Date submitted to WCCC staff: December 19, 2018

C. Program

1. Request for:
   ☒ New Program ☐ Modified Existing Program
2. **Program Title:** Electrical Technology
3. Degree or Certificate to be awarded:
   ☐ AA ☐ AS ☐ AAS ☐ Other ☒ Certificate
4. Total number of credit hours: 18 credits
5. CIP code (6-digit): 46.0302
6. Complete this section only if a certificate approval is requested (not required for modification request):
   a. Choose one:
      ☐ transfer preparation
      ☒ short-term workforce placement
      ☐ one-year workforce placement
      ☐ special need
   b. Certificate description – Which of these descriptors apply to this certificate request. More than one may apply:

☒ **Yes**	☐ **No**	local or state employer or industry specific
☒ **Yes**	☐ **No**	nationally recognized
☐ **Yes**	☒ **No**	examination or licensure preparation
☒ **Yes**	☐ **No**	apprenticeship
☒ **Yes**	☐ **No**	stackable

   c. Is completion of this certificate requested to count as a certificate of completion for WCCC degree and certificate completion metrics?
      ☒ **Yes** ☐ **No**

d. Is this certificate designed to be Title IV financial aid eligible?
☒ **Yes** ☐ **No**

e. Planned semester/year new program will begin: Fall 2019

f. Will any part of this program be provided by non-accredited vendor(s)?
☐ **Yes** (provide details below) ☒ **No**

Click or tap here to enter text.

D. Rationale for this request

List state priorities addressed by program; pertinent partnerships; coordination with citizens; business; industry; non-profit organizations; or K-12 education; if applicable:

Southeastern Wyoming has formed a Next Generation Sector Partnership (NEXTGEN) with a focus on Construction to meet the needs of Wyoming as identified in the recently released ENDOW report. NEXTGEN states that "Secondary and post-secondary educational institutions are being called to engage with industry and align their curriculum and programming in new innovative ways." In order to meet the needs of Wyoming, NEXTGEN and the ENDOW initiative, LCCC has created this program to help build a skilled workforce to support the growing infrastructure.

Discussions with industry have indicated the local workforce is unable meet the needs of industry and is expected to get worse with projects such as the Microsoft expansion and the anticipated USAF Ground Based Strategic Deterrent. LCCC has met with both union and non-union representatives that have voiced their concerns. In an attempt to assist our industry partners, we have worked collaboratively with them to design an electrical technology program that will not only help grow a skilled workforce for the region, but will offer a career that starts with a livable wage to our graduates. One of our industry partners (Encore Electric) has mentioned that there could be the possibility of an internship for our students during the summer months between their first and second years with LCCC.

Local representatives of the International Brotherhood of Electrical Workers (IBEW) met with LCCC instructors to voice their concerns over the lack of skilled workers. IBEW Local 415 provides electricians for all union shops in Southeastern Wyoming and is one of two Local Unions for the entire state of Wyoming. They have agreed to be involved in the LCCC STEM day as well as travel with LCCC instructors on school visits and recruiting events.

E. Program curriculum

1. Program description of a new or modified program:

The Electrical Technology program prepares students to construct, install, maintain, troubleshoot, and repair electrical circuits and systems. Basic knowledge, fundamental skills and industry standards will be emphasized as students learn to work in the field of electrical technology. Completion of the Industrial Systems Technology credit diploma is required for enrollment in Electrical Technology credit diploma courses.

2. Previous program description (for modification request only):

Click or tap here to enter text.

F. New curriculum

Does this program include new curriculum? ☒ **Yes** (provide details below) ☐ **No**

New program

1. List alphabetically the courses that are included in the program (include prefix, course number, course name, credit hours):

EXAMPLE:

DRON	*1010*	*Introduction to Drones*	*3 credits*
DRON	*1012*	*Drone Flying Techniques*	*2 credits*
DRON	*1020*	*Unmanned Aircraft Systems Maintenance*	*5 credits*
ENGL	*1010*	*English I: Composition*	*3 credits*
MATH	*1400*	*College Algebra*	*3 credits*
TOTAL			*16 credits*

ELTR	1516	Electrical Skills and Practices	3 Credits
ELTR	1600	National Electrical Code 1	3 Credits
ELTR	1611	Electrical Calculations	3 Credits
ELTR	1621	Electrical Conductors and Cables	3 Credits
ELTR	1631	Electrical Wiring Methods	3 Credits
ELTR	1641	Special Location Wiring Methods	3 Credits
TOTAL			18 credits

2. Previous program curriculum (for program modification request only).
   List alphabetically the courses that are included in the program (include prefix, course number, course name, credit hours):

Click or tap here to enter text.

G. New course prefixes, numbers, and descriptions

1. This program request includes courses new to Wyoming Community Colleges?
   ☒ **Yes** (if yes, complete items 1-4) ☐ **No**

2. This program would introduce a new course number new to Wyoming.
   ☒ **Yes** ☐ **No**

3. This program would introduce a course prefix new to Wyoming.
   ☐ **Yes** ☒ **No**

4. New course numbering, prefixes, course names, credit hours and LOIs have been coordinated with UW and WCCC staff:
   ☒ **Yes** ☐ **No** (coordination is required)

5. List courses new to Wyoming public higher education institutions that are included in the program (include prefix, course number, course name, credit hours, requested level of instruction (LOI of 1, 2, or 3) and course description):

EXAMPLE:

Course Prefix & Number	Course Title	Semester Credit Hour	Level of Instruction
DRON 1010	*Introduction to Drones*	*3*	*2*

Description: This course is designed to provide an introduction to the vast field of unmanned aircraft systems (drones) that are used across many industries including agriculture, civil engineering, construction, industrial, etc. This is a dynamic, emerging technology that is used for inspection, observation, security, surveillance, and progress updates in those many fields. The course provides both classroom instruction in the history of drones and how the technology is used in business and industry applications, along with lab and field experience in the basic operation of piloting drones safely and legally.

ELTR 1516 - Electrical Skills and Practices (3CH) LOI 2
Students are introduced to electrical symbols and the types of information that can be found on schematics, one-lines, and wiring diagrams. Students investigate the handling and installation of various types of lamps and lighting fixtures. Students describe specific types of incandescent, fluorescent, and HID lamps, ballasts and

various types of lighting controls. Conduit-bending and installation methods enable students to perform techniques for using hand-operated and step conduit benders. Students utilize common electrical test equipment, including voltage testers, ammeters, ohmmeters, multimeters, safety precautions and meter category ratings are investigated.

ELTR 1600 - National Electrical Code 1 (3CH) LOI 2
Students investigate electrical safety rules and regulations including precautions for electrical hazards found on the job. Students learn layout of and practice finding information within the National Electric Code using an easy-to-follow procedure. Students describes fuses and circuit breakers along with their practical applications and sizing. Students explain how to size and select circuit breakers and fuses for various applications and perform short circuit calculations.

ELTR 1611 - Electrical Calculations (3CH) LOI 2
Students explain how to calculate branch circuit and feeder loads for residential and commercial applications. Considering component installation and the National Electric Code requirements, basic service calculations for commercial and residential applications are practiced.

ELTR 1621 - Electrical Conductors and Cables (3CR) LOI 2
Students investigate the factors involved in conductor selection, including insulation types, current-carrying capacity, temperature ratings, and voltage drop. Students describe methods of terminating and splicing conductors, including preparing and taping conductors. Students focus on the purpose of grounding and bonding electrical systems covered in the National Electric Code.

ELTR 1631 - Electrical Wiring Methods (3CR) LOI 2
Students are introduced to systems, mounting hardware and applications of raceways, wireways, ducts, pull and junction boxes. Students demonstrate the selection and sizing of pull boxes and junction boxes and the applications of proper wiring techniques according to the National Electric Code requirements.

ELTR 1641 - Special Location Wiring Methods (3CH) LOI 2
Students investigate the installation of electric circuits in health care facilities, including the requirements for life safety and critical circuits. Students investigate a basic overview of HVAC systems and their controls, electrical troubleshooting and the related National Electric Code requirements.

H. Additional resources

Are additional resources needed through college or other external funds?

☒ **Yes** (provide details below) ☐ **No**

Faculty members have completed the LCCC Space Reutilization Form requesting the lab space, CT 135 (old welding bay), to be repurposed into a training facility to

better train students in our HVAC, Electrical and Plumbing programs. A one-time funding request will be made to help the College to get CT 135 cleaned and built out. Dollar amount to be determined after approval of program and completion of any bidding process.

LCCC is planning on utilizing adjunct instructors not currently on staff for the delivery of this curriculum. Instructors will work with members of industry to acquire donated equipment to help get the program operational. Our industry partners (Encore Electric) has been working with LCCC instructors to ensure that this program will meet and exceed the industry standards. Encore has also agreed to donate equipment to the program through the LCCC Foundation once the program has been approved. Also, to help us get started, Siemens is looking to donate:

- 200A fused disconnect
- One 208V 400A MCB panel with 42 - 1P 20A breakers.
- One 480V 250A MLO panel 14 KAIC with 42 – 1P 20A breakers
- One 1200A switchboard with an insulated case main breaker and some branch breakers – probably two sections
- One motor control center with 600A MLO with 4 or 5 buckets with starters, hand off auto, etc. probably one section
- One 45 KVA transformer

LCCC is requesting fees that will give the students the ability to build realistic trainers to better prepare them for industry.

I. Projected demand in Wyoming and Nation

1. List current state and national data and estimated data for ten years from proposal date (not required for modification request).

United States	**Employment**		**Percent Change**	**Job Openings**
	Year: 2016	**+10 years**		
	666,900	726,500	9%	59,600
Wyoming	**Employment**		**Percent Change**	**Job Openings**
	Year: 2018	**+10 years**		
	2,550	2,910	+14%	360

List data sources:

https://www.onetonline.org/link/summary/47-2111.00

2. State and National Wages

Location	Pay Period	Year: 2018				
		10%	25%	Median	75%	90%
United States	Hourly	$15.47	$19.38	$26.01	$34.34	$44.56
	Yearly	$32,180	$40,320	$54,110	$71,430	$92,690
Wyoming	Hourly	$16.80	$21.70	$27.63	$32.43	$38.52
	Yearly	$34.930	$45,140	$57,470	$67,440	$80,120

List data sources:

https://www.onetonline.org/link/summary/47-2111.00

3. Primary student audience identified for this program (not required for modification request).

We anticipate targeting several different groups within the community, including: local high school, recent high school graduates, incumbent workers who are currently in the electrical field and want to or are required to expand their knowledge; those that are seeking advancement opportunities; displaced workers desiring retraining; poverty-to-self-sufficiency training programs; and high school graduates who are interested in technical fields.

4. Three-year anticipated unduplicated headcount (not required for modification request).

Year One: 12
Year Two: 24
Year Three: 24

Basis for estimate:

Based on discussions with local industry, there are not enough electricians available to meet the need. For example, one company stated that they are transporting 60 electricians a day to Cheyenne from Denver to complete projects. IBEW Local 415 stated that they could have the need for up to 30 interviews for apprentice positions per year for the foreseeable future. Our anticipated

enrollment for this program for the first year is 12 students with an increase to 24 per year after that.

J. Identification of similar programs

1. List similar programs at other Wyoming community Colleges (not required for modification request).

Community College	Degree/Certificate	Number of Semester Credit Hours
CC	Electrical Apprenticeship Certificate (ELAP) Electronics Technology AAS Computer Electronics Technology Certificate Industrial Electronics Technology Certificate	40 63 30 30
CWC	Electrical Apprenticeship Certificate 1 Electrical Apprenticeship Certificate 2	26
EWC	N/A	N/A
LCCC	N/A	N/A
NWCCD	Industrial Electricity Certificate of Completion Industrial Electricity AAS Electrical Apprenticeship Certificate	35 60 24
NWC	Electrical Apprenticeship Certificate	144 hrs
WWCC	Electrical, Instrumentation, Control Technology Certificate Electrical and Instrumentation Technology, Associate of Applied Science	36.5 65

2. Summary of discussions with other Wyoming community college(s) faculty and administrators (not required for modification request).

1. Casper College

Casper College offers an Electrical Apprenticeship Certificate (ELAP) for the International Brotherhood of Electrical Workers (IBEW). It is a closed program specific to the IBEW.
Casper College also offers an Independent Electrical Contractors (IEC) Electrical Apprenticeship Certificate (ELAP) that is not a closed program. An IEC contractor already employs most ELAP students and those employees are receiving the required related instruction required by the State of Wyoming and the Department of Labor. A student not currently in an electrical apprenticeship program could take the courses offered in hope to gain entrance into an apprenticeship program.
Casper College offers an Electronics Technology A.A.S. This degree is more specific to the field of electronics.

2. Central Wyoming College (CWC) Riverton, Lander, Jackson, Dubois
Central Wyoming Community College offers an Electrical Apprenticeship Certificate 1 (ELAP comprised of 26 technical credits), and an Electrical Apprenticeship Certificate 2 including the same 26 technical credits and general education credits. The Electrical Apprenticeship Certificates are not closed programs, however most ELAP students are already employed by an IEC contractor and those employees are receiving the required related instruction required by the State of Wyoming and the Department of Labor. A student not currently in an electrical apprenticeship program could take the courses offered in hope to gain entrance into an apprenticeship program.

3. Northern Wyoming Community College District (NWCCD) Sheridan, Gillette
NWCCD offers an Electrical Apprenticeship Certificate (ELAP). The Electrical Apprenticeship Certificate is a closed program specific to employees of electrical contractors.
NWCCD also offers and Industrial Electricity A.A.S and Certificate Program with emphasis work in an Industrial setting servicing electrical equipment and wiring in the oil, mining and power generation industries.

4. Northwest College (NC) Powell
Northwest College offers an Electrical Apprenticeship Certificate (ELAP). The Electrical Apprenticeship Certificate is not a closed program, however most ELAP students are already employed by an IEC contractor and those employees are receiving the required related instruction required by the State of Wyoming and the Department of Labor. A student not currently in an electrical apprenticeship program could take the courses offered in hope to gain entrance into an apprenticeship program.

5. Western Wyoming Community College (WWCC) Rock Springs
Western Wyoming Community College offers an Electrical Apprenticeship Certificate (ELAP). The Electrical Apprenticeship Certificate is not a closed program, however most ELAP students are already employed by an IEC contractor and those employees are receiving the required related instruction required by the State of Wyoming and the Department of Labor. A student not currently in an

electrical apprenticeship program could take the courses offered in hope to gain entrance into an apprenticeship program.

In addition to the Electrical Apprenticeship Certificate, WWCC also offers an Electrical, Instrumentation, Control Technology Certificate, an Electrical Mine Maintenance Certificate, and an Electrical and Instrumentation Technology A.A.S.

K. Other program information (optional)

Additional information to assist the Commission to better understand this program request may be provided if not previously included. (Additional information related to the WCCC Statewide Strategic Plan could assist the Commission.)

The proposed Electrical Technology program at LCCC will enhance the number of qualified electricians needed to support the widening gap of qualified, skilled workers around the region. The education and training gained by students in the electrical technology program will directly support the local electrical industry while having a direct effect on businesses and residents requiring electrical operations. The current workforce in the Cheyenne region is not keeping up with demand as there are not enough qualified workers to fill the need. This program would have an immediate and long lasting benefit to the entire community.

LCCC anticipates industry input to review the electrical program of study for continuous quality program improvement much like it does with other technical programs offered by the College. Also, as part of LCCC's National Center for Construction Education & Research (NCCER) accreditation, the college will be audited every three years to ensure that we are meeting accreditation standards.

According to the Occupational Information Network (O*NET), it is estimated that a 14% increase in Wyoming's workforce will be needed to meet industry's needs for qualified electricians from 2016 to 2026. Based on conversations that LCCC has had with Cheyenne area electrical companies, it has been noted by industry that "…we are already seeing the increase locally and our current workforce is not sufficient to meet this need."
LCCC has reviewed other electrical curricula from around the United States and developed a program to best meet the needs of the local Cheyenne industry. The unified advisory group looked at several different options and agreed that a one semester, 18-credit hour program has the best opportunity to meet area requirements.

Like all programs at LCCC, a career pathway template will be developed by LCCC career coordinators who work closely with industry experts and high school counselors. The template will be a useful advising tool to help traditional and non-traditional students prepare for their degree or certificate in electrical technology. Aggressive recruiting will done through a variety methods including: (1) LCCC admissions representatives working with local area high school counselors in LCSD

1 and LCSD 2; (2) actively using counselors from the Wyoming Department of Workforce Services.

Stakeholder Input
LCCC has worked closely with local industries, the Wyoming State Government (Department of Workforce Services), the Wyoming representative for the Office of Apprenticeship and LCSD#1 to gauge the level of interest in starting a program of study in Electrical Technology. LCCC has created a Unified Advisory Board to discuss the need for a new program. (Attachment One) The consensus of the group was that “basic knowledge is needed and is very much lacking in the applicant pool.”

Recruitment & Marketing:
LCCC will utilize industry contacts from many different companies to identify and recruit students currently in the workforce who need to update their skills. Industry partners are very supportive and have committed to referring students to the college. IBEW Local 415 has verbally agreed to join LCCC instructors on school visits and other area presentations to help educated the public of the electrical career field as well as the educational opportunities offered by LCCC. Local 415 is also interested in being involved in LCCC’s STEM Day by bringing an electrical bucket truck to the campus for the students to interact with.

LCCC has worked with the Cheyenne Chamber of Commerce over the last two months to create "Short-Go" videos to help in advertising of the recent National Apprenticeship Week. Part of our plan is to work with the Chamber again in the production of program specific videos to help market new LCCC programs.

Our biggest champion for recruiting and marketing for this program has been from our newest industry partner. Encore Electric, based out of Denver, reached out to LCCC in September stressing the emergent need for an electrical training program in the region. Encore is prepared for a full court press marketing program as soon as the LCCC course of study has been approved. Encore’s Chief Marketing Officer has already been in contact with IST instructors and has gathered information that will allow her to engage with marketing outlets to advertise the program. She is planning a marketing campaign that covers electronic, mail-outs and news outlet modes of information sharing. Encore has already produced a mail-out for our recent graduates in an attempt to spread the word on the benefits of an electrical career.

Program Outcomes

Program Outcome
Plan layout and installation of electrical wiring, equipment, or fixtures, based on job specifications and local codes.

ELTR 1516 - Electrical Skills and Practices

Identify types of construction drawings.
Interpret electrical symbols.
Determine lighting fixtures for various applications
Classify lighting by type of service.
Use conduit hand bending equipment.
Make offset conduit bends.

ELTR 1600 - National Electrical Code 1
Recognize overcurrent conditions.
Identify the function of overcurrent protective devices.
Identify fuse types and markings.

ELTR 1611 - Electrical Calculations
Calculate the electric service load.
Apply demand factors.
Calculate appliance loads.
Size grounding electrodes.

ELTR 1621 - Electrical Conductors and Cables
Identify wire sizes.
Determine conductor ampacities.
Identify overcurrent protection for branch circuits and feeders.
Size grounding electrode conductors.

ELTR 1631 - Electrical Wiring Methods
Identify types of conduit applications.
Install metal conduit fittings.
Identify outlet box applications.

ELTR 1641 - Special Location Wiring Methods
Select equipment, components, and wiring methods for temporary installations.
Identify essential electrical systems used in health care facilities.

Program Outcome
Connect wires to circuit breakers or other components.

ELTR 1516 - Electrical Skills and Practices
Determine lighting fixtures for various applications
Classify lighting by type of service.
Use conduit hand bending equipment.
Make offset conduit bends.

ELTR 1600 - National Electrical Code 1
Recognize overcurrent conditions.
Identify the function of overcurrent protective devices.
Identify fuse types and markings.

ELTR 1611 - Electrical Calculations
Size grounding electrodes.

ELTR 1641 - Special Location Wiring Methods
Select equipment, components, and wiring methods for temporary installations.

Identify the grounding requirements for fixed electrical equipment.

Program Outcome
Repair or replace wiring, equipment, or fixtures, using hand tools or power tools.

ELTR 1516 - Electrical Skills and Practices
Use conduit hand bending equipment.
Make offset conduit bends.
ELTR 1621 - Electrical Conductors and Cables
Identify overcurrent protection for branch circuits and feeders.
Size grounding electrode conductors.
Install various types of connectors.
Make aluminum connections.
ELTR 1631 - Electrical Wiring Methods
Install metal conduit fittings.
Install hammer-driven pins and studs.
Install outlet boxes.
ELTR 1641 - Special Location Wiring Methods
Select equipment, components, and wiring methods for temporary installations.
Identify the grounding requirements for fixed electrical equipment.

Program Outcome
Install equipment, machines, wiring, or programs to meet specifications.

ELTR 1516 - Electrical Skills and Practices
Interpret electrical symbols.
Determine lighting fixtures for various applications
Classify lighting by type of service.

ELTR 1600 - National Electrical Code 1
Identify electrical hazards and their effects.
Identify the standards that relate to electrical safety.
ELTR 1611 - Electrical Calculations
Calculate the electric service load.
Apply demand factors.
Calculate appliance loads.
Size grounding electrodes.
ELTR 1621 - Electrical Conductors and Cables
Determine conductor ampacities.
Identify overcurrent protection for branch circuits and feeders.
Size grounding electrode conductors.
Install various types of connectors.
Make aluminum connections.
ELTR 1631 - Electrical Wiring Methods
Identify types of conduit applications.

Install metal conduit fittings.
Install hammer-driven pins and studs.
Install outlet boxes.
Identify outlet box applications.
Select and install raceway systems.

ELTR 1641 - Special Location Wiring Methods
Select equipment, components, and wiring methods for temporary installations.
Identify general wiring requirements for pools, spas, tubs, and fountains.
Identify essential electrical systems used in health care facilities.
Describe the operation and applications of hospital-grade receptacles.
Identify the receptacle requirements for critical care spaces.
Identify the grounding requirements for fixed electrical equipment.

Program Outcome
Install ground leads and connect power cables to equipment.

ELTR 1516 - Electrical Skills and Practices
Identify types of construction drawings.
Interpret electrical symbols.

ELTR 1600 - National Electrical Code 1
Identify electrical hazards and their effects.
Identify the standards that relate to electrical safety.

ELTR 1611 - Electrical Calculations
Calculate the electric service load.
Size grounding electrodes.

ELTR 1621 - Electrical Conductors and Cables
Identify overcurrent protection for branch circuits and feeders.
Size grounding electrode conductors.

ELTR 1631 - Electrical Wiring Methods
Select and install raceway systems.

ELTR 1641 - Special Location Wiring Methods
Identify general wiring requirements for pools, spas, tubs, and fountains.
Identify essential electrical systems used in health care facilities.
Identify the grounding requirements for fixed electrical equipment.

SIGNATURE PAGE

By signing below the Vice President for Academic Affairs verifies that institutional curriculum approval processes have been completed and that the Community College Board of Trustees has approved this program request as per institutional policy.

Submitted by the Vice President for Academic Affairs:

Signature	Date
	01/18/2019
Clark Harris	Vice President of Academic Affairs
Printed Name	Title

Approved by the WCCC Academic Affairs Council:

Signature	Date
Joseph E. McCann	Programs Team Leader
Printed Name	Title

Approved by the Program Review Committee:

Signature	Date
Joseph E. McCann	Programs Team Leader
Printed Name	Title