

Teri Gardner 12-6-2021



November 23, 2021

To Whom It May Concern:

NEWTech Skill Center, located in Spokane, is seeking formal recognition from the Washington State Apprenticeship and Training Council for Energy and Power Program to be a certified education-based preparation program for registered apprenticeship in the state of Washington.

In 2018, NEWTech's welding and construction programs were recognized by the WSATC board as Pre-Apprenticeship programs. As a result of our success with these programs over the last five years, our school has expanded skilled trades courses to include energy and power. Our focus is to train the future electricians of Eastern Washington.

The educator hired to instruct this course is Mark Johnson. Mark has an extensive career as a Journeyman Electrician with 23 years in the field and was a member of the IBEW Local 73, including successful completion of a 5-year apprenticeship. Mark has been a natural fit for our program and quickly began building it from the ground up. He was able to garner tool donations to begin running our program. This included a \$10,000 donation from Milwaukee Electric and \$5,000 in donations from Spokane area electric supply outlets.

This program began in the year of COVID, 2020-2021. Though the nation was delivering education online, NEWTech was able to deliver in-person instruction in small weekly cohorts that followed COVID safety guidelines. Our program ran with 69 total students. By the end of the school year, 7 students had been accepted into Eastern Washington electrical apprenticeships.

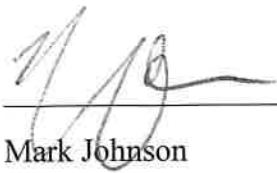
NEWTech's Energy and Power program has the support of the Eastern Washington Apprenticeship Coordinator's Council along with electrical industry partners. We hope to keep building the momentum of our program and continue to place first year electrical apprentices with the support of WSATC.

NEWTech Skill Center is requesting to be put on the agenda for the next Washington State Apprenticeship and Training Council meeting for formal recognition and approval. Enclosed is NEWTech's application packet meeting all requirements for recognition. The Energy and Power Pre-Apprenticeship Program is scheduled to begin in the 2022-2023 school year.

Please contact Suzanne Gretch, Pre-Apprenticeship and Career Coordinator, at (509) 354-4827 or at suzanneg@spokaneschools.org with any questions, concerns, and next steps of formal recognition.

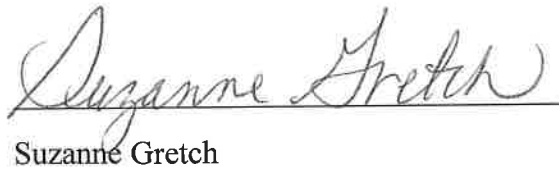
Sincerely,

NEWTECH Skill Center Pre-Apprenticeship Instructors



Mark Johnson

Energy and Power Instructor



Suzanne Gretch

Pre-Apprenticeship and Career Coordinator

Teri Gardner 12-6-2021

INLAND EMPIRE ELECTRICAL TRAINING TRUST

**3210 EAST FERRY AVENUE
SPOKANE, WA 99202
(509) 534-0922**

10/29/2021

Washington State Apprenticeship and Training Council
Attn: Program Manager, Apprenticeship Section
P.O. Box 44530
Olympia, WA 98504-4530

RE: NEWTECH Skill Center – Pre-Apprenticeship Program Recognition

Dear Mr. Robbins,

I am writing this letter in support of NEWTECH Skill Center's Energy and Power Class receiving recognition from the council as an approved pre-apprenticeship program.

The Inland Empire Electrical Training Trust has been working closely with NEWTECH to create and deliver the Energy and Power class to students since its inception 2 years ago. We have served on the advisory committee to help shape the training so that it would effectively teach high school students relevant skills that are necessary in the residential and commercial electrical industry. This included securing a \$10,000 donation in order to obtain electrical curriculum specifically designed for high school students, as well as tool and material donations for hands-on labs. We have also partnered in recruitment events to show potential students the learning opportunities they would be able to participate in, should they enroll. We have attended the classes as guest speakers to explain the tremendous opportunities for employment in the electrical industry, and have also given the classes tours of our training facility so they could see the kind of classroom and hands-on training that apprentices experience. We are happy to have welcomed 2 students from the first cohort of the Energy and Power class into our apprenticeship program, and hope to have many more join our ranks going forward.

Granting the Energy and Power class at NEWTECH status as an approved pre-apprenticeship program will enable us to continue to expand our partnership going forward, and create more opportunities for the students in those classes to pursue careers in the electrical industry. We urge you to give full consideration to this request.

Sincerely,

Jon Medaris
Training Director
Inland Empire Electrical Apprenticeship

MEMORANDUM OF UNDERSTANDING
BETWEEN
NEWTECH SKILL CENTER
AND
EASTERN WASHINGTON APPRENTICESHIP COUNCIL

I. PURPOSE

The purpose of this memorandum of understanding is to identify the roles and responsibilities and working agreements established by NEWTECH Skill Center and the Eastern Washington Apprenticeship Council and Spokane area Apprenticeship Programs. The desired outcome is to promote and provide access to apprenticeship opportunities for NEWTECH Skill Center students who successfully complete the NEWTECH Pre-Apprenticeship Program.

II. ROLES AND RESPONSIBILITIES

NEWTECH Skill Center and EWAC agree to carry out the following roles and responsibilities with the goal and accomplishment of increasing the number of students who partake in the post-secondary education option of an apprenticeship.

Roles and Responsibilities of NEWTECH Skill Center Pre-Apprenticeship Program:

1. Offer an education program that will integrate academic and vocational/technical education.
2. Offer a series of courses that will prepare students for apprenticeship entry requirements and provide students with a clear and seamless pathway to into an apprenticeship.
3. Promote, recruit and refer qualified and under-represented students (i.e., female and minority students) for entry into the Pre-Apprenticeship program.
4. Provide counseling to students and parents to increase their awareness of Washington State Apprenticeships and other post-secondary vocational/technical training as viable career options.
5. Cooperate with participating apprenticeship programs to review Pre-Apprenticeship course curriculum at least once a year to update this agreement.
6. Initiate a minimum of one co-curricular activity as agreed upon by participating apprenticeship programs.

7. Develop a tracking system so that the statistics on the number of students who complete the Pre-Apprenticeship program and successfully transition into an apprenticeship program are reported to all pertinent parties.

Roles and Responsibilities of Eastern Washington Apprenticeship Council:

1. Cooperate with NEWTECH Skill Center to review course work with instructors once a year to ensure courses offered and taught are in conjunction with the knowledge needed successfully enter an apprenticeship program.
2. Communicate information and assistance to NEWTECH Skill Center that will provide instructors and students with a clear and seamless pathway into apprenticeship opportunities.
3. Provide information to NEWTECH instructors on currently industry and safety standards.
4. Assist instructors in carrying out one co-curricular activity for students who are interested in specific apprenticeships.
5. Provide assistance to instructors to promote and advocate for high skill/high wage construction trade careers by offering tours, speakers, serving on an advisory committee, and/or participating in NEWTECH Skill Center Career Night.
6. Apply points earned in the NEWTECH Pre-Apprenticeship Program to apprenticeship applications.

III. TERMINATION

This agreement may be terminated by any of the participants upon 30 days written notice, after a suitable attempt to resolve any issues that might occur under this agreement has been made through a meeting of the represented parties.

APPRENTICESHIP PREPARATION ARTICULATION AGREEMENT

This Apprenticeship Preparation Articulation (APA) agreement is based on the mutual concern for the need of students pursuing additional training after high school in order to access High-Skilled/High Wage career opportunities. This agreement will also enable counselors at the high school level to assist the student with appropriate course selection.

The purpose of this agreement is to provide the high school student with an articulation pathway of preparation through the pre-apprenticeship program to the participating apprenticeship programs. (NOTE: Apprenticeship is an industry scholarship arrangement in which the student is "earning while learning on the job" and attending required classes for related instruction culminating in journey level, transferable credentials.)

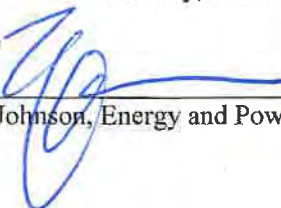
All parties to this agreement hereby agree to the following stipulations:

1. All applicants to the pre-apprenticeship program must meet minimum qualifications set forth in this document.
2. All applicants to the participating apprenticeship programs must meet the minimum qualifications set forth in the selection procedures governed by the Washington State Apprenticeship Training Council (WSATC).
3. Each signatory partner agrees to participate in the program as set forth in this document.
4. The student enrolled at the high school level will successfully complete all required pre-apprenticeship course work prior to being awarded points to be applied toward entrance into the participating apprenticeship program.
5. Advisory group representatives will meet at least one time each year to review all aspects of the Apprenticeship Preparation Articulation agreement. Revisions made upon unanimous consent of all parties to the agreement.
6. Students in the pre-apprenticeship program may appeal, in writing, to the Pre-Apprenticeship Instructors and the Construction and Energy and Power Committees, any decision by the Skill Center staff to remove them from the program within thirty (30) days following such decision. Conclusions of the Skill Center Advisory Committee with regard to such appeals are final.
7. Upon written notice to the other parties, this agreement may be terminated by any of the parties. Such terminations are specific to the notifying party and do not affect the remaining signatory parties.

Dated November 2nd, 2021


Karene Duffy, Director-NEWTECH Skills Center


Mike Ankney, NEWTECH Advisory Apprenticeship Coordinators Council Chairman


Mark Johnson, Energy and Power Instructor


Suzanne Gretch, Pre-Apprenticeship Coordinator

Jo Munn

Roofers JATC

Mark Wagon

LET DASH

Chris

NWCT - Carpenter's Training

Joe B. D.

Bricklayers local #1

Steve

Luis Licea NWLETT

John

Jon Medaris IEETT

Connie M. M. M.

Kenneth Hill CITC of WA



INLAND EMPIRE ELECTRICAL TRAINING TRUST

3210 EAST FERRY AVENUE

SPOKANE, WA 99202

(509) 534-0922

Rec 12/06/2021

AN

December 3rd, 2021

To Whom It May Concern:

This letter is to clarify and declare articulation between the Inland Empire Electrical Training Trust and NEWTech Skill Center Energy and Power Pre-Apprenticeship Program.

Since the inception of the program in the fall of 2020, we have served on the advisory committee to guide the program in choosing curriculum and outline training that will effectively prepare students to become suitable apprentice applicants upon high school graduation.

In addition to advisement on training and curriculum, our organization commits to participating with the program in the following ways:

- Guest speaking to establish direct contact with students in effort to inform and support the apprenticeship application process.
- Advise NEWTech pre-apprentice instructors on resources to help students prepare for mathematic and aptitude tests needed for entry to our training program.
- Partner with NEWTech to ensure prospective students visit the training center and meet apprenticeship instructors.

The Inland Empire Electrical Training Trust is committing 2 guaranteed apprenticeship slots per year for NEWTech Energy and Power Pre-Apprenticeship Program students. Our organization reserves the right to change the number of guaranteed slots based on labor demand and economic forecasts. Prospective apprenticeship students must also meet the basic requirements for entry into the program: acceptable scores on entrance tests, satisfy the mathematic requirement and demonstrate commitment to complete the duration of the apprenticeship with the Inland Empire Electrical.

For questions or concerns on this agreement between the Inland Empire Electrical Apprenticeship and NEWTech Skill Center Energy and Power Pre-Apprenticeship Program, please contact me or Suzanne Gretch, the Pre-Apprenticeship Coordinator at NEWTech Skill Center.

Sincerely,

Jon Medaris
Training Director
Inland Empire Electrical Apprenticeship

Rec 12/06/2021

AN

Teri Gardner 12-6-2021

December 3rd, 2021

To Whom It May Concern:

This letter is to clarify and declare articulation between the Construction Industry Training Council and NEWTech Skill Center Energy and Power Pre-Apprenticeship Program.

CITC is proud of its Commercial Inside Wireman, Residential Wireman and Low Energy/Sound & Communication Apprenticeships and commits to direct entry of NEWTECH Energy and Power Pre-Apprenticeship students into our training programs.

Furthermore, CITC currently supports NEWTech's Energy and Power Program by guest speaking to students about CITC opportunities and ensure students can visit the training center to become comfortable with their future education setting.

In committing to direct entry for NEWTech Pre-Apprenticeship students, CITC reserves the right to limit student entry based CITC's employer demand. Students must also apply within the application windows specified by CITC. Finally, prospective apprenticeship students must meet the basic requirements for entry into the program: proof of age, proof of high school diploma, mathematic requirement, submit official academic transcripts, and successfully complete of the Scheig Test.

For questions or concerns on this agreement between CITC and NEWTech Skill Center Energy and Power Pre-Apprenticeship Program, please contact me or Suzanne Gretch, the Pre-Apprenticeship Coordinator at NEWTech Skill Center.

Sincerely,



Ken Hill

Eastern Washington Apprenticeship & Facility Manager

Construction Industry Training Council of Washington-Spokane Office



Pre-Apprenticeship Desired Program Outcomes

1. Students create and complete a Pre-Apprenticeship portfolio that displaces their apprenticeship seeking materials, skill rubrics, attendance reports, certifications, awards, two letters of recommendation and evidence of completed projects.
2. Students have demonstrated proficiency of the 10 standard employability skills.
3. Students demonstrate proficiency of required math standards.
4. Students demonstrate proficiency of required electrical skills to successfully complete the NEWTech Energy and Power Program.
5. Students have identified and successfully applied to an apprenticeship program in the state of Washington within 12 months after leaving the NEWTech Skill Center Energy and Power Pre-Apprenticeship Program.



NEWTECH Pre-Apprenticeship Student Expectations

	Complete all required course work.
	Maintain 90% attendance in Pre-Apprenticeship courses, with no unexcused absences.
	Pass all performance evaluations, both written and practical.
	Complete apprenticeship workshops and/or job shadow.
	Maintain a reliable means of transportation.
	Develop and maintain a portfolio that includes job application, resume, cover letter, obtained skills at proficient level, certifications, awards, letters of recommendation, and other relevant documents including evidence of work.
	Make formal application to participate in an apprenticeship program within 12 months of completing high school.

Teri Gardner 12-6-2021

NEWTech Skill Center Energy and Power

Syllabus for 2021/2022

Class: Energy and Power

Instructor: Mark Johnson

Email: markjo@spokaneschools.org

Purpose of class: To prepare students for the rigors of apprenticeship and a career in the field of energy and power.

Days/ location: Class meets daily in room 124/126 at NEWTech Skills Center, Spokane, WA

Dress code: Students are expected to wear in their school uniform, closed toe, workstyle boots or shoes (no flip flops, sandals, high heels etc.). Students are expected to have in their possession at all times required personal protective equipment (PPE). PPE includes safety glasses, gloves, denim jeans (no slacks, shorts or skirts) with no rips or tears.

Course objective:

The objective of this course is to prepare prospective students for a future career in the electrical industry including, but not limited to the rigors of apprenticeship.

Grading and Attendance Grading:

1. The grade in Energy and Power is determined by the total number of points earned, divided by the total possible points.
2. All students get the same number of possible points.
3. The points accumulated are up to the student. Each student has the possibility of getting 100% of the possible points.
4. The percentage of points received determines the student's grade. The NEWTECH grading scale will be used for all grades. It is:
 - 92-100%= A
 - 83- 91% = B
 - 74- 82% = C
 - 66- 73% = D
 - Below 66%=F
5. Students will be graded on attendance, written assignments, and lab work.

Attendance:

Good attendance is vital to success in this program just as it will be in your career. Attendance is 33% of your grade. If you cannot attend class, please email me at markjo@spokaneschools.com.

Procedure for unacceptable classroom and jobsite behavior:

- 1st offense: Verbal warning and written warning
- 2nd offense: Instructor conference with student, professional behavior contract
- 3rd offense: Parent/Guardian/Mentor contact
- 4th offense: Conference with Assistant Director of Skills Center
- 5th offense: Dismissal from the program

Participation:

Students are expected to participate in class. Participation is defined as:

1. Being present, in-uniform, with all required PPE. If a student is not in class, he/she/they MUST email the instructor, and communicate as to why the student is absent. No call-No show will result in losing all daily points for that day.
2. Pajamas, robes, or non-work clothing attire will result in the student receiving a zero for the day.
3. Students are required to complete assigned hands-on tasks, participate in class discussions, and complete the stated entry task daily.

Guest Speakers:

The Pre-Apprenticeship program takes advantage of guest speakers to enhance our career-centered curriculum. It is expected that student behavior will be courteous and respectful whenever guests are present. Students will be required to provide feedback on each speaker.

Required PPE and Class Materials:

Students will be required to provide 1 2020 Uglys Electrical Reference book by George v. Hart (Home Depot, Barnes and Noble, Amazon), a pair of safety glasses (side shields for prescription glasses will be acceptable), which must be worn at all times in the lab environment, a pair of form fitting hy-flex cut resistant gloves, leather work type shoes, a folding pocket knife, a spiral notebook, a pack of #2 pencils, construction pencils, NEWTech uniform, and non-ripped work style jeans.

Electrical Subjects Covered in Class:

1. Safety and OSHA Regulations
2. Introduction to Hand and Power Tools
3. Mathematics for Trades People
4. Basic Electrical theory and Ohms Law
5. Electrical Materials
6. National Electrical Code
7. Washington Administrative Code (WAC)
8. Basic Residential Electrical Installation
9. Basic Commercial Electrical Installation
10. Power Generation and Transmission
11. Electrical Distribution
12. Employability Skills

I have read the course syllabus for Power and Energy, and I understand the level of commitment needed to make myself successful, and employable. I know I can succeed in this class and commit to doing my best work.

Pre-Apprenticeship Member Signature

Date

Parent Signature

Date



Pre-Apprenticeship/Career Connected Learning Course- Spokane Chapter

NEWTECH Skilled Trades

2021-2022

Course Syllabus

Course Description:

The purpose of the Pre-Apprenticeship Professionalism Course is to assist students in exploring apprenticeship career opportunities, teach students employability skills, and to encourage post-secondary training upon completion of high school graduation.

Course Objective:

The objective of the Pre-Apprenticeship Program is for students to master 10 core employability skills. The skills fall under six categories: Career Development, Job Attainment, Job Survival, Leadership and Self-Development. Once students have shown appropriate gains in the 10 skills, they will have garnered the necessary knowledge and skills to pursue gainful employment, enter post-secondary education, or an apprenticeship.

Students are expected to:

- Conduct themselves as they would on a job.
- Be respectful to themselves and to others.
- Be prepared to class and all activities required by the course.
- Participate in the classroom:
 - Complete class assignments
 - Attend class with punctuality and reliability
 - Respect their peers, instructors, and guest speakers

Grading Scale:

1. You will be graded based on your completion of the skill assignments, class participation and your attendance to class meetings.

Exceeds Expectations (A) 90-100%

Proficient- (B) 80-89%

Partially Proficient- (C) 70-79%

Insufficient (D) 60-69%

No Credit (F) 59%-0



You may redo any skill assignment to achieve the highest level of achievement possible. However, this may be done before the deadline specified by your Career Specialist. If you miss the deadline, you may not re-submit your work.

Procedure for unacceptable classroom and jobsite behavior:

- 1st offense: Verbal warning and written warning
- 2nd offense: Instructor conference with student, professional behavior contract
- 3rd offense: Parent/Guardian/Mentor contact
- 4th offense: Conference with Assistant Director of Skills Center
- 5th offense: Dismissal from the program

General Course Requirements:

Attendance: Class attendance is necessary for your success in this course. It is also necessary for the program's success. The Pre-Apprenticeship Program is a learning community that is designed for "**Organizational Success,**" in addition to "**Individual Success.**"

- **Organizational Success** is defined as your ability to work and communicate with one another to ensure the project house comes to completion on or before the deadline for project completion.
- **Individual Success** is defined as your ability to demonstrate proficiency in the 10 core skills, a passing grade in the course, and placement in a post-secondary program.

You will receive a participation grade for attending weekly class meetings and being on-time the meetings. These points will be added to your total point accumulation toward completion of the course. **If you do not attend class, you will not receive credit.**

Participation: Students are expected to participate in class. Participation is defined as:

-Completing assignments that pertain to the 10 core skills. During the meetings, Pre-Apprenticeship students will be sharing ideas, completing tasks to ensure success, and supporting your fellow Pre-Apprenticeship members.

Guest Speakers: The Pre-Apprenticeship program takes advantage of guest speakers to enhance our career-centered curriculum. It is expected that student behavior will be courteous and respectful whenever guests are present. Students will be required to provide feedback on each speaker.



NEWTECH SKILL CENTER PRE-APPRENTICESHIP EMPLOYABILITY SKILLS

1. Complete a job/apprenticeship application and accompanying employment tests.
2. Design a personal resume applicable to desired apprenticeship and/or employer.
3. Write a cover letter for a desired position/apprenticeship.
4. Demonstrate job interviewing skills.
5. Dress appropriately for a job interview.
6. Determine apprenticeship and/or employer expectations.
7. Demonstrate the ability to work cooperatively with others.
8. Demonstrate effective decision making, problem solving, and conflict resolution.
9. Demonstrate leadership, positive attitudes, responsibility, and work ethics behaviors.
10. Demonstrate effective money management.



Professionalism Grade per class period:

In addition to your skill assignments, you will receive a professionalism grade. Here are the daily grades you will receive:

- Uniform-students wear their nametag, NEWTECH Pre-Apprenticeship Program shirt, long pants, work boots or appropriate footwear.
- Masks are required for safety.
- Clock in and out- students must clock in for class and clock out at their specified time.
- Professional Behavior- students are expected to listen, follow directions, ask questions for clarification, and speak respectfully to instructors and peers.
- **No professional grade is given for unexcused absences.**



NEWTech Skill Center Pre-Apprenticeship Energy and Power Program Certifications

1. OSHA 10 – Safety Certification and Training
2. CPR/First Aid/AED Certification
3. Forklift Certification
4. The Interim Credentials Program- Implemented 2022-2023
 - This credential is designed for advanced placement into any of the 270 IBEW/NECA Electrical Training Centers across the United States.
 - Once the student completes the mastery of the Interim Credentials Program, along with graduation from high school, they can present the completion certificate to the local IBEW.
 - *Upon selection, student can qualify for advanced placement directly into the 2nd academic year of the 5-year electrical apprenticeship.
 - ****Final entry into an IBEW/NECA apprenticeship program is dependent on the results of the selection process.***



NEWTech Skill Center Energy and Power Pre-Apprenticeship Program:

Example of Student Work Using Ohm's Law

Washington State Math Standards used when teaching and using Ohm's Law:

3. Cluster: Reason quantitatively and use units to solve problems.

- N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
- N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

4. Cluster: Create equations that describe numbers or relationships.

- A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.
- A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

5. Cluster: Understand solving equations as a process of reasoning and explain the reasoning.

- A.REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- A.REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.



7. **Cluster: Solve systems of equations.**

- A.REI.C.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- A.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- A.REI.C.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.
- A.REI.C.8 Represent a system of linear equations as a single matrix equation in a vector variable.
- A.REI.C.9 Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

25/80

Electrcial quiz 11/2021

1) what are the two main characteristics of a series circuit?

- Current has one path to take
- Amperage is the same throughout the circuit

2) What are the two main characteristics of a parallel circuit?

- Current has multiple paths to take
- Voltage stays the same throughout the circuit. Voltage stays the same!

3) What is NEC art 110 about?

Requirements for electrical installations

4) what is meant by mechanical execution of work? NEC art 110.12

installing equipment in a neat and workmanlike manner

5) how should a high leg be marked? NEC ART: 110.15

only the conductor or bus bar having the higher phase voltage shall be marked with an orange outer finish.

6) how should a disconnect be identified? NEC ART: 110.22

It shall be legibly marked to indicate its purpose.

7) if you are installing an electrical panel that is rated for up to 600V, how much working clearance is required? NEC ART: 110.26

3 feet

Denine these terms:

9) Grounded conductor

a system or circuit that is intentionally grounded; Neutral
Also known as neutral

10) workman like manner

Installing equipment in a neat and professional way.

11) switched leg

the wire that goes from the switch to one or more light fixtures close!

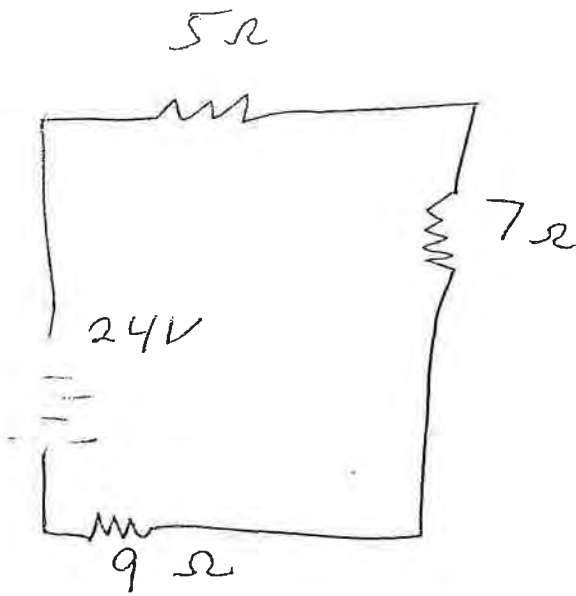
12) traveller

terminals on 3-way and 4-way switches used to communicate between other switches. Either brass or pink and purple close!

13) equipment grounding conductor

a current carrying conductor that grounds equipment.

$$R_T = 21 \Omega$$



$$I_T = 1.143 \text{ amps}$$

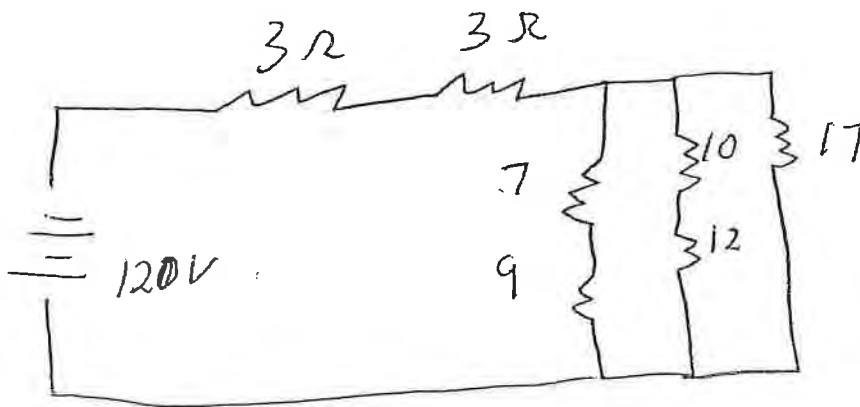
$$P_T = 27.432 \text{ watts}$$

$$E_1 = 5.715 \text{ V}$$

$$E_2 = 8.001 \text{ V}$$

$$E_3 = 10.287$$

Good Job!



$$I_T = 10.003 \text{ Amps}$$

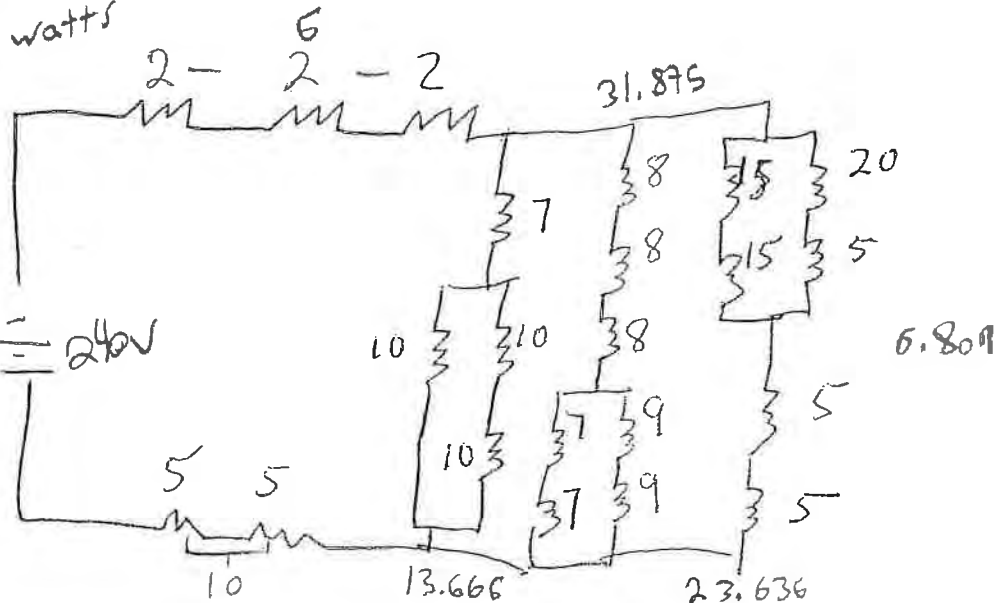
$$R_T = 11.996 \Omega$$

$$P_T = 1200.36 \text{ watts}$$

$$R_T = 22.809 \Omega$$

$$P_T = 2525.28 \text{ watts}$$

$$I = 10.522 \text{ Amps}$$





NEWTECH Pre-Apprenticeship Energy and Power Yr. 1 & Yr. 2:
Washington State Math Standards

1. Cluster: Extend the properties of exponents to rational exponents.

- N.RN.A.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
- N.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

2. Cluster: Use properties of rational and irrational numbers.

- N.RN.B.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

3. Cluster: Reason quantitatively and use units to solve problems.

- N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
- N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

4. Cluster: Create equations that describe numbers or relationships.

- A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.



- A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

5. Cluster: Understand solving equations as a process of reasoning and explain the reasoning.

- A.REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- A.REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

6. Cluster: Solve equations and inequalities in one variable.

- A.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- A.REI.B.4 Solve quadratic equations in one variable.
 - 4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
 - 4b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .



7. Cluster: Solve systems of equations.

- A.REI.C.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- A.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- A.REI.C.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.
- A.REI.C.8 Represent a system of linear equations as a single matrix equation in a vector variable.
- A.REI.C.9 Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

8. Cluster: Experiment with transformations in the plane.

- G.CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
- G.CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
- G.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
- G.CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.



- G.CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

9. **Cluster: Understand congruence in terms of rigid motions.**

- G.CO.B.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
- G.CO.B.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- G.CO.B.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

10. **Cluster: Prove geometric theorems.**

- G.CO.C.9 Prove theorems about lines and angles.
- G.CO.C.10 Prove theorems about triangles.
- G.CO.C.11 Prove theorems about parallelograms.

11. **Cluster: Make geometric constructions.**

- G.CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).
- G.CO.D.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.



12. Cluster: Understand similarity in terms of similarity transformations

- G.SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor:
 - 1a A dilation takes a line not passing through the center of the dilation to a parallel line and leaves a line passing through the center unchanged.
 - 1b The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
- G.SRT.A.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
- G.SRT.A.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

13. Cluster: Prove theorems involving similarity

- G.SRT.B.4 Prove theorems about triangles.
- G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

14. Cluster: Define trigonometric ratios and solve problems involving right triangles

- G.SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- G.SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles.
- G.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.



15. **Cluster: Apply trigonometry to general triangles**

- G.SRT.D.9 Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
- G.SRT.D.10 Prove the Laws of Sines and Cosines and use them to solve problems.
- G.SRT.D.11 Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

16. **Cluster: Understand and apply theorems about circles**

- G.C.A.1 Prove that all circles are similar.
- G.C.A.2 Identify and describe relationships among inscribed angles, radii, and chords.
- G.C.A.3 Construct the inscribed and circumscribed circles of a triangle and prove properties of angles for a quadrilateral inscribed in a circle.
- G.C.A.4 Construct a tangent line from a point outside a given circle to the circle.

17. **Cluster: Find arc lengths and areas of sectors of circles**

- G.C.A.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

18. **Cluster: Translate between the geometric description and the equation for a conic section**

- G.GPE.A.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.



- G.GPE.A.2 Derive the equation of a parabola given a focus and directrix.
- G.GPE.A.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

19. **Cluster: Use coordinates to prove simple geometric theorems algebraically**

- G.GPE.B.4 Use coordinates to prove simple geometric theorems algebraically.
- G.GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- G.GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
- G.GPE.B.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

20. **Cluster: Explain volume formulas and use them to solve problems**

- G.GMD.A/1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.
- G.GMD.A.2 Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
- G.GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.



21. Cluster: Visualize relationships between two-dimensional and three-dimensional objects

- G.GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

22. Cluster: Apply geometric concepts in modeling situations

- G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
- G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).



NEWTech Skill Center Energy and Power Pre-Apprenticeship

Physical Fitness

To address the physical fitness standard of the Energy and Power Pre-Apprenticeship, students:

- Have access and are encouraged to use NEWTech's gym. The equipment students have access to are exercise bikes, weights and kettle bells, and the opportunity to run the mile under the supervision of a NEWTech instructor who is certified to teach physical education.
- Students are required to dig ditches twice a year in anticipation of field work within their future apprenticeship. (See attached photos)
- Students are required to work in the lab every class period. This requires students to lift and move materials without injury.
- Students perform physical work in conjunction with the Construction Technology Pre-Apprenticeship program at an outside project house jobsite to prepare the house for electrical installation.









Teri Gardner 12-6-2021

NEWTECH SKILL CENTER: RECRUITMENT AND RETENTION PROGRAM

RECRUITMENT:

NEWTECH Skilled Trades Programs offers Pre-Apprenticeship opportunities to all to students who are pursuing learning with purpose and are interested in exploring apprenticeship as a post-secondary educational option.

NEWTECH's goal is to successfully propel students into post-secondary apprenticeships by providing a hands-on environment, building a solid skill foundation for the apprenticeship they are seeking, and coach students to acquire employability skills that will help them complete their chosen apprenticeship successfully.

The NEWTECH yearly recruitment process includes:

1. **Welcome Wednesdays:** NEWTECH uses social media and counselors to advertise the opportunity for prospective students to spend a day at NEWTECH experiencing the class, learning about the tools, meet the instructors and gaining a full understanding of "a day in the life as a NEWTECH Pre-Apprenticeship Student."
2. **Student Ambassador Program:** Students enrolled in our current skilled trades programs travel to area high schools and speak to English and Social Studies classes. Students talk about their experience at NEWTECH, the benefits of attending NEWTECH and invite students to learn more by participating in Welcome Wednesday or Career Night.
3. **Career Night:** Prospective students and parents are invited to participate in an evening event to visit the skilled trades programs, meet the instructors and participate in a hands-on project to gain insight into the course.



4. **Skilled Trades Fairs:** NEWTECH skilled trades programs hold their own skilled trades fair with area apprenticeships and industry partners giving prospective students the opportunity to interact with employers who are part of our internship and employment program.
5. **8th Grade Career Showcase:** This an exploratory event is specifically for younger future students interested in a career in the trades to participate in a fun day interacting and performing hands-on activities with area apprenticeships.
6. **Women in the Trades:** In the school year of 2021-2022, NEWTECH has the highest rate of female participation than ever in the history of our skilled trades programs. To support our female students, we are exposing them current positive tradeswomen in our area apprenticeships in sharing their success stories and the benefits of working in the trades as a woman. In addition, we have selected them as part of our Student Ambassador program to support and encourage prospective female students from our area high schools.
7. **Socio-Economic Variant:** The lab fees for the NEWTECH skilled trades programs are low, though we are still aware of students who need financial assistance. Our programs have extensive financial support from our area industry partners. We use this financial assistance to help students purchase uniforms, work boots, and work pants. We also use financial assistance to pay for program certifications, drivers licenses and identification documents. This is the ensure that no student faces employment barriers due to financial need.



RETAINMENT:

NEWTECH Skill Center is focused on students' long term career goals. The NEWTECH Pre-Apprenticeship Program has a support apparatus in place that assists students through the rigors of the program, until the end when the student applies for the apprenticeship of their choice. The support structure and learning opportunities include:

- Academic accommodations for students who qualify delivered via education technology, differentiated instruction, and extra academic support staff.
- Parent, counselor(s) and instructor cooperation to support student through social, emotional, and/or academic difficulties.
- Extensive and intense employability training.
- Job shadow and internship opportunities.
- Industry certifications offered and paid for by the program.
- Opportunities to interact with apprenticeship multiple times throughout the school year.
- Support through the apprenticeship application process.

Demographics of Intended Program Participants:

NEWTech's target program participant is:

- 10th graders moving onto 11th grade who are in good academic standing. Students must be considered true 11th graders in terms of graduating credits.
- Program goal of enrollment of a 20% female population.
- Program goal of enrollment of 20% non-traditional population in terms of ethnic diversification.
- Students who can show genuine interest in the post-secondary pathway of becoming an Electrician Apprentice.