Syracuse City School District
Career and Technical Education Program
Electrical Trades Pathway
Summary Overview

Program Overview

The Electrical Trades Program is a four-year pathway designed to teach students the fundamentals of electricity theory, wiring methods and materials, national and local electrical codes, and print layout, the use of tools and electrical test equipment, the basics of electrical wiring and electrical construction according to the National Electric Code, OSHA 10 Construction Safety certification, and career ready workplace skills. Successful students will have the necessary experience to install receptacles, switches, lighting, and service entrance conductors and work with motors, generators and meters. In the classroom, students will learn both basic electrical theory and get practical hands-on experience, including completing a work-based internship in a local business. Throughout the program students will work both individually and as part of a team to complete assignments and projects. Safety will be given the highest priority at all times as students are working in the classroom. Upon successful completion of the Electrical Trades Program students will be able to obtain entry-level jobs in residential and commercial wiring. Students will also be prepared to continue training and education through post-secondary electrical technology programs at the college level or through private or electrical union apprenticeship programs.

Calendar for Pathway

ELT 100 9th Grade			
1	**2**	**3**	**4**
• Orientation to Electrical Trades Program • Triangle of Success • Career Exploration • Work-Based Learning: Career Coaching • Electrical Safety	• Electrical Safety (Cont.) • Electrical Mathematical Fundamentals • Work-Based Learning: Career Coaching • Power Tools and Safety	• Power Tools and Safety (Cont.) • Work-Based Learning: Career Coaching • Hand Tools and Safety	• Electrical Materials: Identification and Uses • Renewable and Alternative Energy Sources: Solar Energy • Work-Based Learning: Career Coaching, Field Trip • Final Examination
ELT 200 10th Grade			
1	**2**	**3**	**4**

• Expectations of Electrical Trades Program
• Triangle of Success
• Career and Communication Skills
• Electrical Fundamentals:
  ○ Shop Safety
  ○ Power and Specialized Tools
• Electrical Energy Fundamentals
	• Print Reading and Specifications
	• Installation of Switch and Receptacle Boxes
	• Residential Electrical Installation:
	  ○ Wiring Systems
	  ○ Raceways
	  ○ Conductors
	• Work-Based Learning: Career Coaching
		• Residential Electrical Installation:
		  ○ Box Installation
		  ○ Fastening Devices
		  ○ Device Wiring
		• Residential Electrical Service and Distribution Theory
		• Residential Electrical Installation:
		  ○ Service Entrance
		  ○ Load Centers
		• Work-Based Learning: Career Coaching
			• Residential Electrical Installation:
			  ○ Overcurrent Protection
			  ○ Grounding
			• Renewable and Alternative Energy Sources: Hydro/Tidal Energy
			• Work-Based Learning: Career Coaching, Field Trip
			• Review and Final Examination

ELT 300 11th Grade			
1	**2**	**3**	**4**

• Expectations of Electrical Trades Program
• Triangle of Success
• Career and Communication Skills
• Electrical Fundamentals:
  ○ Shop Safety
  ○ Power and Specialized Tools
• Electrical Energy and Mathematics Fundamentals
• Work-Based Learning: Career Coaching
	• Electrical Energy and Mathematics Fundamentals (Cont.)
	• Print Reading, Specifications and Codes
	• Residential Electrical Installation:
	  ○ Service Entrance
	  ○ Load Centers
	  ○ Transformers
	  ○ Conductors and Cables
	• Work-Based Learning: Career Coaching, Job Shadow
		• Residential Electrical Installation:
		  ○ Conduit, Raceways, Boxes, Fittings and Covers,
		  ○ Device Wiring
		  ○ Lighting Systems
		  ○ Appliance Wiring and Special Outlets
		• Work-Based Learning: Career Coaching
			• Residential Electrical Installation:
			  ○ Overcurrent Protection
			  ○ Grounding
			  ○ Design and Installation
			• OSHA Instruction
			• Renewable and Alternative Energy Sources: Wind Energy
			• Work-Based Learning: Career Coaching, Field Trip
			• Review and Final Examination

ELT 400 12th Grade			
1	**2**	**3**	**4**

• Expectations of Electrical Trades Program
• Triangle of Success
• Career and Communication Skills
• Electrical Fundamentals:
  ○ Shop Safety
  ○ Power and Specialized Tools
  ○ OSHA Certification
• Commercial Electrical Print Specifications and Codes
• Work-Based Learning: Career Coaching
	• Commercial Wiring Methods, Materials and Installation:
	  ○ Boxes and Conduit Bodies/Condulets
	  ○ Overcurrent Protection
	  ○ Service Distribution
	  ○ Transformers
	  ○ Branch Circuits and Feeders
	• Work-Based Learning: Career Coaching, Job Shadow
		• Electrical Motors Installation
		• Structured Wiring: Low Voltage Cabling
		• Renewable and Alternative Energy Sources: Nuclear Energy
		• Work-Based Learning: Career Coaching, Field Trip
			• Review of Triangle of Success
			• Work Based Learning: Internships
			• Review of All Electrical Trades Installation, Maintenance and Repair
			• Pre-Employment Exam for IBEW
			• Final Assessments

Syracuse City School District
Career and Technical Education Program
Course Syllabus
ELT100: Electrical Trades 100

Program Overview

The Electrical Trades Program is a four-year pathway designed to teach students the fundamentals of electricity theory, wiring methods and materials, national and local electrical codes, and print layout, the use of tools and electrical test equipment, the basics of electrical wiring and electrical construction according to the National Electric Code, OSHA 10 Construction Safety certification, and career ready workplace skills. Successful students will have the necessary experience to install receptacles, switches, lighting, and service entrance conductors and work with motors, generators and meters. In the classroom, students will learn both basic electrical theory and get practical hands-on experience, including completing a work-based internship in a local business. Throughout the program students will work both individually and as part of a team to complete assignments and projects. Safety will be given the highest priority at all times as students are working in the classroom. Upon successful completion of the Electrical Trades Program students will be able to obtain entry-level jobs in residential and commercial wiring. Students will also be prepared to continue training and education through post-secondary electrical technology programs at the college level or through private or electrical union apprenticeship programs.

Course Description

Electrical Trades 100 is an introductory course designed to give students a general overview of the Electrical Industry. This class is a pre-requisite for Electrical Trades 200, 300 and 400. The course includes an introduction to career opportunities, basic workplace safety, and an introduction to the tools and materials in the electrical trades.

Work-Based Learning

Students will be connected with electrical trades professionals in the community through Career Coaching, field trips and job shadowing which could lead to further opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their work-based learning experiences throughout the program to document the development of their skills.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the projects that they are involved in. Some examples for this pathway include, but are not limited to:
    - OSHA 10 Construction Safety Certification
    - NABTU (North America's Building Trades Unions) Multi-Craft Core Curriculum (MC3)
    - Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.
- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other pathways and programs.

Pre-Requisites

N/A

Course Objectives

1. Students will know the different types of jobs available in the electrical field.
2. Students will know the importance and seriousness of safety when working with electricity.
3. Students will have a foundational knowledge of electrical hand and power tools and their uses.
4. Students will have a foundational knowledge of electrical materials and their purposes.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Complete set of electrical hand tools, power tools, and personal protective equipment.
- **Student will provide:** work boots or safety shoes

Textbook

Henke-Konopasek, Nancy and Harvey N. Holzman. *Modern Residential Wiring, 10th Edition*. Tinley Park, IL: Goodhear-Wilcox Company, Inc., 2015. (Workbook)

Holzman, Harvey N. *Modern Residential Wiring, 10th Edition*. Tinely Park, IL: Goddheart-Willcox Co., Inc., 2015. (Textbook)

Grading

20% Quizzes/Projects
10% Homework
50% Weekly Participation
20% Tests

Additional Course Policies

Student attendance is very important due to the mandatory hours required for the national assessment. The absentee policy is strictly enforced.

Course Calendar

Quarter	Units of Study
1	• Orientation to Electrical Trades Program • Triangle of Success • Career Exploration • Work-Based Learning: Career Coaching • Electrical Safety
2	• Electrical Safety (Cont.) • Electrical Mathematical Fundamentals • Work-Based Learning: Career Coaching • Power Tools and Safety
3	• Power Tools and Safety (Cont.) • Work-Based Learning: Career Coaching • Hand Tools and Safety
4	• Electrical Materials: Identification and Uses • Renewable and Alternative Energy Sources: Solar Energy • Work-Based Learning: Career Coaching, Field Trip • Final Examination

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
ELT100: Electrical Trades 100

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-4 **Orientation to Electrical Trades Program** **Triangle of Success**	• What are the expectations of the Electrical Trades program? • What are the three ingredients for success represented by the Triangle of Success? • How are these three ingredients for success acquired and developed? • How do the three ingredients interact to help an individual achieve success? • What personal qualities do electrical trades professionals need to possess? • How can these personal qualities be assessed and developed?	• Describe the expectations of the Electrical Trades program. • Explain and follow classroom procedures. • Explain the three ingredients for success represented by the Triangle of Success. • Explain how each of the three ingredients for success is acquired and developed. • Explain how the three ingredients interact to help an individual achieve success. • Explain how the Knowledge, Skills, and Attitude of the Triangle of Success apply to success in Electrical Trades 100. • Identify and describe personal characteristics needed for electrical trades professionals. • Identify and create a profile of personal qualities to be developed during the Electrical Trades program.	**Written** • Daily, Weekly and Quarterly Assignments • Quizzes • Self-Assessment: Personal Attributes • Rubric: Personal Qualities to Be Developed **Performance** • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,10 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 6 AC-DES 2,5	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 5-8 **Career Exploration** **Work-Based Learning: Career Coaching**	• What are some of the career paths within the electrical industry? • What skills are needed for a successful electrical trades career? • How much education is needed to pursue various careers in electrical trades? • What types of license or certifications are required to gain employment in the electrical trades field? • What is the role of the electrical trades professional in the industry? • What are the steps to finding an electrical trades-related job?	• Research the career pathways in the electrical industry. • List the factors to be considered when developing personal career goals. • Identify and research the different career opportunities that are available under the umbrella of electrical trades. • Describe different types of skills needed for a successful electrical trades career. • List electrical trades jobs available at various educational levels. • Explain the role and duties of an electrical trades professional. • Describe the components of a successful job application process. • Set up an online professional portfolio with a resume. • List actions needed to advance in a career.	**Written** • Daily, Weekly and Quarterly Assignments • Quizzes • Portfolio Design and Set-Up • Career Coaching Self-Assessment **Performance** • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,10 **Cluster Standards** AC 1,5,7 **Pathway Standards** AC-CST 6 AC-DES 2,5	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	• What behaviors does an employee need to advance in a career? • Why are successful job-seeking skills required in a competitive marketplace? • How does an electrical trades professional convey professionalism in the workplace? • What can be learned from electrical industry professionals?	• Explain the importance of professionalism and ethics in the workplace. • Explain the importance of being prompt, being able to take directions and being motivated to accomplish assigned tasks. • Participate in Career Coaching process.			
Weeks 9-12 **Electrical Safety**	• Why is safety important in the electrical industry? • What do electrical trades students need to know to keep themselves and others safe in the shop? • What Personal Protective Equipment (PPE) is used by electricians? • What should be done to treat electrical shock? • What organizations create the rules and regulations for the electrical industry?	• List rules for general classroom and shop safety. • Explain and follow basic classroom safety rules and procedures. • Identify and demonstrate proper use of required PPE • Explain a lockout/tagout/blockout program. • Understand the effects of electrical shock. • Describe conditions likely to affect severity of electrical shock. • Describe steps for helping a shock victim. • Explain OSHA safety requirements for working in the electrical industry. • Explain the importance of the rules, regulations, and criteria for the installation of electrical equipment of National Electrical Code.	**Written** • Daily, Weekly and Quarterly Assignments • Research Project on Five Sources of Energy • Quizzes • Written Exam on OSHA Safety Regulations • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on PPE	**Career Ready Practices** CRP 1,2,3,4,8,9,10,12 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,6	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 13-17 **Electrical Mathematical Fundamentals** **Work-Based Learning: Career Coaching**	• How is mathematics used in the electrical industry? • What algebraic equations are needed to complete electrical tasks? • What can be learned from electrical industry professionals?	• Identify the practical applications of math in the electrical industry. • Demonstrate problem-solving techniques involving whole numbers, fractions, and decimals, using addition, subtraction, multiplication, and division. • Demonstrate techniques for converting fractions to decimals and decimals to fractions. • Calculate percentage and convert fractions to percentages. • Calculate circle area and circumference and rectangle area and perimeter.	**Written** • Assignment on Ohm's Law, Watt's Law, Mathematical Formulas and Electrical Mathematical Formulas • Quizzes and Tests • Written Exam on Mathematical Fundamentals (Given pre and post to check students' math levels.) • Portfolio Update • Career Coaching Self-Assessment	**Career Ready Practice** CRP 2,4,8 **Cluster Standards** AC 1 **Pathway Standards** AC-CST 5,8,9 AC-DES 8 AC-MO 3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Identify formulas used regularly in the electrical industry including Ohm's law and the basic power formula. • Participate in Career Coaching process.	**Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist		
Weeks 18-26 **Power Tools and Safety** **Work-Based Learning: Career Coaching**	• What power tools are used in the electrical trades? • Where is information on the safe use of power tools found? • What are the basic safety procedures for using power tools? • Why is it important to use the correct tool for the application? • What should be done with damaged or broken power tools? • What can be learned from electrical industry professionals?	• Identify various power tools and their uses for cutting and drilling. • Identify where to find safety information for power tools. • Select essential power tools for residential wiring. • Use electrical power tools safely and efficiently. • Explain procedures for damaged or broken tools. • Participate in Career Coaching process.	**Written** • Assignment on Quality of Tools • Quizzes and Tests • Written Exam on Power Tools and Safety Procedures • Portfolio Update • Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Power Tools and Safety Procedures (Both written and practical assessments must be passed before student can go into work stations.)	**Career Ready Practice** CRP 1,2,3,4,8 **Cluster Standards** AC 1,2,3 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 8 AC-MO 1,2,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 27-30 **Hand Tools and Safety**	• What hand tools are used in the electrical trades? • What is the most important thing to look for when purchasing electrical hand tools? • What are the basic safety procedures for using hand tools?	• Identify basic electrical hand tools and their uses for measuring and working with wire and conduit. • Identify considerations of quality and function when purchasing electrical hand tools. • Select essential hand tools for residential wiring. • Use hand tools safely and efficiently.	**Written** • Assignment on Quality of Tools • Quizzes and Tests • Written Exam on Hand Tools and Safety Procedures • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Hand Tools and Safety Procedures (Both written and practical assessments must be passed before student can go into work stations.)	**Career Ready Practice** CRP 1,2,3,8 **Cluster Standards** AC 1,2,3 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 8 AC-MO 1,2,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 31-35 **Electrical Materials: Identification and Uses**	• What types of materials are used in residential and commercial wiring?	• Identify the types of materials used in residential and commercial wiring. • Describe the differences between residential and commercial electrical materials. • List the different conductor systems used in residential and light commercial wiring. • Identify different types of raceway systems. • Describe the different materials used for conductors. • Describe the four types of boxes and box mounting systems. • Describe connectors that fasten wiring to boxes. • List and describe electrical circuit overcurrent protective devices (OCPDs).	**Written** • Assignments • Quizzes • Written Exam on Uses of Electrical Materials • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Identification and Differentiation of Commercial and Residential Materials • Visual Exam on Materials Identification	**Career Ready Practice** CRP 1,2,8 **Cluster Standards** AC 1,2,3 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 4,8 AC-MO 3,4,5	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 36-39 **Renewable and Alternative Energy Sources: Solar Energy** **Work-Based Learning: Career Coaching, Field Trip**	• What alternative energy sources are in use today? • What are the benefits and drawbacks of different renewable energy technologies? • What are the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place? • What are the advantages and disadvantages of solar energy? • How does solar energy change with time and location? • How is solar energy used in sustainable power applications? • Why is solar energy becoming more prevalent? • What are the considerations when installing or troubleshooting solar energy sources? • What can be learned from electrical industry professionals?	• Identify and describe alternative energy sources in use today • Describe the benefits and drawbacks to using renewable energy sources instead of fossil fuels. • Explain the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place. • Describe solar energy and why it changes with time and location. • Explain how solar energy is used in sustainable power applications. • Explain why solar energy is becoming more prevalent. • Describe the considerations when installing or troubleshooting solar energy sources. • Participate in Career Coaching process. • Participate in field trip to electrical industry site.	**Written** • Assignments • Quizzes • Portfolio Update • Career Coaching Self-Assessment • Field Trip Reflection **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practice** CRP 1,2,4,5,6,8,10,11 **Cluster Standards** AC 1,3,4,7 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,2,3,4	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Week 40		• Review for written final	**Written**	**Career Ready Practice** CRP 1,2,4,8	**ELA** 9-10R 1,4,7,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Final Examination	• What knowledge and skills are needed to pass the final exam?	• Practice for hands-on assessment of core electrical tasks on safety and construction	• Cumulative Final Exam • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Cumulative Practical Assessment	**Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 3,4,5,7,8,9 AC-DES 2,4,8 AC-MO 1,2,3,4,5	9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Syracuse City School District
Career and Technical Education Program
Course Syllabus
ELT 200: Electrical Trades 200

Program Overview

The Electrical Trades Program is a four-year pathway designed to teach students the fundamentals of electricity theory, wiring methods and materials, national and local electrical codes, and print layout, the use of tools and electrical test equipment, the basics of electrical wiring and electrical construction according to the National Electric Code, OSHA 10 Construction Safety certification, and career ready workplace skills. Successful students will have the necessary experience to install receptacles, switches, lighting, and service entrance conductors and work with motors, generators and meters. In the classroom, students will learn both basic electrical theory and get practical hands-on experience, including completing a work-based internship in a local business. Throughout the program students will work both individually and as part of a team to complete assignments and projects. Safety will be given the highest priority at all times as students are working in the classroom. Upon successful completion of the Electrical Trades Program students will be able to obtain entry-level jobs in residential and commercial wiring. Students will also be prepared to continue training and education through post-secondary electrical technology programs at the college level or through private or electrical union apprenticeship programs.

Course Description

Electrical Trades 200 builds on skills learned in Electrical Trades 100 and gives students a more in-depth understanding of the knowledge and skills required to be successful in the electrical industry. This class is a pre-requisite for Electrical Trades 300. Students will build their knowledge and skills in wiring methods and materials, and the proper tools for residential wiring. The course also includes job seeking and communication skills, and an introduction to important professional organizations. Throughout the course there is an emphasis on workplace safety.

Work-Based Learning

Students will be connected with electrical trades professionals in the community through Career Coaching, field trips and job shadowing which could lead to further opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their work-based learning experiences throughout the program to document the development of their skills.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the projects that they are involved in. Some examples for this pathway include, but are not limited to:
    - OSHA 10 Construction Safety Certification
    - NABTU (North America's Building Trades Unions) Multi-Craft Core Curriculum (MC3)
    - Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.
- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other pathways and programs.

Pre-Requisites

ELT 100: Electrical Trades 100

Course Objectives

1. Students will understand the job seeking and communication skills needed to enter the electrical field.
2. Students will understand the importance of workplace safety when working with electricity.
3. Students will learn the safe and efficient use of hand and power tools used in the electrical industry.
4. Students will have knowledge of electrical materials and their purposes for residential wiring.
5. Students will understand electrical theory and mathematics and be able to read electrical prints and schematics.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Complete set of electrical hand tools, power tools, and personal protective equipment.
- **Student will provide:** Work boots or safety shoes

Textbook

Holzman, Harvey N. *Modern Residential Wiring, 11th Edition*. Tinley Park, IL: Goodheart-Willcox Company, Inc., 2018.

Grading

20% Quizzes/Projects
10% Homework
50% Weekly Participation
20% Tests

Additional Course Policies

Student attendance is very important due to the mandatory hours required for licensing, so the absentee policy is strictly enforced.

Course Calendar

Quarter	Units of Study

1	• Expectations of Electrical Trades Program
	• Triangle of Success
	• Career and Communication Skills
	• Electrical Fundamentals:
	  ○ Shop Safety
	  ○ Power and Specialized Tools
	• Electrical Energy Fundamentals

2	• Print Reading and Specifications
	• Installation of Switch and Receptacle Boxes
	• Residential Electrical Installation:
	  ○ Wiring Systems
	  ○ Raceways
	  ○ Conductors
	• Work-Based Learning: Career Coaching

3	• Residential Electrical Installation:
	  ○ Box Installation
	  ○ Fastening Devices
	  ○ Device Wiring
	• Residential Electrical Service and Distribution Theory
	• Residential Electrical Installation:
	  ○ Service Entrance
	  ○ Load Centers
	• Work-Based Learning: Career Coaching

4	• Residential Electrical Installation:
	  ○ Overcurrent Protection
	  ○ Grounding
	• Renewable and Alternative Energy Sources: Hydro/Tidal Energy
	• Work-Based Learning: Career Coaching, Field Trip
	• Review and Final Examination

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
ELT 200: Electrical Trades 200

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-3 **Expectations of Electrical Trades Program** **Triangle of Success** **Career and Communication Skills**	• What are the expectations of the Electrical Trades program? • What are the three ingredients for success represented by the Triangle of Success? • How are these three ingredients for success acquired and developed? • What are some of the career paths within the electrical industry? • What skills are needed for a successful electrical trades career? • How much education is needed to pursue various careers in electrical trades? • What types of license or certifications are required to gain employment in the electrical trades field? • What professional organizations set standards for the electrical industry?	• Describe the expectations of the Electrical Trades program. • Explain and follow classroom procedures. • Explain the three ingredients for success represented by the Triangle of Success. • Explain how each of the three ingredients for success is acquired and developed. • Identify and research the different career opportunities that are available electrical trades industry. • Describe different types of skills needed for a successful electrical trades career. • List electrical trades jobs available at various educational levels. • Describe training and licensing requirements for electricians. • Identify professional organizations in the electrical industry.	**Written** • Daily, Weekly and Quarterly Assignments • Quizzes • Self-Assessment: Personal Attributes • Rubric: Personal Qualities to Be Developed **Performance** • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,10 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 6 AC-DES 2,5	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 4-6 **Electrical Fundamentals:** • **Shop Safety** • **Power and Specialized Tools**	• Why is safety important in the electrical industry? • What organizations create the rules and regulations for the electrical industry? • What power tools are used in the electrical trades?	• List basic shop safety rules. • Maintain safety practices and procedures during electrical installations. • Describe principles of safe tool use and maintenance. • Describe tools used for both essential and more specialized electrical installations including tools for making electrical measurements. • Explain OSHA safety requirements for working in the electrical industry.	**Written** • Assignments • Quizzes and Tests • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,10 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,6	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 7-10 **Electrical Energy Fundamentals**	• How is electricity measured? • What is the difference between direct and alternating current? • What algebraic equations are needed to complete electrical tasks?	• Explain the electron theory for current. • Define and explain the difference between direct current and alternating current.	**Written** • Assignments • Quizzes and Tests on Specific Areas of Electrical Theory • Portfolio Update	**Career Ready Practice** CRP 2,4,8 **Cluster Standards** AC 1	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Work-Based Learning: Career Coaching	• What is Ohm's Law? • What is Watt's Law? • What is a series circuit? • What is a parallel circuit? • What can be learned from electrical industry professionals?	• Define basic electrical terms for measuring electricity including ampere, volt, ohm, watt, joule and kilowatt-hour. • Identify and explain mathematical formulas used regularly in the electrical industry including Ohm's Law and Watt's Law (basic power formula). • Describe the makeup of series and parallel electrical circuits. • Participate in Career Coaching process.	• Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Electro-Motive Force (EMF)	**Pathway Standards** AC-CST 5,8,9 AC-DES 8 AC-MO 1	9-10WHST 2,5,6,7 **Math** **Science**
Weeks 11-15 **Print Reading and Specifications** **Installation of Switch and Receptacle Boxes**	• What do prints represent? • What components of prints are the most important? • When using electrical prints what is the importance of the scale and legend? • What is the proper procedure for installing switch and receptacle boxes?	• Identify the types of prints that an electrician may read. • List the standard parts of drawings and prints. • Interpret a set of prints accurately • Identify and use standard electrical symbols. • Describe the schedules that are found on prints. • Describe the two types of notes. • Read an electrical print. • Identify specifications and explain their importance. • Explain where to find codes and authorities for an installation. • Explain the proper procedure for installing switch and receptacle boxes. • Use a print to correctly install a switch and receptacle.	**Written** • Daily Assignments • Research Project On • Quiz and Tests • Exam on Print Specifications and Codes • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Print Reading	**Career Ready Practice** CRP 1,2,4,8 **Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 4,7,8 AC-MO 1,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 16-20 **Residential Electrical Installation:** • **Wiring Systems** • **Raceways** • **Conductors** **Work-Based Learning: Career Coaching**	• What are the components of a wiring system? • What kinds of cables are used in residential wiring? • What the basic ways of bending conduit? • What different materials are used for conductors? • How is the correct conductor size determined? • What can be learned from electrical industry professionals?	• Describe the different wiring systems and cables used in residential wiring. • Choose appropriate cable products for various installations. • Prepare standard types of cable for connection to device. • Describe different types of raceway materials. • Explain the distinct uses of different types of raceways. • Cut, prepare, and join various types of raceway materials. • Demonstrate the basics of conduit bending. • Describe the different materials used for conductors. • Determine the correct conductor size based on the circuit load.	**Written** • Daily Assignments • Quizzes and Tests • Written Exam on Raceways, Conductors, • Portfolio Update • Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practice** CRP 1,2,3,4,8 **Cluster Standards** AC 1,2,3 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 4,8 AC-MO 1,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Properly specify wire size using the American Wire Gage (AWG) or kcmils. • Explain the cause of voltage drop. • List the factors that affect conductor ampacity rating. • Adjust conductor ampacity based on ambient temperature and number of conductors. • Prepare conductors for connection and make safe conductor splices. • Demonstrate the proper method for attaching conductors to devices and fixtures. • Participate in Career Coaching process.			
Weeks 20-25 **Residential Electrical Installation:** • **Box Installation** • **Fastening Devices** • **Device Wiring**	• What types of boxes are used in residential wiring? • What are knockouts and pryouts? • What are the different types of fasteners used for box installation and device wiring? • How are conductors prepared, sliced and attached to devices and fixtures?	• Identify the four common box shapes. • List four common box types and explain their uses. • Describe how to use knockouts and pryouts and how to gang boxes. • Demonstrate how to use different types of fasteners in box installation including clamps, ground clips, connectors, bushings, locknuts, couplings and holding devices. • Discuss box mounting systems and box fittings. • Explain box fill allotment. • Discuss covers for different boxes and applications. • Discuss the significance of listing or labeling electrical devices and materials. • Properly prepare conductors for connection to devices and equipment. • Make safe, secure conductor splices. • Demonstrate the proper method for attaching conductors to switches and receptacles. • Ground a receptacle. • Split-wire a receptacle.	**Written** • Daily Assignments • Quizzes • Written Exam on Reading of Simple Electrical Diagrams • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Proper Sizing	**Career Ready Practice** CRP 1,2,4,8 **Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 4,8 AC-MO 1,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 26-30 **Residential Electrical Service and Distribution Theory**	• What is the importance of Ohm's and Watt's Laws? • What are the components of an electrical circuit? • What is the service entrance? • What are the guidelines when locating the service entrance?	• Explain the formulas in Ohm's and Watt's Laws, how and when to apply them. • Perform calculations on an electrical circuit using Ohm's and Watt's Laws. • Break down an electrical circuit into its components.	**Written** • Assignments • Research Project on Theory of Service Distribution • Test on Load Distribution • Portfolio Update	**Career Ready Practice** CRP 1,2,4,8 **Cluster Standards** AC 1,2,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Residential Electrical Installation: • **Service Entrance** • **Load Centers** **Work-Based Learning: Career Coaching**	• What is the function of the load center? • What can be learned from electrical industry professionals?	• List the components of the service entrance. • Describe the guidelines for locating the service entrance. • Determine the number of branch circuits for a house. • Explain the function of the load center. • Explain noncoincident loads. • Describe the basic requirements for switches, receptacles, and lighting. • Participate in Career Coaching process	• Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Installation of 120v/240v Electrical Service According to Load Calculation	**Pathway Standards** AC-CST 5,7,8,9 AC-DES 4,8 AC-MO 1,3	**Math** **Science**
Weeks 30-34 **Residential Electrical Installation:** • **Overcurrent Protection** • **Grounding**	• What causes overcurrent in electrical circuits? • What are electrical current overcurrent protective devices (OCPDs)? • What are two types of grounding for electrical systems? • What is bonding? • What are two types of circuit interrupters?	• Explain the causes of overcurrent. • List and describe electrical circuit OCPDs. • Describe the rating system for OCPDs. • Explain the operation of a ground-fault circuit interrupter (GFCI) and where it is used. • Explain how an arc-fault circuit interrupter (AFCI) works and the hazards it is designed to prevent. • Explain which branch circuits require an AFCI. • Explain the working principles for electrical grounding. • Describe system grounding and equipment grounding and their purposes. • Define bonding and explain how it is done.	**Written** • Daily Assignments • Quizzes and Tests • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Exam on Identification of Different OCPDS and Their Uses • Practical Exam on Scenarios with Different Types of Grounding, Bonding, Fusing, and Sizing	**Career Ready Practice** CRP 1,2,4,8 **Cluster Standards** AC 1,2,3 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 4,8 AC-MO 1,3	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**
Weeks 35-38 **Renewable and Alternative Energy Sources: Hydro/Tidal Energy** **Work-Based Learning: Career Coaching, Field Trip**	• What alternative energy sources are in use today? • What are the benefits and drawbacks of different renewable energy technologies? • What are the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place? • What are the advantages and disadvantages of hydro/tidal energy? • How does hydro/tidal energy change with time and location?	• Identify and describe alternative energy sources in use today • Describe the benefits and drawbacks to using renewable energy sources instead of fossil fuels. • Explain the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place. • Describe hydro/tidal energy and why it changes with time and location. • Explain how hydro/tidal energy is used in sustainable power applications. • Explain why hydro/tidal energy is becoming more prevalent.	**Written** • Assignments • Quizzes • Portfolio Update • Career Coaching Self-Assessment • Field Trip Reflection **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practice** CRP 1,2,4,5,6,8,10,11 **Cluster Standards** AC 1,3,4,7 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,2,3,4	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	• How is hydro/tidal energy used in sustainable power applications? • Why is hydro/tidal energy becoming more prevalent? • What are the considerations when installing or troubleshooting hydro/tidal lar energy sources? • What can be learned from electrical industry professionals?	• Describe the considerations when installing or troubleshooting hydro/tidal energy sources. • Participate in Career Coaching process. • Participate in field trip to electrical industry site.			
Week 39-40 **Review and Final Examination**	• What knowledge and skills are needed to pass the final exam?	• Review for written final. • Practice for hands-on assessment of core electrical tasks on installation and design.	**Written** • Cumulative Final Exam • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Cumulative Practical Assessment of Skills	**Career Ready Practice** CRP 1,2,4,8,11 **Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 3,4,5,7,8,9 AC-DES 2,4,7,8 AC-MO 1,2,3,4	**ELA** 9-10R 1,4,7,8 9-10W 2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,4,7.9 9-10WHST 2,5,6,7 **Math** **Science**

Syracuse City School District
Career and Technical Education Program
Course Syllabus
ELT 300: Electrical Trades 300

Program Overview

The Electrical Trades Program is a four-year pathway designed to teach students the fundamentals of electricity theory, wiring methods and materials, national and local electrical codes, and print layout, the use of tools and electrical test equipment, the basics of electrical wiring and electrical construction according to the National Electric Code, OSHA 10 Construction Safety certification, and career ready workplace skills. Successful students will have the necessary experience to install receptacles, switches, lighting, and service entrance conductors and work with motors, generators and meters. In the classroom, students will learn both basic electrical theory and get practical hands-on experience, including completing a work-based internship in a local business. Throughout the program students will work both individually and as part of a team to complete assignments and projects. Safety will be given the highest priority at all times as students are working in the classroom. Upon successful completion of the Electrical Trades Program students will be able to obtain entry-level jobs in residential and commercial wiring. Students will also be prepared to continue training and education through post-secondary electrical technology programs at the college level or through private or electrical union apprenticeship programs.

Course Description

At this level, students will go into depth with the fundamentals of basic wiring established in ELT 200, including knowledge of proper wiring, devicing, materials, and installation. Students will understand the what, how, and why of residential wiring as well as the proper procedure for making a residential wiring project efficient. Students will continue to build their understanding of Ohm's Law, Watt's Law and the NEC Code Book. They will know and apply the terminology and symbols on electrical prints as well as the proper tools and equipment needed for different installation tasks. Students who successfully complete ELT 300 will have the skills comparable to those required for an entry-level job in residential wiring.

Work-Based Learning

Students will be connected with electrical trades professionals in the community through Career Coaching, field trips and job shadowing which could lead to further opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their work-based learning experiences throughout the program to document the development of their skills.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the projects that they are involved in. Some examples for this pathway include, but are not limited to:
    - OSHA 10 Construction Safety Certification
    - NABTU (North America's Building Trades Unions) Multi-Craft Core Curriculum (MC3)
    - Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.
- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other pathways and programs.

Pre-Requisites

ELT 100: Electrical Trades 100
ELT 200: Electrical Trades 200

Course Objectives

1. Students will know the safety standards for OSHA 10 Construction Safety.
2. Students will know electrical theory and fundamentals.
3. Students will know the difference between residential and commercial wiring.
4. Students will understand electrical metering devices.
5. Students will know the proper identification and safe use of electrical hand and power tools.

Integrated Academics

1 CTE Integrated Math Credit

Equipment and Supplies

- **School will provide:** Complete set of electrical hand tools, power tools, and personal protective equipment.
- **Student will provide:** work boots or safety shoes

Textbook

Holzman, H. N. (2018). *Modern Residential Wiring, 11th Edition.* Tinley Park, IL: Goodheart-Willcox Company, Inc.

Grading

20% Quizzes/Projects
10% Homework
25% Weekly Participation
25% Labs
20% Tests and Unit Exams

Additional Course Policies

Student attendance is very important due to the mandatory hours required for the national assessment. The absentee policy is strictly enforced.

Course Calendar

Quarter	Units of Study

1	• Expectations of Electrical Trades Program
	• Triangle of Success
	• Career and Communication Skills
	• Electrical Fundamentals:
	  ○ Shop Safety
	  ○ Power and Specialized Tools
	• Electrical Energy and Mathematics Fundamentals
	• Work-Based Learning: Career Coaching

2	• Electrical Energy and Mathematics Fundamentals (Cont.)
	• Print Reading, Specifications and Codes
	• Residential Electrical Installation:
	  ○ Service Entrance
	  ○ Load Centers
	  ○ Transformers
	  ○ Conductors and Cables
	• Work-Based Learning: Career Coaching, Job Shadow

3	• Residential Electrical Installation:
	  ○ Conduit, Raceways, Boxes, Fittings and Covers,
	  ○ Device Wiring
	  ○ Lighting Systems
	  ○ Appliance Wiring and Special Outlets
	• Work-Based Learning: Career Coaching

4	• Residential Electrical Installation:
	  ○ Overcurrent Protection
	  ○ Grounding
	  ○ Design and Installation
	• OSHA Instruction
	• Renewable and Alternative Energy Sources: Wind Energy
	• Work-Based Learning: Career Coaching, Field Trip
	• Review and Final Examination

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
ELT 300: Electrical Trades 300

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-3 **Expectations of Electrical Trades Program** **Triangle of Success** **Career and Communication Skills**	• What are the expectations of the Electrical Trades program? • What are the three ingredients for success represented by the Triangle of Success? • How are these three ingredients for success acquired and developed? • What are some of the career paths within the electrical industry? • What skills are needed for a successful electrical trades career? • How much education is needed to pursue various careers in electrical trades? • What types of license or certifications are required to gain employment in the electrical trades field? • What professional organizations set standards for the electrical industry?	• Describe the expectations of the Electrical Trades program. • Explain and follow classroom procedures. • Explain the three ingredients for success represented by the Triangle of Success. • Explain how each of the three ingredients for success is acquired and developed. • Identify and research the different career opportunities that are available electrical trades industry. • Describe different types of skills needed for a successful electrical trades career. • List electrical trades jobs available at various educational levels. • Describe training and licensing requirements for electricians. • Identify professional organizations in the electrical industry.	**Written** • Daily, Weekly and Quarterly Assignments • Quizzes • Self-Assessment: Personal Attributes • Rubric: Personal Qualities to Be Developed **Performance** • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,10 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 6 AC-DES 2,5	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 4-6 **Electrical Fundamentals:** • **Shop Safety** • **Power and Specialized Tools**	• Why is safety important in the electrical industry? • What organizations create the rules and regulations for the electrical industry? • What power tools are used in the electrical trades?	• List basic shop safety rules. • Maintain safety practices and procedures during electrical installations. • Describe principles of safe tool use and maintenance. • Describe tools used for both essential and more specialized electrical installations including tools for making electrical measurements. • Explain OSHA safety requirements for working in the electrical industry.	**Written** • Assignments • Quizzes and Tests • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,10 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 7-12 **Electrical Energy and Mathematics Fundamentals**	• How is electricity measured? • What is Ohm's Law? • What is Watt's Law? • What is the difference between direct and alternating current? • What is a series circuit? • What is a parallel circuit?	• Define basic electrical terms for measuring electricity including ampere, volt, ohm, watt, joule and kilowatt-hour. • Apply mathematical formulas used regularly in the electrical industry including Ohm's Law and Watt's Law (basic power formula).	**Written** • Assignments • Quizzes and test on specific areas of electrical theory • Portfolio Update	**Career Ready Practice** CRP 2,4,8 **Cluster Standards** AC 1	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Work-Based Learning: Career Coaching	• What can be learned from electrical industry professionals?	• Explain the difference between direct current and alternating current. • Describe the makeup of series and parallel electrical circuits. • Participate in Career Coaching process.	• Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Pathway Standards** AC-CST 5,8,9 AC-DES 8 AC-MO 1	**Math**
Weeks 13-15 **Print Reading, Specifications and Codes**	• What do prints represent? • What components of prints are the most important? • When using electrical prints what is the importance of the scale and legend? • What is the National Electric Code (NEC)?	• Identify the types of prints that an electrician may read. • List the standard parts of a drawing. • Identify and use standard electrical symbols. • Describe the schedules that are found on prints. • Describe the two types of notes. • Read an electrical print. • Identify specifications and explain their importance. • Explain where to find codes and authorities for an installation. • Identify the marks of the most commonly used testing agencies.	**Written** • Assignments • Quiz and Tests • Written exams on proper sizing, efficiency, material handling, and timing • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Print Reading • Practical Assessment of Proper Sizing, Efficiency, Material Handling, And Timing	**Career Ready Practice** CRP 1,2,4,8 **Cluster Standards** AC 1,2,3 **Pathway Standards** AC-CST 5,7,8,9 AC-DES 2,7,8 AC-MO 1,3,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 16-19 **Residential Electrical Installation:** • **Service Entrance** • **Load Centers** • **Transformers** • **Conductors and Cables** **Work-Based Learning: Career Coaching, Job Shadow**	• What is the service entrance? • What are the guidelines when locating the service entrance? • What is the function of the load center? • What is the function of a transformer? • What different materials are used for conductors? • How is the correct conductor size determined? • What are the components of a wiring system? • What kinds of cables are used in residential wiring? • What can be learned from electrical industry professionals?	• List the components of the service entrance. • Describe the guidelines for locating the service entrance. • Calculate the size of service entrance needed based on the power needs of the dwelling. • Explain the function of the load center. • Demonstrate proper installation of service entrance components including conductors between the meter socket, and main disconnect. • Explain the purpose of transformer and where it is used. • Compare and contrast step-up and step-down transformers. • List the NEC rules regarding conductors for general wiring. • Describe the different materials used for conductors. • Use the NEC to select a wire type when given a specific installation.	**Written** • Assignments • Quizzes and Tests • Written Assessment on Identifying Proper Conductors According Ampacity • Portfolio Update • Career Coaching Self-Assessment • Job Shadow Reflection **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Conductor Sizing According to Given Ampacity	**Career Ready Practices** CRP 1,2,4,6,8,12 **Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 5,8,9 AC-DES 4,8 AC-MO 1,3	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Properly specify wire size using the American Wire Gage (AWG) or kcmils. • Explain the cause of voltage drop. • List the factors that affect conductor ampacity rating. • Determine the correct conductor size based on the circuit load using the NEC. • Use the NEC to adjust conductor ampacity based on ambient temperature and number of conductors. • Demonstrate the proper method for attaching conductors to devices and fixtures. • Describe the different wiring systems and cables used in residential wiring. • Choose appropriate cable products for various installations. • Prepare standard types of cable for connection to device. • Participate in Career Coaching process. • Participate in job shadow at electrical industry site.			
Weeks 20-23 **Residential Electrical Installation:** • **Conduit** • **Raceways** • **Boxes, Fittings, and Covers**	• What the basic ways of bending conduit? • What types of boxes are used in residential wiring? • What are knockouts and pryouts? • What are the different types of fasteners used for box installation and device wiring?	• Describe different types of raceway materials. • Explain the distinct uses of different types of raceways, based on the NEC. • Cut, prepare, and join various types of raceway materials. • Demonstrate the basics of conduit bending. • Identify the four common box shapes. • List four common box types and explain their uses. • Describe how to use knockouts and pryouts and how to gang boxes. • Demonstrate how to use different types of fasteners in box installation. • Discuss box mounting systems and box fittings. • Explain box fill allotment. • Discuss covers for different boxes and applications.	**Written** • Assignments • Research Project on Materials • Quiz and Tests • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Identification and Installation of Materials	**Career Ready Practices** CRP 1,2,4,8,7,12 **Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 5,8,9 AC-DES 4,8 AC-MO 1,3	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 24-28 **Residential Electrical Installation:**	• How are conductors prepared, sliced and attached to devices and fixtures? • What are the main types of lighting in a home?	• Discuss the significance of listing or labeling electrical devices and materials. • Properly prepare conductors for connection to devices and equipment.	**Written** • Assignments • Quiz and Tests	**Career Ready Practices** CRP 1,2,4,8,12 **Cluster Standards**	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
• **Device Wiring** • **Lighting Systems** • **Appliance Wiring and Special Outlets** **Work-Based Learning: Career Coaching**	• Why are different types of lighting fixtures and lighting technologies used in a residential installation? • What are the main concerns when installing appliances? • What are the electrical requirements of common household appliances? • What NEC regulations pertain to appliance circuits and other special circuits? • What can be learned from electrical industry professionals?	• Make safe, secure conductor splices. • Demonstrate the proper method for attaching conductors to switches and receptacles. • Ground a receptacle. • Split-wire a receptacle. • Define basic lighting terminology. • Explain the main types of lighting in a home. • Identify various lighting fixtures. • Select lighting fixtures for specific applications. • Compare lamp types and lighting technologies. • Identify various light switches • Make wiring connections for common lighting circuits • Describe NEC regulations for appliance circuits and other special circuits. • Describe installation practices for various appliances and special circuits. • Describe various methods of heating. • Explain basic electrical requirements of common household appliances. • Participate in Career Coaching process.	• Written Assessment with Visual Aids on Identification of Devices • Portfolio Update • Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Proper Installation of Residential devices and lighting systems • Practical Assessment of Wiring Common Appliances	AC 1,2,3,6 **Pathway Standards** AC-CST 5,8,9 AC-DES 4,8 AC-MO 1,3	11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 29-33 **Residential Electrical Service:** • **Overcurrent Protection** • **Grounding** • **Design and Installation**	• What causes overcurrent in electrical circuits? • What are electrical current overcurrent protective devices (OCPDs)? • What are two types of grounding for electrical systems? • What is bonding? • What are two types of circuit interrupters? • What is electrical service? • How do you calculate the size of electrical service? • What are the differences between overhead and underground services per NEC?	• Explain the causes of overcurrent. • List and describe electrical circuit OCPDs. • Describe the rating system for OCPDs. • Explain the operation of a ground-fault circuit interrupter (GFCI) and where it is used. • Explain how an arc-fault circuit interrupter (AFCI) works and the hazards it is designed to prevent. • Explain which branch circuits require an AFCI. • Explain the working principles for electrical grounding. • Describe system grounding and equipment grounding and their purposes. • Define bonding and explain how it is done. • Explain what materials are used for different types of electrical services • Calculate the size of electrical service	**Written** • Assignments • Research Project on History of Fuses and Breakers • Quizzes and Tests • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Use of Metering Devices to Determine Breaker Size, Fuse Size and other Overcurrent Protection Devices Needed • Practical Assessment on Installation of Electrical Service as per Given Specifications	**Career Ready Practices** CRP 1,2,4,7,8,12 **Cluster Standards** AC 1,2,3,6 **Pathway Standards** AC-CST 3,4,5,7,8,9 AC-DES 4,8 AC-MO 1,3	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Explain the differences between overhead and underground services • Lay out and install a residential electrical service per blueprint, NEC, and Authority Having Jurisdiction (AHJ)			
Weeks 34-35 **OSHA Instruction**	• What are the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards? • What is the purpose and function of the Occupational Safety and Health Administration (OSHA)? • What are the requirements of the OSHA 10-hour Construction Course?	• Explain the benefits of safety, the cost of workplace incidents, and ways to reduce related hazards. • Explain the importance and the elements of an effective safety program. • Define job site safety regulations and requirements. • Explain the purpose and function of the Occupational Safety and Health Administration (OSHA). • Review the requirements of the OSHA 10-hour Construction Course.	**Written** • Assignments • Quizzes and Tests • OSHA 10-Hour Course • Portfolio Update • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,7,8,9,12 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 4,8 AC-MO 1,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 35-39 **Renewable and Alternative Energy Sources: Wind Energy** **Work-Based Learning: Career Coaching, Field Trip**	• What alternative energy sources are in use today? • What are the benefits and drawbacks of different renewable energy technologies? • What are the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place? • What are the advantages and disadvantages of wind energy? • How does wind energy change with time and location? • How is wind energy used in sustainable power applications? • Why is wind energy becoming more prevalent? • What are the considerations when installing or troubleshooting wind energy sources? • What can be learned from electrical industry professionals?	• Identify and describe alternative energy sources in use today • Describe the benefits and drawbacks to using renewable energy sources instead of fossil fuels. • Explain the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place. • Describe wind energy and why it changes with time and location. • Explain how wind energy is used in sustainable power applications. • Explain why wind energy is becoming more prevalent. • Describe the considerations when installing or troubleshooting wind energy sources. • Participate in Career Coaching process. • Participate in field trip to electrical industry site.	**Written** • Assignments • Quizzes • Portfolio Update • Career Coaching Self-Assessment • Field Trip Reflection **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,7,8,9,10,12 **Cluster Standards** AC 1,3,4,7 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,2,3,4	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Week 40 **Review and Final Examination**	• What knowledge and skills are needed to pass the final exam?	• Review for written final • Practice for hands-on assessment of core electrical tasks on safety and construction	**Written** • Cumulative Final Exam • Portfolio Update • Self-Assessment	**Career Ready Practice** CRP 1,2,4,8	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
			Performance • Cumulative Practical Assessment	**Cluster Standards** AC 1,2,3,6	**Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7
				Pathway Standards AC-CST 3,4,5,7,8,9 AC-DES 4,7,8 AC-MO 1,3,6	**Math**
					Science

Syracuse City School District
Career and Technical Education Program
Course Syllabus
ELT 400: Electrical Trades 400

Program Overview

The Electrical Trades Program is a four-year pathway designed to teach students the fundamentals of electricity theory, wiring methods and materials, national and local electrical codes, and print layout, the use of tools and electrical test equipment, the basics of electrical wiring and electrical construction according to the National Electric Code, OSHA 10 Construction Safety certification, and career ready workplace skills. Successful students will have the necessary experience to install receptacles, switches, lighting, and service entrance conductors and work with motors, generators and meters. In the classroom, students will learn both basic electrical theory and get practical hands-on experience, including completing a work-based internship in a local business. Throughout the program students will work both individually and as part of a team to complete assignments and projects. Safety will be given the highest priority at all times as students are working in the classroom. Upon successful completion of the Electrical Trades Program students will be able to obtain entry-level jobs in residential and commercial wiring. Students will also be prepared to continue training and education through post-secondary electrical technology programs at the college level or through private or electrical union apprenticeship programs.

Course Description

This course is designed to educate students in the commercial aspect of the electrical industry. Students will expand on their knowledge of electrical theory and application learned in Electrical Trades 100, 200 and 300. Students will interpret blueprints and specifications appropriate to a commercial setting, and identify the different materials and tools needed for the installation of commercial wiring. As a requirement for the course, students will complete internships with local electrical contractors, complete a professional portfolio and take a national assessment to earn CTE endorsement for graduation. Students who successfully complete ELT 400 are eligible to take the entrance exam for the IBEW (International Brotherhood of Electrical Workers) training program. Those students who pass the entrance exam will be interviewed for admittance to the program and will be on their way to a successful career in the electrical industry.

Work-Based Learning

Students will be connected with electrical trades professionals in the community through Career Coaching, field trips and job shadowing which could lead to further opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their work-based learning experiences throughout the program to document the development of their skills.

Additional Learning Opportunities

- **Micro-credentials:** Students may pursue learning experiences and credentials depending on the requirements of the projects that they are involved in. Some examples for this pathway include, but are not limited to:
    - OSHA 10 Construction Safety Certification
    - NABTU (North America's Building Trades Unions) Multi-Craft Core Curriculum (MC3)
    - Other relevant certifications as they become available through industry collaborations, teacher certifications and student interest.
- **Summer Bridge Enrichment:** Students will have the opportunity to participate in cross-curricular Summer Bridge programs to enhance and enrich their skills. Students will explore and create solutions that address authentic needs in the school and wider community with the involvement of local industry professionals. Students will build on skills learned during the school year to work collaboratively with students from other pathways and programs.

Pre-Requisites

ELT 100: Electrical Trades 100
ELT 200: Electrical Trades 200
ELT 300: Electrical Trades 300

Course Objectives

Students will:

1. Gain essential employability skills.
2. Obtain OSHA 10 certification.
3. Understand electrical theory in a commercial setting.

4. Know how to navigate through the NEC.
5. Gain experience with motor control.
6. Understand different types of transformers and ratings.
7. Understand NEMA ratings for different commercial materials.
8. Complete a professional portfolio.
9. Pass a national assessment of knowledge and skills in Electrical trades.

Integrated Academics

1 CTE Integrated English Credit

Equipment and Supplies

- **School will provide:** Complete set of electrical hand tools, power tools, and personal protective equipment.
- **Student will provide:** work boots or safety shoes

Textbook

Holzman, H. N. (2018). *Modern Commercial Wiring, 7th Edition.* Tinley Park, IL: Goodheart-Willcox Company, Inc.

Grading

20% Quizzes/Projects
10% Homework
25% Weekly Participation
25% Labs
20% Tests and Unit Exams

Additional Course Policies

Student attendance is very important due to the mandatory hours required for the national assessment. The absentee policy is strictly enforced.

Course Calendar

Quarter	Units of Study

1	• Expectations of Electrical Trades Program
	• Triangle of Success
	• Career and Communication Skills
	• Electrical Fundamentals:
	  ○ Shop Safety
	  ○ Power and Specialized Tools
	  ○ OSHA Certification
	• Commercial Electrical Print Specifications and Codes
	• Work-Based Learning: Career Coaching

2	• Commercial Wiring Methods, Materials and Installation:
	  ○ Boxes and Conduit Bodies/Condulets
	  ○ Overcurrent Protection
	  ○ Service Distribution
	  ○ Transformers
	  ○ Branch Circuits and Feeders
	• Work-Based Learning: Career Coaching, Job Shadow

3	• Electrical Motors Installation • Structured Wiring: Low Voltage Cabling • Renewable and Alternative Energy Sources: Nuclear Energy • Work-Based Learning: Career Coaching, Field Trip
4	• Review of Triangle of Success • Work Based Learning: Internships • Review of All Electrical Trades Installation, Maintenance and Repair • Pre-Employment Exam for IBEW • Final Assessments

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
ELT 400: Electrical Trades 400

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-3 **Expectations of Electrical Trades Program** **Triangle of Success** **Career and Communication Skills**	• What are the expectations of the Electrical Trades program? • What are the three ingredients for success represented by the Triangle of Success? • How are these three ingredients for success acquired and developed? • What are some of the career paths within the electrical industry? • What skills are needed for a successful electrical trades career? • How much education is needed to pursue various careers in electrical trades? • What types of license or certifications are required to gain employment in the electrical trades field? • What professional organizations set standards for the electrical industry?	• Describe the expectations of the Electrical Trades program. • Explain and follow classroom procedures. • Explain the three ingredients for success represented by the Triangle of Success. • Explain how each of the three ingredients for success is acquired and developed. • Identify and research the different career opportunities that are available electrical trades industry. • Describe different types of skills needed for a successful electrical trades career. • List electrical trades jobs available at various educational levels. • Describe training and licensing requirements for electricians. • Identify professional organizations in the electrical industry.	**Written** • Daily, Weekly and Quarterly Assignments • Quizzes • Self-Assessment: Personal Attributes • Rubric: Personal Qualities to Be Developed **Performance** • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,7,8,9,10,12 **Cluster Standards** AC 1,7 **Pathway Standards** AC-CST 6 AC-DES 2,5	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 4-8 **Electrical Fundamentals:** • **Shop Safety** • **Power and Specialized Tools** • **OSHA Certification**	• Why is safety important in the electrical industry? • What organizations create the rules and regulations for the electrical industry? • What power tools are used in the electrical trades? • What are the requirements of the OSHA 10-hour Construction Course?	• List basic shop safety rules. • Maintain safety practices and procedures during electrical installations. • Describe principles of safe tool use and maintenance. • Describe tools used for both essential and more specialized electrical installations including tools for making electrical measurements. • Explain OSHA safety requirements for working in the electrical industry. • Review the requirements of the OSHA 10-hour Construction Course. • Complete the requirements of the OSHA 10-hour Construction Course.	**Written** • Assignments • Quizzes and Tests • Portfolio Update • OSHA 10-Hour Course Assessments • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,7,8,9,10,12 **Cluster Standards** AC 1,3 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 9-10			**Written**	**Career Ready Practices** CRP 1,2,4,8,12	**ELA** 11-12R 1,4,7,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Commercial Electrical Print Specifications and Codes **Work-Based Learning: Career Coaching**	• What is the importance of electrical drawings and prints? • What is the purpose of the National Electric Code (NEC)? • What agencies set standards for electrical practices and procedures? • What safety and performance testing is performed on electrical devices, equipment and components? • What can be learned from electrical industry professionals?	• Describe several types of electrical drawings. • Identify common electrical symbols. • Explain the purpose of specifications. • Explain the importance of building codes. • Define the purpose, intent, arrangement, and key terminology of the NEC. • Name various agencies that set standards concerning electrical practices and procedures. • Identify various lab facilities that perform rigorous testing on electrical devices, equipment, and associated components for safety and performance certification. • Participate in Career Coaching process.	• Assignments • Quizzes and Tests • Career Coaching Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Design of Legend, Keys and Symbols for Specific Prints	**Cluster Standards** AC 1,3,6 **Pathway Standards** AC-CST 5,8,9 AC-DES 2,4,7,8 AC-MO 1,6	11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 11-20 **Commercial Wiring Methods, Materials and Installation:** • **Boxes and Conduit Bodies/Condulets** • **Overcurrent Protection** • **Service Distribution** • **Transformers** • **Branch Circuits and Feeders** **Work-Based Learning: Career Coaching, Job Shadow**	• What wiring methods are available for commercial installations? • What are the rules for commercial wiring methods? • What are the important components of each wiring method? • What is the purpose of the different types of wiring hardware? • What are the Code requirements for different wiring methods? • What is the purpose of different types of boxes and conduit bodies/condulets? • How are materials selected for various types of applications? • What are the Code requirements for different types of boxes and conduit bodies/condulets? • What are the characteristics of different types of electrical protective devices? • What is the difference between fuses and circuit breakers? • What are the common applications of various supply	• List the wiring methods available for commercial installation and the rules regarding each method of wiring. • Size wireways to satisfy Code requirements. • Identify fittings, connectors, supports, and other integral hardware unique to a particular wiring method. • Select the correct wiring method based on Code requirements. • Identify different types of boxes. • Select boxes for various applications. • Explain how boxes are grounded. • Mount and support boxes in accordance with the Code. • Identify various types of conduit bodies. • Perform box fill calculations using the Code. • Identify the types, ratings, and characteristics of electrical protective devices. • Recognize overloads and short circuits. • List types of fuses. • Compare fuses and circuit breakers. • Describe the two basic types of service. • Explain service terminology. • Identify the required working clearances at the service equipment. • Explain the various supply voltages available in the United States and their common applications.	**Written** • Assignments • Quiz and Tests • Career Coaching Self-Assessment • Job Shadow Reflection Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Practical Assessment on Identifying Industrial Materials, Bending EMT, Rigid and PVC Conduit • Practical Assessment on Installation of Condulets • Practical Assessment on Identifying Proper Branch Feeders and Wire for Project	**Career Ready Practices** CRP 1,2,4,8,12 **Cluster Standards** AC 1,3,6 **Pathway Standards** AC-CST 5,8,9 AC-DES 2,4,8 AC-MO 1,3,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	voltages available in the United States? • What is the purpose and uses of transformers? • What are the components of a distribution system? • What are the various types of branch circuits? • What are the functions of feeders and branch-circuit conductors? • How are feeder conductors sized? • What can be learned from electrical industry professionals?	• Define the purpose and uses of transformers. • Identify the basic components and construction of a transformer. • List the types of transformers. • Identify the feeder and branch circuit portions of a distribution system. • Describe the various types of branch circuits. • Define the functions of a feeder and the functions of branch-circuit conductors. • Calculate lighting and receptacle loads using Code requirements. • Size branch circuits in accordance with the Code. • Determine branch circuit overcurrent protection required by the Code. • Use the Code to size feeder conductors. • Participate in Career Coaching process. • Participate in job shadow at electrical industry site.			
Weeks 21-22 **Electrical Motors Installation**	• What are the basic classes and components of motors? • What are the applications for the various classes of motors. • How are motors sized?	• Explain the basic components of motors. • List various classes of motors. • Choose the appropriate motor size and type for its correct application and use.	**Written** • Assignments • Quizzes and Tests • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,8,12 **Cluster Standards** AC 1,3,6 **Pathway Standards** AC-CST 5,8,9 AC-DES 2,4,8 AC-MO 1,2,3,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Weeks 23-28 **Structured Wiring: Low Voltage Cabling**	• What is the purpose of structured cabling? • What types of services are supported by structured cabling? • What types of cable are used in structured cabling and what are their attributes? • What are the types and purpose of wall outlets and access points? • What are the industry standards for recommended cable runs?	• Define structured cabling. • List the three components of structured cabling. • Explain the many services supported by structured cabling. • Explain the basic physical and performance characteristics of cable used in structured cabling. • Identify different low voltage cable types and their attributes. • Define Main Distribution Frame (MDF) and Intermediate Distribution Frame (IDF) • List the types and purpose of wall outlets and access points.	**Written** • Assignments • Quizzes and Tests • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,4,7,8,10,11,12 **Cluster Standards** AC 1,3,6,7 **Pathway Standards** AC-CST 5,8,9 AC-DES 2,4,8 AC-MO 1,2,3,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	• What is the importance of surge protection for technology systems? • What are the basics steps needed to terminate cable? • What are TIA 568A and 568B standards for cable termination? • How are Cat 5, audio, and Coax cables terminated? • What are the tools used for terminating different cable types? • How is cable terminated at the main distribution frame? • How are distribution modules installed into the distribution panel? • Why is testing structured cabling systems important and when should it occur? • What are the symptoms and causes of common cabling problems? • What are common testing tools and their functions?	• Identify industry standards for recommended cable runs. • Discuss the importance of surge protection for technology systems. • List the basics steps to take to terminate wire. • Define TIA 568A and 568B standards for wire termination. • Explain how to terminate Cat 5, audio, and Coax wires. • List the tools to use for terminating different wire types. • Identify how to terminate wire at the distribution panel. • Explain how to install distribution components into the main and intermediate distribution frames. • Explain why testing structured cabling systems is important. • Identify when structured cable testing should occur. • Discuss symptoms and causes of common cabling problems. • List common testing tools and their functions.			
Weeks 29-32 **Renewable and Alternative Energy Sources: Nuclear Energy** **Work-Based Learning: Career Coaching, Field Trip**	• What alternative energy sources are in use today? • What are the benefits and drawbacks of different renewable energy technologies? • What are the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place? • What are the advantages and disadvantages of nuclear energy? • How is nuclear energy used in sustainable power applications? • Why is nuclear energy might become more or less prevalent? • What are the considerations when installing or	• Identify and describe alternative energy sources in use today • Describe the benefits and drawbacks to using renewable energy sources instead of fossil fuels. • Explain the geographic conditions that favor or restrict the use of various renewable energy technologies in a particular place. • Explain how nuclear energy is used in sustainable power applications. • Explain why nuclear energy might become more or less prevalent. • Describe the considerations when installing or troubleshooting nuclear energy sources. • Participate in Career Coaching process. • Participate in field trip to electrical industry site.	**Written** • Assignments • Quizzes • Portfolio Update • Career Coaching Self-Assessment • Field Trip Reflection **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practice** CRP 1,2,4,5,6,8,10,11 **Cluster Standards** AC 1,3,4,7 **Pathway Standards** AC-CST 5,9 AC-DES 2,4 AC-MO 1,2,3,4	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	troubleshooting nuclear energy sources? • What can be learned from electrical industry professionals?				
Weeks 33-36 **Review of Triangle of Success** **Work Based Learning: Internships**	• What are the three ingredients for success represented by the Triangle of Success? • How are these three ingredients for success acquired and developed? • How preparation is needed for a particular career choice? • Why are successful job-seeking skills required in a competitive marketplace? • How does an electrician convey professionalism in the workplace? • Why are internships necessary? • How does an internship experience contribute to a professional portfolio? • What were areas of improvement and challenges during the internship experience? • What can be learned from electrical industry professionals?	• Explain the three ingredients for success represented by the Triangle of Success. • Explain how each of the three ingredients for success is acquired and developed. • Apply job search techniques to seek out, evaluate and obtain internship opportunities. • Participate in internship experience. • Communicate with industry/potential employers through the internship experience. • Apply knowledge and skills from the classroom to workplace situations. • Explain the importance of professionalism and ethics in the workplace. • Comply with workplace policies and regulations. • Communicate effectively both verbally and in writing with coworkers and customers. • Explain the importance of being prompt, being able to take directions and being motivated to accomplish assigned tasks. • Analyze and resolve problems that arise in completing assigned tasks. • Update online professional portfolio and employability profile.	**Written** • Self-Assessment • Reflection Summary: Internship Experience • Professional Portfolio • Employability Profile **Performance** • Internship Checklist • Safety Checklist • Procedure Checklist • Teacher Observation • Teacher Checklist	**Career Ready Practices** CRP 1,2,4,8,10,12 **Cluster Standards** AC 1,3,6,7 **Pathway Standards** AC-CST 5,8,9 AC-DES 2,4,8 AC-MO 1,3,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**
Week 39-40 **Review of All Electrical Trades Installation, Maintenance and Repair** **Pre-Employment Exam for IBEW** **Final Assessments**	• What were the main learning goals for this past year? • What knowledge and skills are needed to pass the final assessments?	• Review knowledge and skills from the program in preparation for IBEW Pre-Employment Exam, and Final Course Assessments. • Practice for hands-on assessment of core electrical tasks on safety and construction. • Complete IBEW Pre-Employment Exam, and Final Course Assessments.	**Written** • Self-Assessment • Skills USA Written Assessment • Portfolio Completion • IBEW Pre-Employment Exam **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation • Teacher Checklist	**Career Ready Practices** CRP 1,2,4,8,12 **Cluster Standards** AC 1,2,3,4,6,7 **Pathway Standards** AC-CST 5,8,9 AC-DES 2,4,7,8 AC-MO 1,2,3,6	**ELA** 11-12R 1,4,7,8 11-12W 2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,4,7,9 11-12WHST 2,5,6,7 **Math** **Science**

Multi-Craft Core Curriculum (MC3) Crosswalk with SCSD Electrical Trades Curriculum

Unit	Module	Objectives	ELT 100 Unit of Study	ELT 200 Unit of Study	ELT 300 Unit of Study	ELT 400 Unit of Study
Unit 1: Orientation and Industry Awareness	**1. Introduction**	• Discuss the interrelationship of craft skills, construction industry stakeholders, and craft workers to the construction process and explain the interconnectedness of work processes in the progress of a construction job.	•	•	•	•
	2. Overview of the Construction Industry	• Describe the scope of each major part of the construction industry. • Describe the roles of occupations indirectly related to the construction industry. • Discuss the roles of governmental agencies of interest to the building trades. • Describe construction careers after apprenticeship, including careers as a journeyperson in each craft, union and management leadership roles, and continuing education responsibilities.	• **Weeks 1-12 Electrical Orientation**	• **Weeks 1-4 Professional Organizations** • **Weeks 1-4 Career and Communication Skills**	• **Weeks 1-3 Professional Organizations** • **Weeks 1-3 Career and Communication Skills**	• **Weeks 1-3 Professional Organizations** • **Weeks 1-3 Career and Communication Skills**
	3. Introduction to Specific Trades	• Describe the roles of the principal occupations in the construction industry.	•	• **Weeks 1-4 Professional Organizations**	• **Weeks 1-3 Professional Organizations**	•
	4. Attitudes and Behaviors	• Explain the relationship between job productivity employee welfare, and attitudes and behaviors on the job.	•	• **Weeks 1-4 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills**	•
	5. An Overview	• Describe the demographics of the construction trade. • Discuss industry projections of the future of the building trades. • Identify the development of the apprenticeship from the fifth century B.C. to the modern times. • Explain the role of contractor organizations and their relationships to the unions. • Explain the structure of the union and its role in collective bargaining. • Describe the national building trades drug and alcohol program and its relationship to health and safety, productivity, and economic welfare of the principal stakeholders in construction work. • Describe construction careers after apprenticeship, including careers as a journeyperson in each craft, union and management leadership roles, and continuing education responsibilities.	•	• **Weeks 1-4 Professional Organizations**	• **Weeks 1-3 Professional Organizations**	•
	6. Apprentice Roles and Responsibilities (N.B. no Module 7	• Describe the apprentice's role in the building trades and the institutional structures and facilities which support the apprenticeship program, including the obligations of the	•	•	•	•

	in original document)	indenture, the apprenticeship trust and school, and sponsors.				
	8. Workers and Union Membership	• Describe the benefits and obligations of union membership. • Describe the rights of workers: to be free from wrongful discrimination, sexual harassment, to earn fair wages, overtime requirements under law, to join a union and to organize, and to rights generally secured under a collective bargaining agreement, union constitutions, and labor law, and for an apprentice to be trained and educated; and describe the obligations of workers. • Know the importance of the Helmets to Hardhats program and veterans' in the construction industry.	•	•	•	•
	9. Motivation and Codes of Conduct	• Describe and explain the codes of conduct for the crafts and the disciplinary process maintained by the craft unions and the apprenticeship program. • Explain the relationship between job productivity, employee welfare, and attitudes and behaviors on the job. • Explain the keys to success---motivation and leadership.	•	• **Weeks 1-4 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills** • **Weeks 33-36 Internships**
	10. Getting Along at Work	• Recognize the importance of effective communication and different forms of communication and how to avoid the barriers of communication. • Recognize the importance of teamwork in construction. • Understand discrimination and harassment on the job site and how to avoid conflict.	•	• **Weeks 1-4 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills** • **Weeks 33-36 Internships**
	11. Interview Skills	• Explain the importance of interviews in the application and hiring process. • Explain the interview process and expectations. • Prepare for an interview and respond to interview questions. • Demonstrate positive body language and non-verbal behavior. • Demonstrate effective interviewing skills. • Address interview questions that may not be legal.	•	• **Weeks 1-4 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills**	• **Weeks 1-3 Career and Communication Skills** • **Weeks 33-36 Internships**
Unit 2: Tools		• Be familiar with tools and materials used on construction sites.	• **Weeks 21-30 Power Tools and Safety** • **Weeks 31-35 Hand tools and Safety**	• **Weeks 1-4 Power and Specialized Tools**	• **Weeks 1-3 Power and Specialized Tools**	• **Weeks 1-3 Power and Specialized Tools**
U ni t	**1. OSHA Module**	• Recognize a life-threatening emergency and take action.	• **Weeks 1-12 Electrical Safety**	• **Weeks 1-4 Shop Safety**	• **Weeks 1-3 Shop Safety**	• **Weeks 1-3 Shop Safety**

		• Recognize breathing and cardiac emergencies that call for CPR. • Perform CPR on adults. • Provide rescue breathing when needed. • Use an automated external defibrillation unit, (AED), by the guidelines of the American Red Cross. • Use the emergency medical services (EMS) system effectively. • Recognize when 911 should be activated and support the most common situations until further help arrives. • Treat sudden illness, including poisonings and heat and cold emergencies. • Determine the best response to medical emergencies like: heart attacks, strokes, allergic reactions, cardiac arrest, and seizures.		• **Weeks 1-4 OSHA 10 Construction Course Instruction**	• **Weeks 1-3 OSHA 10 Construction Course Instruction**	• **Weeks 1-3 OSHA 10 Construction Course Certification**
	2. Safety Issues for Women Module	• Describe why gender matters in health and safety issues in the construction industry. • Describe how health and safety issues are impacted by gender. • Describe how issues that are specific to gender can be safety concerns. • Demonstrate what individuals can do to protect themselves and their co-workers. • Promote equitable health and safety practices and policies in the workplace.	•	•	•	•
Unit 4: Blueprint Reading			•	• **Weeks 11-16 Print Reading and Specifications**	• **Weeks 11-16 Print Reading, Specifications and Codes**	• **Weeks 4-5 Commercial Electrical Print Specifications and Codes**
Unit 5: Math	**1. Intro to Mathematics**	• Describe the basic history of mathematics. • Identify two basic systems of measurement used by BAC craftworkers. • Select a calculator. • Use the student manual to learn mathematics for BAC craftworkers.	• **Weeks 13-20 Electrical Mathematical Fundamentals**	• **Weeks 5-10 Electrical Energy Fundamentals**	• **Weeks 4-10 Electrical Energy and Mathematics Fundamentals**	• **Weeks 1-3 Electrical Fundamentals**
	2. Whole Numbers	• Add whole numbers. • Subtract whole numbers. • Multiply whole numbers. • Divide whole numbers. • Perform combined operations with whole numbers.	• **Weeks 13-20 Electrical Mathematical Fundamentals**	• **Weeks 5-10 Electrical Energy Fundamentals**	• **Weeks 4-10 Electrical Energy and Mathematics Fundamentals**	• **Weeks 1-3 Electrical Fundamentals**
	3. Common Fractions	• Describe the fundamentals of common fractions. • Add common fractions. • Subtract common fractions. • Multiply common fractions.	• **Weeks 13-20 Electrical Mathematical Fundamentals**	• **Weeks 5-10 Electrical Energy Fundamentals**	• **Weeks 4-10 Electrical Energy and Mathematics Fundamentals**	• **Weeks 1-3 Electrical Fundamentals**

		• Divide common fractions. • Perform combined operations with common fractions.				
	4. Decimal Fractions	• Use a calculator to add, subtract, multiply, and divide whole numbers and fractions. • Describe the fundamentals of decimal fractions. • Add decimal fractions. • Subtract decimal fractions. • Multiply decimal fractions. • Divide decimal fractions. • Perform combined operations with decimal fractions.	• **Weeks 13-20 Electrical Mathematical Fundamentals**	• **Weeks 5-10 Electrical Energy Fundamentals**	• **Weeks 4-10 Electrical Energy and Mathematics Fundamentals**	• **Weeks 1-3 Electrical Fundamentals**
	5. Measurement	• Solve linear measurement problems. • Solve area measurement problems. • Solve circular measurement problems. • Solve volume measurement problems.	• **Weeks 13-20 Electrical Mathematical Fundamentals**	• **Weeks 5-10 Electrical Energy Fundamentals**	• **Weeks 4-10 Electrical Energy and Mathematics Fundamentals**	• **Weeks 1-3 Electrical Fundamentals**
Unit 6: Labor Heritage	**1. From Artisans to Wage-earners to Local and National Unions**	• Describe the "artisan system" of work and skills training in the early years of the American republic, and they should be able to describe the different roles in this system performed by master craftsmen, journeymen and apprentices. • Understand how social, technological and political change began to transform the "artisan system" in the mid-19th century and the effects these changes had on workers in the building and construction trades. • Describe why building and construction tradesmen joined forces in the late 19th century to improve their situations and the reasons these workers chose trade or craft unions as what they thought were the best type of organizations to achieve their goals. • Be familiar with the impact of high-rise building construction ("skyscrapers") on the Building Trades and the construction industry.	•	•	•	•
	2. Government Matters	• Describe the effects of the Great Depression on the American economy in general and on the Building Trades and construction in particular. • Understand the Building Trades' role in World War I and the response to the increasing power in the Trades known as "the American Plan." • Understand why Building Trades leaders came to the realization that "government matters" to them and their organizations. • Understand the purpose of the Fitzgerald Act and the federal government's role in the US apprenticeship system. • Understand the Building Trades role during World War II, and why powerful business interests and their allies in Congress pushed	•	•	•	•

		back against the new-found power of the Building Trades with policies such as the Taft-Hartley Act in 1947.				
	3. The Best of Times, The Worst of Times	• Describe why many Building Trades locals limited access to their training programs and their membership, and the detrimental impact this had on the reputation of the Building Trades around the country. • Be familiar with the steps that policy makers and Building Trades leaders took to address the lack of diversity in the trades, and why these changes were slow in coming at the local level. • Describe the series of attacks by powerful business interests in the 1970s that was similar to the "American Plan" in the 19202, which was designed to increase opportunities for "open shop," or non-union, workers and contractors.	•	•	•	•
	4. Back to the Future	• Understand how a new generation of Building Trades leaders (such as those whose interviews are included in this chapter) have committed their unions to recruiting new members and increasing diversity among apprentices and in the general membership, through programs such as the Multi-Craft Core Curriculum, Helmets to Hardhats, the NABTU Tradeswomen Committee and others.	•	•	•	•
Unit 7: Diversity Awareness and Sexual Harassment	**1. Diversity Awareness**	• Explain the importance of a diverse workforce in the construction industry. • Identify the importance of the construction industry to diverse populations. • Identify the historical and social roots of under-representation of women and minorities in the trades. • Explain the barriers and challenges to building a diverse construction workforce and an equitable worksite. • Explain what it means to be a culturally competent person and organization. • Identify equal employment opportunity and non-discrimination rights in the workplace and classroom.	•	•	•	•
	2. Sexual Harassment	• Define the legal definition of sexual harassment and identify the evolution of laws pertaining to sexual harassment. • Recognize and define different forms of sexual harassment. • Explain why sexual harassment is a problem in the construction workplace. • Identify who is harmed by sexual harassment.	•	•	•	•

		• Describe the role of employers, unions, and workers in preventing and addressing sexual harassment. • Demonstrate action steps to take in response to witnessing or experiencing sexual harassment.				
Unit 8: Green Construction	**1. Sustainability**	• Describe the basic elements of green construction and green buildings and the part they will play as a construction worker on green job sites. • Understand basic green building terms. • Describe the role of green building certification and how it works. • Recognize green awareness on construction projects, including sustainable site development, efficient use of water resources, energy conservation, the use of sustainable building materials, reducing and recycling construction waste and protecting indoor and outdoor environmental quality.	•	•	•	• **Weeks 29-32 Alternative Energy Sources**
	2. Green Building	• Describe the basic elements of green construction and green buildings and the part they will play as a construction worker on green job sites. • Understand basic green building terms. • Describe the role of green building certification and how it works. • Recognize green awareness on construction projects, including sustainable site development, efficient use of water resources, energy conservation, the use of sustainable building materials, reducing and recycling construction waste and protecting indoor and outdoor environmental quality.	•	•	•	• **Weeks 29-32 Alternative Energy Sources**
Unit 9: Financial Responsibility		• Identify the rationale for understanding financial literacy. • Construct a budget. • Devise a strategy for savings and debt management. • Define financial services and products for financial security.	•	•	•	•