

Electrical
Level III Unit Outline

Unit 1: Agenda Book Review/Classroom Rules

- Class discussion of student agenda book
- Review of classroom rules
- School safety protocols, district drills and emergency evacuations, behavior and meeting locations
- Review expectations and school policies for electronic devices

Unit 2: Safety, First Aid, Personal Protective Equipment and Shop Attire

- Identify, discuss, locate first aid and bloodborne kits
- Identify, locate and demonstrate function and purpose of the Emergency Eye Station
- Identify, discuss, locate fire extinguisher
- Identify, distribute and discuss function and uses of protective eyewear, appropriate personal protective equipment (PPE) required in shop, and acceptable shop attire
- Identify, show location and discuss function and uses of the SDS (Safety Data Sheets) and how to interpret the information about paints and aerosols, content precautions, material labeling
- Equipment safety protocols
- Identify, demonstrate shop ventilation systems where applicable
- Identify locate and discuss function of shop flammable cabinet where applicable
- Discuss and demonstrate shop housekeeping of supplies, work stations and room maintenance
- Discuss and identify electrical safety considerations in the shop area
- Compile a safety section in the student shop notebook
- Identify, demonstrate air gauge function and operation where applicable
- Completion of online safety course and successful passing of safety test(s)

Unit #3: Residential Electrical Systems I

- Ability to read floor plans used in a residential setting
- Grasp concepts related to general lighting loads in a residential setting
- Understanding of small appliance circuits in a residential setting

Unit #4 – Commercial Electrical Systems I

- Ability to read blueprints in a commercial setting

- Understanding of lighting loads and demand factors in a commercial setting
- Explore receptacle loads for general use and those that are dedicated receptacles

Unit #5 – Three Phase Service Installations II

- Understanding of Transformer Configurations and Voltages – Delta, Open Delta, Wye, Delta to wye Transformers
- Explore three phase Sign Wave and power factors
- Ability to identify voltage

Unit #6 – Tools and Equipment I

- Learn proper and safe use of hand and power cable cutters in the work environment
- Learn proper and safe use of wire and cable splice devices in the work environment
- Discuss proper and safe use of wire and cable insulating wraps and heat shrink
- Learn proper and safe use of portable heating equipment
- Discuss proper and safe use of conduit wire pulling equipment

Unit #7 – Industrial Power Systems I

- Explore different lighting panels and voltages
- Explore different power panels and voltages
- Discuss Delta to Wye Dry type transformers
- Discuss main service disconnecting means
- Learn to make proper calculations relating to voltage drop
- Safety – handling and securing equipment and lighting fixtures

Unit #8 – Motor and Motor Control I

- Learn principles of ladder diagrams
- Learn diagram symbols
- Ability to construct ladder diagrams
- Learn principles of DC and AC motors and operating voltages
- Learn principles of single and three phase motors
- Understanding of manual and automatic operations
- Discuss types of motors and operating characteristics
- Ability to trouble shoot motors and controllers
- Safety – Lockout, tagout procedures and testing for voltage potential

Unit #9 – Motor Control Circuits I

- Use of vocabulary and knowledge of definitions
- Understanding of the purpose and location of remote-control circuits
- Use of transformers in control writing
- Understanding of NEC requirements for control circuit conductors
- Safety – matching control voltage to equipment voltage and testing for voltage potential

Unit # 10 – Special Control Circuits I

- Use of vocabulary and knowledge of definitions
- Explore types and uses of commercial and industrial control circuits
- Explore principles of pilot lights

Unit #11 – Solid State Motor Control I

- Discuss programmable logic controllers
- Explore static control
- Learn aspects of photoelectric devices
- Discuss infrared detecting devices
- Understanding principles of timers
- Understanding concepts of solid state replacements
- Safety – Testing for voltage potential

Unit #12 – Commercial and Industrial Power Distribution I

- Use of vocabulary and knowledge of definitions
- Understanding principles of parallel feeders and conduit
- Understanding principles of subpanels, junction, and pull boxes
- Discuss bus duct
- Understand principles of gutters, trays, and ladders

Unit #13 – Industrial Lighting I

- Explore types of H.I.D. lighting
- Explore styles of luminaires and use
- Discuss typical ballast voltages
- Discuss principles of switch rated circuit breakers

Unit #14 – Related Commercial and Industrial Electrical Systems I

- Explore various different Electric Heating Systems used in the industry
- Understand the related control circuits and equipment
- Explore both AC and Refrigeration Wiring
- Understand the principles related to Oil and Gas Fired Heating Equipment

Unit #15 – Data and Communication Wiring I

- Use of vocabulary and definitions related to data and communication wiring
- Discuss principles of TV Co-AX Installation
- Explore Data Cable Installation
- Explore Telephone Cable Installation

Unit #16 – Electrical Contractor License I

- State and Age Requirements
- Times Applied to Apprenticeship

Electrical
New Jersey Student Learning Standards (NJSLS)

NJ Learning Standards: CTE.9.3

CONTENT AREA:	STANDARD 9.3 CAREER AND TECHNICAL EDUCATION
ARCHITECTURE & CONSTRUCTION CAREER CLUSTER®	
Number	Standard statement
<i>By the end of Grade 12, Career and Technical Education Program completers will be able to:</i>	
CAREER CLUSTER®:	ARCHITECTURE & CONSTRUCTION (AC)
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.4	Evaluate the nature and scope of the Architecture & Construction Career Cluster and the role of architecture and construction in society and the economy.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
9.3.12.AC.6	Read, interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC.7	Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.
PATHWAY:	CONSTRUCTION (AC-CST)
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
9.3.12.AC-CST.2	Describe the approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6	Manage relationships with internal and external parties to successfully complete construction projects.
9.3.12.AC-CST.7	Compare and contrast the building systems and components required for a construction project.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.