

CONSTRUCTION TRADES: ELECTRICAL II

Construction Technology: Electrical II includes classroom and laboratory experiences concerned with the practice of residential wiring, including electrical service, metering equipment, lighting, switches, outlets and other common components, and methods of installation and maintenance of the residential wiring system in accordance with the current National Electrical Code. Additionally, it presents methods and techniques for troubleshooting appliances, motors, motor controls, relay wiring, commercial wiring and industrial wiring systems. It also covers wiring methods and material selection for commercial and industrial wiring systems. Studies include mechanical installation of hardware as well as electrical design and layout. Focuses on tool use, material selection, and installation of machines in the industrial setting. Instruction in thinking critically and independently analyzes, synthesizes, and evaluate technical problems and information. Identify and interpret health, safety, and welfare standards and codes as dictated by local, state or Federal agencies

- DOE Code: 4832
- Recommended Grade Level: Grade 12
- Recommended Prerequisites: Construction Technology: Electrical I
- Credits: 2-3 credits per semester, maximum of 6 credits
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- This course is aligned with postsecondary courses for Dual Credit:
 - Ivy Tech
 - BCOT 129 – Residential Wiring
 - BCOT 220 – Electrical Troubleshooting Techniques
 - BCOT 222 – Commercial/Industrial Wiring

Dual Credit

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in SkillsUSA, the CTSO for this area.

Content Standards

Domain – Residential Wiring

Core Standard 1 Students apply and adapt wiring concepts in residential electrical projects to ensure compliance with National Electrical Code.

Standards

- ETII-1.1 Select wire and devices according to code
- ETII-1.2 Design and install typical service entrance
- ETII-1.3 Draw a wiring diagram based on a set of blueprints, specifications and code requirements
- ETII-1.4 Apply critical thinking skills to technical problems and information
- ETII-1.5 Identify and interpret health, safety, and welfare standards as dictated by local, state or federal agencies

Domain – Electrical Troubleshooting Techniques

Core Standard 2 Students employ wiring concepts to solve electrical problems in generators and alternators.

Standards

- ETII-2.1 Explain operating principles of DC generators
- ETII-2.2 Examine single phase AC generation principles
- ETII-2.3 Examine physical and electrical characteristics of three phase alternators
- ETII-2.4 Perform wiring procedures for alternators

Core Standard 3 Students apply wiring concepts to solve electrical problems in transformers.

Standards

- ETII-3.1 Examine basic principles of transformers
- ETII-3.2 Examine single phase transformers connected in Delta
- ETII-3.3 Explain Wye and Delta connections of single phase transformers
- ETII-3.4 Install instrument transformers
- ETII-3.5 Examine the role of three phase transformers
- ETII-3.6 Understand National electrical code requirements for transformers installations

Domain – Commercial/Industrial Wiring

Core Standard 4 Students apply and adapt wiring processes to all commercial/industrial electrical projects to ensure compliance with the National Electrical Code.

Standards

- ETII-4.1 Read blueprints, interpret drawings, understand specifications, and the NEC when installing an industrial wiring system
- ETII-4.2 Install, service, and repair electrical circuits and controllers in the industrial setting
- ETII-4.3 Size conductors for each application
- ETII-4.4 Identify proper machine hook-up from plans
- ETII-4.5 Install commercial light fixtures
- ETII-4.6 Provide protection for wiring in industrial work areas
- ETII-4.7 Identify safety problems in the industrial areas
- ETII-4.8 List hardware needed
- ETII-4.9 Select tools needed for each job