

CONSTRUCTION TRADES: ELECTRICAL I

Construction Technology: Electrical I includes classroom and laboratory experiences focused on the installation and repair of the electrical and wiring systems of physical structures. The course includes instruction on the reading of technical drawings and their application in construction processes. Topics include the relationship between views and details, interpretation of dimension, transposing scale, tolerance, electrical symbols, sections, materials list, architectural plans, room schedules and plot plans. This course covers both AC and DC circuits. Studies include electron theory, Ohm's Law, Watt's Law, Kirchoff's Law, series circuits, series-parallel circuits, electromagnetic induction, current, voltage, resistance, power, inductance, capacitance, and transformers. Students will demonstrate the use of electrical equipment, troubleshooting techniques, the installation of hardware, metering equipment, lights, switches, and safety procedures and practices. Students will use the underlying scientific principles related to electricity, electronics, circuits, sine waves, and Ohm's Law. Mathematical principles will be used to solve electrical problems. Students will also interpret health, safety, and welfare standards and codes as dictated by local, state or federal agencies.

- DOE Code: 4830
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: Introduction to Construction
- Credits: 2-3 credits per semesters, 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
 - CONT 101 – Introduction to Construction
 - CONT 106 – Constructions Blueprint Reading
 - CONT 127 – Electrical Basics

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 – Introduction To Construction Technology

Core Standard 1 Students examine concepts of basic shop safety and proper tool usage to ensure compliance with professional and governmental regulations.

Standards

- ETI-1.1 Demonstrate safe practices and procedures with construction tools
- ETI-1.2 Demonstrate basic shop and workplace safety procedures
- ETI-1.3 Properly use basic construction hand tools
- ETI-1.4 Use levels and transits
- ETI-1.5 Demonstrate the proper use of portable power tools
- ETI-1.6 Demonstrate the proper set-up and use of stationary power tools
- ETI-1.7 Interpret plans, specifications and codes
- ETI-1.8 Select appropriate tools to create a lab project built to plans or specifications
- ETI-1.9 Diagnose technical and wiring problems based on given information
- ETI-1.10 Interpret health, safety, and welfare standards as dictated by local, state or federal agencies

Domain – Construction Blueprint Reading

Core Standard 2 Students interpret data from plans, blueprints, and codes to ensure structures are built to specifications.

Standards

- ETI-2.1 Identify various elements used in commercial and residential blueprints
- ETI-2.2 Identify the types of architectural lines, symbols, notations, and abbreviations used in print reading
- ETI-2.3 Distinguish between types of drawings such as elevation views, section views, detail views, and construction materials
- ETI-2.4 Interpret and explain building specifications
- ETI-2.5 Define dimensioning standards
- ETI-2.6 Demonstrate the ability to read various scales used in print reading
- ETI-2.7 Read blueprints for structural and trade information
- ETI-2.8 Demonstrate knowledge and skills in reading various plot plans
- ETI-2.9 Think critically to evaluate technical problems and information

Domain – Electrical Basics

Core Standard 3 Students apply concepts of circuitry to ensure proper wiring of structure.

Standards

- ETI-3.1 Describe the differences in AC and DC current
- ETI-3.2 Explain the operation of capacitors, inductors, and transformers
- ETI-3.3 Identify various power sources

Core Standard 4 Students design electrical circuits to ensure correct wiring operations in structures.

Standards

- ETI-4.1 Draw a simple DC circuit and explain various components
- ETI-4.2 Describe the properties of resistance, voltage, current and power

- ETI-4.3 Use Ohm's Law to calculate values
- ETI-4.4 Use a multimeter to measure values in a circuit
- ETI-4.5 Draw and explain series, parallel, series-parallel, open and short circuits
- ETI-4.6 Explain the properties of magnetism and electro-magnetism
- ETI-4.7 Describe the operation of capacitors, inductors, and transformers
- ETI-4.8 Solve mathematical problems relating to electrical systems

Core Standard 5 Students apply appropriate procedures when working with electricity to ensure compliance with professional and governmental regulations.

Standards

- ETI-5-1 Explain proper fusing and wire sizing
- ETI-5-2 Explain proper safety practices when working with electricity
- ETI-5-3 Think critically to evaluate technical problems and information