

Central Ohio Technical College
Course Description Listing – Electrical Trades Technology Courses
2009-2010 Academic Year

ETA-3060 Overview of the Electrical Trades Industry

3 credit hours, 4 contact hours (2 hours lecture and 2 hour lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

This course is an overview of the Electrical Trades Industry that focuses on the apprentices' responsibility, industry structure, and safety on the job. The course also introduces the apprentice to common materials and equipment typically found on a commercial or industrial work site.

ETA-3061 Blue Print Reading and Conduit Fabrication I

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

This course includes conduit fabrication and common installations of conduit plus the introduction to blueprints in which the student uses actual blueprints and construction specifications for a job.

ETA-3062 National Electrical Code I

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

In this first course on National Electric Codes (NEC), the student will be introduced to the code and its importance on the job site. The student will also cover code topics in wiring and wiring devices.

ETA-3063 National Electrical Code II

6 credit hours, 6 contact hours (6 hours lecture and 0 hours lab). Prerequisite: ETA-3062; Open to students accepted into the ETA program only. Course is graded A-E.

In a continued study of the national and local electrical codes for wiring, the student will learn wiring design and production, methods, materials, general use equipment, special occupancies, equipment and tables and diagrams for the solution of wiring problems.

ETA-3064 Blueprint Reading and Conduit Fabrication II

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: ETA-3063; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student will examine grounding and bonding requirements for industrial and commercial electrical installations. Using a combination of lessons, National Electric Code sections and labs, the student will explore all facets of grounding and bonding. The student is introduced to a variety of real world applications requiring a fundamental understanding of electrical theory, codes and installation practices. Topics include grounding requirements for AC systems, service equipment, ground faults and testing.

ETA-3065 Test Instrumentation and Safety

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

An introduction to basic Test Instruments and Transformers, the student will learn the theory of operation and use of analog meters, Digital Multimeters, and Oscilloscopes. Emphasis will be placed on accurate safe measurement techniques. The student will also learn basic transformer theory.

**COTC Course Description Listing – Electrical Trades Technology Courses
2009-2010 Academic Year****ETA-3066 Electrical Grounding**

6 credit hours, 6 contact hours (6 hours lecture and 0 hours lab). Prerequisite: ETA-3063; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will examine grounding and bonding requirements for industrial and commercial electrical installations. Using a combination of lessons, National Electric Code sections and labs, the student will explore all facets of grounding and bonding. The student is introduced to a variety of real world applications requiring a fundamental understanding of electrical theory, codes and installation processes. Topics include grounding requirements for AC systems, service equipment, ground faults and testing.

ETA-3067 Industrial Blueprints and Advanced Transformers

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: ETA-3064; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student using grounding and bonding skills from previous lessons will apply the knowledge to common industrial and commercial electrical applications. The student will explore the mathematics and science of three phase grounded systems. Topics include advanced three phase (WYE and DELTA) transformers, calculating ground faults, and using complex industrial blueprints.

ETA-3068 Advanced Codes and Practices

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: ETA-3063; Open to students accepted into the ETA program only. Course is graded A-E.

In a continued study of the national and local electrical codes for Overcurrent, ground faulty and short circuit protective devices, the student will learn the fundamentals of circuit protection. The student will learn how to calculate the load and apply the correct circuit protection for various applications.

ETA-3069 Motors and Motor Control I

5 credit hours, 6 contact hours (4 hours lecture and 2 hours lab). Prerequisite: ETA-3082; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student begins an in-depth study of motors and industrial motor control systems. The student first learns the operation and construction of polyphase AC motors and DC motors, then applies those skills to commercial and industrial applications and their controls. Topics include polyphase motors, basic motor control applications.

ETA-3070 Lightning Protection and HVAC

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: ETA-3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student begins a study of HVAC fundamentals, Lightning protection systems, and Locating Cable faults pertaining to applications found in modern commercial and industrial environments.

ETA-3071 OSHA 30

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: Open to students accepted into the AMT and ETA programs only. Course is graded S/U.

This course provides in-depth coverage of OSHA policies, procedures and standards, as well as construction safety and health principles. Topics include scope and application of the OSHA construction standards, fall protection, electrical safety, excavations, trenching, personal protective equipment, ladders, lockout/tagout and scaffolds as well as hazard communication, fire protection, hand tools, power tools, welding, cranes, hoists, power transmission, asbestos, mechanized equipment and concrete. Special emphasis is placed on those areas that are the most hazardous, using OSHA standards as a guide. Upon successful course completion, the student will receive an OSHA construction safety and health 30-hour course completion card. This course is graded Satisfactory/Unsatisfactory.

**COTC Course Description Listing – Electrical Trades Technology Courses
2009-2010 Academic Year****ETA-3072 Program Logic Controllers for Electricians**

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: ETA-3069; Open to students accepted into the ETA program only. Course is graded A-E.

This course of study provides the electrical worker with hands-on exposure to PLC's and their associated installation and programming requirements. The student will learn basic ladder logic and PLC programming.

ETA-3073 Fire Alarm Systems

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: ETA-3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student will use skills from previous lessons and apply the knowledge to Fire Alarm systems. Using a combination of lessons and labs, the student will explore the mathematics and science of fire alarm applications. Topics include using complex blueprints, fire alarm installation requirements, code requirements for fire alarm applications.

ETA-3074 Automated Networks and Special Code Applications

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: ETA-3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. Using a combination of lessons, National Electric Code sections and labs, the student will explore the mathematics and science of Automated Networks and special power systems. Topics include using complex blueprints, and Automated and Integrated building networks.

ETA-3075 Advanced Test Instruments

4 credit hours, 4 contact hours (4 hours lecture and 0 hours lab). Prerequisite: ETA-3065; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. The student will explore Measurement techniques, Instrumentation fundamentals, calibration, Installation and Maintenance.

ETA-3076 Distributed Generation

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: ETA-3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial Distributed Generation Systems. Topics include uninterrupted Power Supplies, Solar Photovoltaic Systems and Fuel Cells.

ETA-3077 High Voltage and Insulation Testing

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: ETA-3065; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. The student will explore the process of detecting, testing and safety measures of High Voltage testing. Power Quality is explored to understand, identify, troubleshoot and repair Power Quality problems. Topics include High Voltage safety and testing measures, Power Quality concepts, problems, harmonics and system troubleshooting.

**COTC Course Description Listing – Electrical Trades Technology Courses
2009-2010 Academic Year****ETA-3078 Telephone and Security Systems**

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: ETA-3074; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. Using a combination of lessons and labs, the student will explore Basic Telephone and Security systems.

ETA-3079 OSHA 10

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded S/U.

This course provides in-depth coverage of OSHA policies, procedures and standards, as well as construction safety and health principles. Topics include scope and application of the OSHA construction standards, fall protection, electrical safety, excavations, trenching, personal protective equipment, ladders, lockout/tagout and scaffolds and hazard communications. Special emphasis is placed on those areas that are the most hazardous, using OSHA standards as a guide. Upon successful completion of the course, the student will receive an OSHA construction safety and health 10-hour course completion card. This course is graded Satisfactory/Unsatisfactory.

ETA-3080 Mathematics for Electrical Workers I

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

First year inside apprentices continue their studies with an in-depth overview of mathematics used in field. Topics studies include fractions, trigonometric functions, prefixes and powers of ten, algebraic equations and calculating square roots. The student will also review standard and metric conversions.

ETA-3081 Physics - DC Theory for Electricians

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: ETA-3080; Open to students accepted into the ETA program only. Course is graded A-E.

An introduction to direct current fundamentals, electron physics, current and voltage, work, power series and parallel resistances, electrical measurement devices, circuit analysis.

ETA-3082 Physics - AC Theory for Electricians

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: ETA-3081; Open to students accepted into the ETA program only. Course is graded A-E.

Properties of alternating current, AC measurements, inductance and inductive, reactance, capacitance, impedance, series and parallel circuits, resonance, power and power factor correction, single and three phase transformers and load analysis are discussed.

ETA-3083 Mathematics for Electrical Workers II

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: ETA-3080; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will learn basic Trigonometry functions and right triangle theory. Topics covered will include Pythagorean's Theorem, scalars, vectors, phasors, and complex numbers.

**COTC Course Description Listing – Electrical Trades Technology Courses
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ETA-3084 Physics-Electronics for Electricians

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: ETA-3083; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student is introduced to electronic theory that applies to industrial and commercial electrical systems. Through the use of lessons and labs, the student is exposed to most basic components found in electronic circuits. The student is introduced to a variety of real world applications requiring a fundamental understanding of electronics and electronic components. Topics include semiconductors, diodes, SCRs, transistor, rectifiers, amplifiers, integrated circuits, oscillators and timers.

ETA-3085 Physics - Digital Electronics for Electricians

4 credit hours, 5 contact hours (3 hours lecture and 2 hours lab). Prerequisite: ETA-3084; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student begins an in-depth study of digital electronics. The student is exposed to Boolean Algebra, along with some characteristics of logic circuits, while building upon the binary number system and computer mathematics to explore memory, RS, flip-flops, binary arithmetic circuits, clock circuits, and digital switching circuits.