

# ELECTRONICS SERVICING (414)

## 414-186. Industrial Electricity. (2 Credits)

The student will be introduced to topics such as the atomic nature of electricity, stressing electrical units, basic definitions and symbols, series and parallel circuits, magnetism, inductance, capacitance, generators, and basic alternating current circuits.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=186>)

## 414-389. Industrial Electricity II. (2 Credits)

Explore the selection, application, troubleshooting, and maintenance of electrical control devices and circuitry. Focus on line/ladder logic diagrams, motor starters, time delay logic, AC power systems, control devices, reduced voltage starter circuits, accelerating and decelerating circuits, and reversing circuits for single, three-phase, and DC motors. Prerequisites: (414-386 (may be taken concurrently) with a minimum grade of C- or 414-186 (may be taken concurrently) with a minimum grade of C-)

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=389>)

## 414-396. Industrial Drives and Robotics. (2 Credits)

Gain a basic understanding of CNC and robotic theory of operation and learn to apply that theory to troubleshoot, maintain, and repair this equipment. Become competent in using manufacturer's maintenance manuals to set up and troubleshoot the machines.

Prerequisites: (414-395 with a minimum grade of C or 605-188 with a minimum grade of C or 414-186 with a minimum grade of C)

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=396>)

## 414-408. Basic Industrial Electricity. (0.8 Credits)

This is a basic 8-hour course that is tailored to students needing a basic understanding of voltage, current, resistance and power.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=408>)

## 414-412. AC Motor Drive Applications. (0.8 Credits)

A course in pulse width modulation AC drive technology covering standard components, parameters common to these drives, and principles of operation. Lab work will provide the student with the opportunity to work with actual AC drive components and further enhance their understanding of the principles of operation. Lab work will also cover symptom-based troubleshooting of the drives.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=412>)

## 414-427. Introduction to Controllogix. (3.6 Credits)

Students will learn and apply skills that will provide basic functionality with Controllogix programmable logic controllers (PLC).

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=427>)

## 414-427A. Electrical Controls. (1.2 Credits)

Participants will study power distribution circuits including transmission substation (high voltage), distribution substation (medium voltage), and in-plant distribution; explore the construction and operation of DC motors and single-phase and three-phase AC motors; become familiar with elementary industrial control circuits; construct, wire, test, and operate a typical industrial control panel.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=427A>)

## 414-500. Electricity-Apprentices. (1 Credit)

Explore the principles and applications of direct current and Ohm's Law, and examine the various types of circuits and meters during this apprenticeship course. Discuss additional topics such as electrical power, magnetism, relays, energy, and transducers.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=500>)

## 414-722. E&I Troubleshooting Elec Sys. (1 Credit)

Apprentices will examine troubleshooting and repair of electronic systems and devices involved with electrical and instrumentation. Course learning outcomes include applying safety procedures when testing and troubleshooting electronic systems, analyzing the role and function of semiconductor components, testing semiconductor components, troubleshooting semiconductor applications, performing circuit repair, and applying predictive and preventative maintenance concepts to electronic systems and devices.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=722>)

## 414-725. E&I Intro Indust Automated Sys. (1 Credit)

E and I apprentices will be introduced to industrial automated equipment and systems in this course. Learning outcomes will examine basic control loops, compare automated and robotic manufacturing systems, explore distributed and central control, examine various system layouts, apply controller concepts and communications, and discuss automated control system safety Signaling systems and redundant systems are explored as well.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=725>)

## 414-726. E&I Instrumentation Proc Ctrl. (2 Credits)

Apprentices will explore instrumentation basics involved in process control and relate these to job duties and tasks performed by E and I technicians. Course learning outcomes include safety, instrumentation basics, measurement, control, instrument calibration, control theories, using technical resources, and networking protocols.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=726>)

## 414-727. E&I Measurement and Process. (2 Credits)

Apprentices will learn to describe and explain the make-up of an automatic control loop, the function of each of the control loop elements and the terms used to describe the loop performance and characteristics and perform mathematical functions associated with offset math and apply the concepts to common signaling systems use used in process control systems. Course will examine the principles, methods and devices used to measure flows, temperatures, pressures, levels, and densities in various industrial process applications. Course will explore common methods and types of equipment used to measure chemical components of a material or stream. This course was formerly the MOD-11 unit in related instruction.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=727>)

**414-728. E&I Appl Process Ctrl Capstone. (2 Credits)**

Apprentices will explore the make-up of automatic control loops, and the role and function of control loop elements. Concepts related to common signaling systems used in process control systems will be examined. Course compares various methods of transmitting sensor signals and examines the principles associated with various types of control valves and accessories. Theories of distributed control systems and design considerations are included. A capstone project will be completed during this course to demonstrate mastery of skills learned throughout the entire apprenticeship.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=414&num=728>)