

**Electronic Systems Technician: Level One**

**33101-10 Introduction to the Trade (2.5 Hours)**

Provides an overview of the alarm, telecommunications, and entertainment electronics industries from a technician's perspective. Also introduces the elements of professional conduct and trainees' responsibilities to themselves and their employers, customers, and fellow workers.

**33102-10 Wood and Masonry Construction Methods (12.5 Hours)**

Gives the trainees an overview of the materials and techniques used in constructing and finishing all forms of buildings, including wood frame, brick and block, and post and beam. Covers common drills, bits, and techniques used to drill through wood and masonry. Also reviews the various types of fasteners used with these materials.

**33103-10 Concrete and Steel Construction Methods (12.5 Hours)**

Gives the trainees an overview of the materials and techniques used in constructing and finishing all forms of buildings, including poured and prefabricated concrete and structural steel. Covers common drills, bits, and techniques used to drill through concrete and steel. Also reviews the various types of fasteners used with these materials.

**33104-10 Pathways and Spaces (12.5 Hours)**

Introduces the many types of conduits and wireways used in low-voltage applications, along with their supporting hardware and fittings. Provides an overview of telecommunications cables pathways from the source to the destination, including maintenance holes, ducts, equipment rooms, and telecommunications closets.

**33105-10 Craft-Related Mathematics (12.5 Hours)**

Expands on the knowledge gained in the Core Curriculum module Introduction to Construction Math. Emphasizes metric system, including how to convert between corresponding English and metric system units. Also covers the use of scientific notation, powers and roots, and the basic concepts of algebra, geometry, and right-angle trigonometry.

**33106-10 Hand Bending of Conduit (7.5 Hours)**

Provides an introduction to conduit bending and installation. Covers the techniques for using hand-operated conduit benders, as well as cutting, reaming and threading conduit.

**33107-10 Introduction to the *National Electrical Code* (7.5 Hours)**

Provides a navigational road map for using the NEC. Introduces the layout of the NEC and the types of information found within the code book. Allows trainees to practice finding information using an easy-to-follow procedure.

**33108-10 Low-Voltage Cabling (20 Hours)**

Covers the makeup, identification, and applications of various types of conductors and cables used in telecommunications and security systems. Describes the tools, materials, and procedures for pulling cables through conduit and raceways.

**Electronic Systems Technician: Level Two**

**33201-05 DC Circuits (12.5 Hours)**

Offers a general introduction to the electrical concepts used in Ohm's law as applied to DC series circuits. Includes atomic theory, electromotive force, resistance, and electrical power equations. Introduces series, parallel, and series-parallel DC circuits. Covers Kirchoff's voltage and current laws and circuit analysis.

**33202-05 AC Circuits (15 Hours)**

Provides an introduction to AC theory, circuits, and components, including inductors, capacitors, and transformers. Covers the calculation of reactance and impedance in RL, RC, LC, and RLC circuits using math and vector analysis.

**33203-05 Semiconductors and Integrated Circuits (10 Hours)**

Provides an introduction to the principles of electronics and semiconductor theory, components, and applications.

**33204-05 Basic Test Equipment (10 Hours)**

Covers selection, inspection, use, and maintenance of the analog and digital meters used in the installation and checkout of electronic systems.

**33205-05 Power Quality and Grounding (20 Hours)**

Covers grounding and bonding of electrical systems. Discusses NEC regulations pertaining to grounding and bonding. Covers equipment and devices used for grounding and bonding, including their methods of installation. Explains power quality, along with the causes and effects of poor power quality

**33206-05 Introduction to Electrical Blueprints (7.5 Hours)**

Introduces electrical prints, drawings, and symbols. Teaches the types of information that can be found on schematics, one-line drawings, and wiring diagrams.

**33207-05 Switching Devices and Timers (12.5 Hours)**

Presents the principles of operation and describes the different types and configurations of switches, relays, timers, and photoelectric devices. Covers guidelines for the selection of appropriate devices using specification sheets.

**33208-05 Wire and Cable Terminations (20 Hours)**

Provides information and detailed instructions for selecting, installing, and testing connectors and other terminating devices on the various cables used in low-voltage work, including telecommunications, video and audio, and fiber optics.

**33209-05 Introduction to Codes and Standards (10 Hours)**

Describes the scope and content of the major codes and standards that apply to telecommunications, life safety, security, and other low-voltage systems. Emphasizes on familiarization with and use of the NEC.

**33210-05 Computer Applications (20 Hours)**

Provides an introduction to computer hardware and software, as well as the types and uses of computer networks. Explains many terms used in conjunction with computers and computer networks. Also introduces the trainee to computer troubleshooting.

**3211-05 Advance Test Equipment (20 Hours)**

Covers test devices, such as oscilloscopes, signal generators, meggers, wattmeters, frequency meters, cable testers, and RF analyzers, used in troubleshooting cabling systems.

**Electronic Systems Technician: Level Three**

**33301-04 Cable Selection (15 Hours)**

Provides an overview of the types of cable used for various low-voltage installations. Also covers the methods used to select the proper size and type of cable for a typical installation.

**33302-04 Buses and Networks (25 Hours)**

Provides information on connecting computers and components, including various methods for connecting computers in a network, information on connecting controls and equipment in a control system, and information on how data is transferred between the nodes in a network.

**33303-04 Fiber Optics (20 Hours)**

Introduces the types of equipment and methods used in fiber-optic cable installation.

**33304-04 Video Systems (15 Hours)**

Introduces the types of equipment used in various video systems. Describes the operation of the various types of video systems.

**33305-04 Wireless Communication (15 Hours)**

Introduces the operating principles and equipment used in common types of radio frequency (RF) and infrared (IR) wireless communication systems. Covers RF communication systems, IR-controlled systems, power line carrier (PLC) systems, RF and IR wireless computer networks, and satellite communication systems. Discusses the equipment used for testing and troubleshooting wireless communication system.

**33306-04 Site Survey, Project Planning, and Documentation (15 Hours)**

Covers the tasks involved in planning a job from start to finish, including how to perform site survey for both new and retrofit construction projects. Covers the different kinds of drawings, specifications, and other documents commonly used.

**33307-04 Maintenance and Repair (15 Hours)**

Introduces the background information and the tasks involved in the maintenance and repair of low-voltage systems and equipment. Covers a systematic approach to system and component-level troubleshooting and the methods of identifying common type of repairs.

**33308-04 Introductory Skills for the Crew Leader (16 Hours)**

Teaches the basic skills required to supervise personnel. Discusses principles of project planning and management and presents several case studies for student participation.

**33309-04 Rack Assembly (15 Hours)**

Describes rack systems and best practices for assembling electronic system enclosures including power sequencing, grounding, weight distribution, and heat dissipation. Explains electrical power distribution and load calculations for equipment housed within racks.

**Electronic Systems Technician: Level Four**

**33401-03 Fire Alarm Systems (40 Hours)**

Covers the basics of fire alarm systems, including devices, circuits, system design and installation guidelines, power requirements, control panel programming, testing, and troubleshooting. Explores integration of fire alarms with other systems. Examines both residential and commercial fire alarm applications. Emphasizes the NEC.

**33402-03 Intrusion Detection Systems (30 Hours)**

Introduces intrusion detection security systems. Describes devices such as sensors, notification, control panel, and programming. Covers system design and installation guidelines, wiring, testing, and troubleshooting. Emphasizes codes and standards.

**33403-03 Audio Systems (40 Hours)**

Introduces and explains audio system components, including input sources, amplifiers, signal processing equipment, and output equipment. Describes power requirements, cabling options, system configuration, and basic design considerations. Reviews common test equipment used for installation and troubleshooting.

**33404-03 Overview of Nurse Call and Signaling Systems (10 Hours)**

Presents an overview of nurse call and signaling systems as found in hospitals and other health-care facilities. Covers basic emergency call and duress system requirements based on facility type. Identifies installation requirements based on UL and other building code specifications.

**33405-03 CCTV Systems (20 Hours)**

Describes the installation and configuration of closed circuit TV systems for small, medium, and large facilities. Explains various equipment, including cameras, lenses, remote-positioning, video recording, and transmission. Covers the roles of the internet and digital technologies. Introduces test and troubleshooting equipment.

**33406-03 Broadband Systems (15 Hours)**

Describes the major elements of headend design for specialized television systems, including CATV, SMATV, and MATV systems. Explains receivers, modulators, amplification, and distribution devices. Explains proper signal levels, cable attenuation, insertion loss, and acceptable carrier-to-noise levels. Covers common test equipment and troubleshooting procedures.

**33407-03 Access Control Systems (30 Hours)**

Introduces access control systems, including applications, door locking systems, readers, biometrics, and controllers. Emphasizes installation practices as well as building and electrical codes.

**33408-03 Systems Integration (20 Hours)**

Presents concepts for connecting two or more standalone systems together. Emphasizes how to improve the capabilities of each system. Describes the best practices for interoperability and system performance. Discusses various interconnecting options and integration protocols. Emphasizes high-tech building automation systems.

**33409-03 Systems Commissioning and User Training (10 Hours)**

Covers the basics of final testing and closeout procedures and how to build these activities into your projects. Describes customer satisfaction levels and expectations and how to meet them during the cut-over phase of any project. Focuses on industry best practice and user required training.

**33410-03 Media Management Systems (10 Hours)**

Explains the basic principle behind shared media resource and their access via a computer network or hardwired application. Describes media types for both analog and digital platforms. Explains cabling options including fiber-optic interfaces.

**33411-06 Telecommunications Systems (10 Hours)**

Describes the history and current use of basic subscriber systems. Also covers PBX systems used in business applications and Central office services used to interface to the public switched telephone network (PSTN).