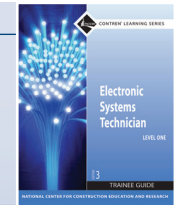


Electronic Systems Technician

L1 ELECTRONIC SYSTEMS TECHNICIAN



LEVEL 1

Curriculum Notes

- 160 Hours (Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately. See p. 14 for ordering information.)
- Revised: 2010, Third Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK	ISBN
Trainee Guide: \$67	978-0-13-213709-6
Instructor's Guide: \$67	978-0-13-213710-2
NCCERconnect Access Card: \$67	978-0-13-424371-9
NCCERconnect + Trainee Guide: \$92	978-0-13-427459-1

MODULES

All of the modules listed below are included in the Trainee Guide and the Instructor's Guide. The following ISBN and pricing information is for ordering individual modules only.

Introduction to the Trade (2.5 Hours)

Trainee \$20 ISBN 978-0-13-213747-8
 Instructor \$20 ISBN 978-0-13-213756-0
 (Module ID 33101-10) Provides an overview of the alarm, telecommunications, and entertainment electronics industries. Introduces the elements of professional conduct and trainees' responsibilities to themselves and their employers, customers, and fellow workers.

Wood and Masonry Construction Methods (12.5 Hours)

Trainee \$20 ISBN 978-0-13-213748-5
 Instructor \$20 ISBN 978-0-13-213757-7
 (Module ID 33102-10) Reviews the materials and techniques used in constructing and finishing residential and commercial 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 describes types of fasteners used with these materials.

Concrete and Steel Construction Methods (12.5 Hours)

Trainee \$20 ISBN 978-0-13-213749-2
 Instructor \$20 ISBN 978-0-13-213758-4
 (Module ID 33103-10) Describes the materials and techniques used in constructing and finishing residential and commercial buildings, including poured and prefabricated concrete and structural steel. Covers common drills, bits, and techniques used to drill through concrete and steel. Also describes types of fasteners used with these materials.

Pathways and Spaces (12.5 Hours)

Trainee \$20 ISBN 978-0-13-213750-8
 Instructor \$20 ISBN 978-0-13-213759-1
 (Module ID 33104-10) Introduces conduits and wireways used in low-voltage applications, along with their supporting hardware and fittings. Covers telecommunications cable pathways from the source to the destination, including maintenance holes, ducts, equipment rooms, and telecommunications closets.

Craft-Related Mathematics (12.5 Hours)

Trainee \$20 ISBN 978-0-13-213751-5
 Instructor \$20 ISBN 978-0-13-213761-4
 (Module ID 33105-10) Expands on the *Core Curriculum* module *Introduction to Construction Math* with an emphasis on the metric system, including how to convert between English and metric units. Also covers the use of scientific notation, powers and roots, and the basic concepts of algebra, geometry, and right-angle trigonometry.

Hand Bending of Conduit (7.5 Hours)

Trainee \$20 ISBN 978-0-13-213753-9
 Instructor \$20 ISBN 978-0-13-213762-1
 (Module ID 33106-10) Introduces conduit bending and installation. Covers techniques for using hand-operated conduit benders, as well as cutting, reaming, and threading conduit.

Introduction to the National Electrical Code® (7.5 Hours)

Trainee \$20 ISBN 978-0-13-213754-6
 Instructor \$20 ISBN 978-0-13-213728-7
 (Module ID 33107-10) Provides a road map for using the *NEC*® by introducing the layout and the types of information found within the code book. Allows trainees to practice finding information using an easy-to-follow procedure.

Low-Voltage Cabling (20 Hours)

Trainee \$20 ISBN 978-0-13-213755-3
 Instructor \$20 ISBN 978-0-13-213730-0
 (Module ID 33108-10) Covers the makeup, identification, and applications of conductors and cables used in telecommunications and security systems. Describes the tools, materials, and procedures for pulling cables through conduit and raceways.

L2 ELECTRONIC SYSTEMS TECHNICIAN

LEVEL 2

Curriculum Notes

- 145 Hours
- Revised: 2011, Third Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK	ISBN
Trainee Guide: \$97	978-0-13-213712-6
Instructor's Guide: \$97	978-0-13-213713-3
NCCERconnect Access Card: \$97	978-0-13-424365-8
NCCERconnect + Trainee Guide: \$122	978-0-13-427761-5

MODULES

All of the modules listed below are included in the Trainee Guide and the Instructor's Guide. The following ISBN and pricing information is for ordering individual modules only.

DC Circuits (15 Hours)

Trainee \$20 ISBN 978-0-13-266153-9
 Instructor \$20 ISBN 978-0-13-266165-2
 (Module ID 33201-10) Introduces electrical concepts used in Ohm's law as applied to DC series circuits. Describes atomic theory, electromotive force, resistance, and electrical power equations. Introduces series, parallel, and series-parallel DC circuits. Covers Kirchhoff's voltage and current laws and circuit analysis.

AC Circuits (20 Hours)

Trainee \$20 ISBN 978-0-13-266154-6
 Instructor \$20 ISBN 978-0-13-266166-9
 (Module ID 33202-10) Introduces 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.

Switching Devices and Timers (15 Hours)

Trainee \$20 ISBN 978-0-13-276963-1
 Instructor \$20 ISBN 978-0-13-266167-6
 (Module ID 33203-10) 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.

Semiconductors and Integrated Circuits (10 Hours)

Trainee \$20 ISBN 978-0-13-266157-7
 Instructor \$20 ISBN 978-0-13-266168-3
 (Module ID 33204-10) Introduces the principles of electronics and semiconductor theory, components, and applications.

Test Equipment (10 Hours)

Trainee \$20 ISBN 978-0-13-266158-4
 Instructor \$20 ISBN 978-0-13-266169-0
 (Module ID 33205-10) Covers the selection, inspection, use, and maintenance of basic test equipment used in low-voltage work. Also covers specialized test equipment such as signal generators, wattmeters, cable testers, and RF analyzers.

Introduction to Electrical Drawings (10 Hours)

Trainee \$20 ISBN 978-0-13-266159-1
 Instructor \$20 ISBN 978-0-13-266170-6
 (Module ID 33206-10) Describes electrical prints, drawings, and symbols and the types of information that can be found on schematics, one-line drawings, and wiring diagrams.

Introduction to Codes and Standards (10 Hours)

Trainee \$20 ISBN 978-0-13-266160-7
 Instructor \$20 ISBN 978-0-13-266171-3
 (Module ID 33207-10) Describes the scope and content of the major codes and standards that apply to telecommunications, life safety, security, and other low-voltage systems. Emphasis on familiarization with and use of the *NEC*®.

Cable Selection (10 Hours)

Trainee \$20 ISBN 978-0-13-266161-4
 Instructor \$20 ISBN 978-0-13-266173-7
 (Module ID 33208-10) Provides an overview of the types of cable used for low-voltage installations. Also covers the methods used to select the proper size and type of cable for a typical installation.

Electronic Systems Technician Level 2 (continued)

Wire and Cable Terminations (25 Hours)

Trainee \$20 ISBN 978-0-13-266162-1
 Instructor \$20 ISBN 978-0-13-266174-4
 (Module ID 33209-10) Provides information and instructions for selecting, installing, and testing connectors and other terminating devices on cables used in low-voltage work, including telecommunications, video and audio, and fiber optics.

Power Quality and Grounding (20 Hours)

Trainee \$20 ISBN 978-0-13-266163-8
 Instructor \$20 ISBN 978-0-13-266175-1
 (Module ID 33210-10) 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.

L3 ELECTRONIC SYSTEMS TECHNICIAN

LEVEL 3

Curriculum Notes

- 152.5 Hours
- Revised: 2011, Third Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

ISBN

Trainee Guide: \$97 978-0-13-257823-3
 Instructor's Guide: \$97 978-0-13-266249-9

NCCERconnect Access Card: \$97 978-0-13-424374-0

NCCERconnect +
 Trainee Guide: \$122 978-0-13-427859-9

MODULES

All of the modules listed below are included in the Trainee Guide and the Instructor's Guide. The following ISBN and pricing information is for ordering individual modules only.

Buses and Networks (25 Hours)

Trainee \$20 ISBN 978-0-13-266375-5
 Instructor \$20 ISBN 978-0-13-266383-0
 (Module ID 33301-11) Details procedures for connecting computers and components, including network connections. Provides information on connecting controls and equipment in a control system, and explains how data is transferred between the nodes in a network.

Fiber Optics (25 Hours)

Trainee \$20 ISBN 978-0-13-266376-2
 Instructor \$20 ISBN 978-0-13-266384-7
 (Module ID 33302-11) Introduces the types of equipment and methods used in fiber-optic cable installation.

Wireless Communication (10 Hours)

Trainee \$20 ISBN 978-0-13-266377-9
 Instructor \$20 ISBN 978-0-13-266385-4
 (Module ID 33303-11) Introduces operating principles and equipment used in 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 systems.

Site Survey, Project Planning, and Documentation (15 Hours)

Trainee \$20 ISBN 978-0-13-266378-6
 Instructor \$20 ISBN 978-0-13-266386-1
 (Module ID 33304-11) Explains planning a job from start to finish, including how to perform site surveys for new and retrofit construction projects. Covers drawings, specifications, and other documents commonly used.

Fundamentals of Crew Leadership (20 Hours)

Trainee \$43 ISBN 978-0-13-266379-3
 Instructor \$43 ISBN 978-0-13-266387-8
 (Module ID 46101-11, Second Edition) Covers basic leadership skills and explains different leadership styles, communication, delegating, and problem solving. Jobsite safety and the crew leader's role in safety are discussed, as well as project planning, scheduling, and estimating. Includes performance tasks to assist the learning process.

Rack Assembly (17.5 Hours)

Trainee \$20 ISBN 978-0-13-266380-9
 Instructor \$20 ISBN 978-0-13-266389-2
 (Module ID 33305-11) 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.

System Commissioning and User Training (20 Hours)

Trainee \$20 ISBN 978-0-13-266381-6
 Instructor \$20 ISBN 978-0-13-266390-8
 (Module ID 33306-11) Covers the final testing and closeout procedures and how to build these activities into projects. Describes customer satisfaction levels and expectations and how to meet them during the cut-over phase of any project. Focuses on industry best practices and user-required training.

Maintenance and Repair (20 Hours)

Trainee \$20 ISBN 978-0-13-266382-3
 Instructor \$20 ISBN 978-0-13-266391-5
 (Module ID 33307-11) Introduces tasks involved in the maintenance and repair of low-voltage systems and equipment. Presents a systematic approach to system and component-level troubleshooting and methods of identifying common types of repairs.

L4 ELECTRONIC SYSTEMS TECHNICIAN

LEVEL 4

Curriculum Notes

- 325 Total Hours (175 Audio, Video, Voice & Data Training Path and 175 Life Safety & Security Training Path)
- Revised: 2012, Third Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.
- Modules 33401-12, 33402-12, 33403-12, and 33404-12 carry SBCA's endorsement of training in support of its Satellite Fundamentals, Home Theater Fundamentals, and MDU/SMATV certifications.
- Module 33408-12 supports skills and knowledge statements used as the basis for NICET Fire Alarm Installer Certification Tests.

PAPERBACK

ISBN

Trainee Guide: \$97 978-0-13-257821-9
 Instructor's Guide: \$97 978-0-13-266256-7

NCCERconnect Access Card: \$97 978-0-13-443625-8

NCCERconnect +
 Trainee Guide: \$122 978-0-13-453975-1

MODULES

All of the modules listed below are included in the Trainee Guide and the Instructor's Guide. The following ISBN and pricing information is for ordering individual modules only.

Audio Systems (30 Hours)

Trainee \$20 ISBN 978-0-13-292256-2
 Instructor \$20 ISBN 978-0-13-292267-8
 (Module ID 33401-12) 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.

Video Systems (40 Hours)

Trainee \$20 ISBN 978-0-13-292257-9
 Instructor \$20 ISBN 978-0-13-292269-2
 (Module ID 33402-12) Describes the types of equipment used in various video systems and equipment, including both analog and digital video, video signaling, display devices, HDTV, 3-D video, and video processing and distribution.

Broadband Systems (40 Hours)

Trainee \$20 ISBN 978-0-13-292258-6
 Instructor \$20 ISBN 978-0-13-292270-8
 (Module ID 33403-12) Describes the major elements of head-end design for specialized television systems, including CATV, SMATV, and MATV systems. Explains the function and operation of receivers, modulators, amplification, and distribution devices. Discusses proper signal levels, cable attenuation, insertion loss, and acceptable carrier-to-noise levels. Covers common test equipment and troubleshooting procedures.



Electronic Systems Technician Level 4 (continued)

Media Management Systems (20 Hours)

Trainee \$20 ISBN 978-0-13-292259-3
Instructor \$20 ISBN 978-0-13-292271-5
(Module ID 33404-12) Explains the basic principles behind shared media resources and their access via a computer network or hardwired application. Describes media types for both analog and digital platforms. Explores cabling options including fiber-optic interfaces.

Telecommunications Systems (20 Hours)

Trainee \$20 ISBN 978-0-13-292260-9
Instructor \$20 ISBN 978-0-13-292272-2
(Module ID 33405-12) 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).

Residential and Commercial Building Networks (25 Hours)

Trainee \$20 ISBN 978-0-13-292261-6
Instructor \$20 ISBN 978-0-13-292273-9
(Module ID 33406-12) Describes how home and business systems such as fire alarms, security, energy, and entertainment can be integrated using specialized smart home and building management software and controllers. Describes best practices for system interoperability and performance. Discusses various interconnection options and integration protocols.

Intrusion Detection Systems (30 Hours)

Trainee \$20 ISBN 978-0-13-292262-3
Instructor \$20 ISBN 978-0-13-292274-6
(Module ID 33407-12) Describes devices such as sensors, notification, control panels, and programming used in intrusion detection security systems. Covers system design and installation guidelines, wiring, testing, and troubleshooting. Emphasizes codes and standards.

Fire Alarm Systems (40 Hours)

Trainee \$20 ISBN 978-0-13-292263-0
Instructor \$20 ISBN 978-0-13-292275-3
(Module ID 33408-12) 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, emphasizing *NEC*[®] requirements.

Overview of Nurse Call and Signaling Systems (15 Hours)

Trainee \$20 ISBN 978-0-13-292264-7
Instructor \$20 ISBN 978-0-13-292276-0
(Module ID 33409-12) 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.

CCTV Systems (30 Hours)

Trainee \$20 ISBN 978-0-13-292265-4
Instructor \$20 ISBN 978-0-13-292278-4
(Module ID 33410-12) 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.

Access Control Systems (35 Hours)

Trainee \$20 ISBN 978-0-13-292266-1
Instructor \$20 ISBN 978-0-13-292279-1
(Module ID 33411-12) Introduces access control systems, including applications, door locking systems, readers, biometrics, and controllers. Emphasizes installation practices as well as building and electrical codes.