

ATCW-1230: STANDARDS AND MEASUREMENTS

Cuyahoga Community College

Viewing: ATCW-1230 : Standards and Measurements

Academic Term:

Spring 2019

Subject Code

ATCW - AIT-Communication Workers

Course Number:

1230

Title:

Standards and Measurements

Catalog Description:

Basic course covering electrical codes and industrial standards and manufacturing warranties for the communications transport industry. In addition, industry practices for jurisdictional compliance are included.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: admission into the CWA apprenticeship program.

Outcomes

Course Outcome(s):

I. Discuss the respective electrical codes with respect to terminology, materials and procedures, general equipment and related communications systems.

Objective(s):

1. Differentiate between codes, standards and manufacturers' warranties.
2. Identify the agencies that develop codes.
3. Define the terms related to the communication transport codes.
4. Explain the pathway system including the components, bonding infrastructure and conduits used with respect to the National Electrical Code (NEC).
5. Identify proper installation and maintenance procedures for the NEC.
6. Identify NEC acceptable equipment for use in communication systems.
7. Discuss the codes related to the communication circuits and various medium types of distribution.

Course Outcome(s):

II. Discuss the function of the different standards committees including pathways and compliance systems and equipment identification.

Objective(s):

1. Explain standards that affect pathway components and infrastructure.
 2. Define a standards compliance system.
 3. Identify equipment used to establish an industry standard system.
 4. Identify terms related to communications transport standards.
 5. Recognize the organizations that develop industry standards.
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Course Outcome(s):

III. Discuss the requirements of meeting manufacturers' warranted installations.

Objective(s):

1. Explain conditions that must be met in order to be manufacturer compliant.
 2. Identify equipment used to complete a warrantable system.
 3. Discuss the training required for meeting manufacturers' warranties.
 4. List different manufacturers' warranties for current standards compliance.
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Course Outcome(s):

IV. Identify the testing procedures for various circuits to meet codes, industry standards/manufacturer warranties and customer requirements.

Objective(s):

1. Discuss the administrative duties of communications transport systems testing.
 2. List the different steps of performance/compliance testing.
 3. Discuss the procedures followed for testing documentation.
 4. Identify the different types of circuits that are tested for compliance.
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Methods of Evaluation:

1. Quizzes
2. Tests
3. Class participation

Course Content Outline:

1. Electrical codes
 - a. NEC
 - i. Purpose
 - ii. Governance
 - iii. Enforcement
 - iv. Revisions
 - b. Terminology
 - i. Fiber optics
 - ii. Scope
 - iii. Shall/must versus may/should
 - iv. Circuit
 - v. Pathway
 - vi. Demarcation
 - vii. Point of entry
 - viii. Twisted pair
 - ix. Topology
 - x. Infrastructure
 - xi. Coaxial
 - xii. Terminations
 - xiii. As built
 - c. Pathway system
 - i. Wiring
 - ii. Conduits
 - iii. Structural support
 - iv. Penetrations
 - v. Fire stopping
 - d. Installation
 - i. Exposed work
 - ii. New
 - iii. Retrofit
 - iv. Pathway

- e. Maintenance
 - i. Equipment
 - ii. Hazards
 - iii. As built drawings
 - iv. Personnel
 - v. Certifications
 - vi. Documentations
- f. Acceptable equipment
 - i. Wiring
 - 1. Gauge
 - 2. Sheathing
 - 3. Pair counts
 - 4. Rating
 - ii. Termination
 - 1. Station
 - 2. Equipment room
 - iii. Grounding and bonding
 - iv. Safety equipment
 - 1. Personal protective equipment
 - 2. Environmental
 - 3. Ventilation
- g. Communications circuits
 - i. Abandoned cable
 - ii. Point of entry
 - iii. Access
 - iv. Demarcation
 - v. Markings
- h. Mediums
 - i. Copper
 - 1. Twisted pair
 - 2. Coaxial
 - ii. Fiber
 - iii. Wireless
- 2. Standards committees
 - a. Terms
 - i. White papers
 - ii. Technical service bulletin
 - iii. Footnotes
 - iv. Intermediate Main Distribution Frame IMDF
 - v. Open System Interconnection OSI
 - vi. Network
 - vii. Tip and ring
 - viii. Wireless fidelity Wi-Fi
 - ix. Transmission Control Protocol Internet Protocol TCPIP
 - b. Organizations
 - i. Institute of Electrical and Electronics Engineers IEEE
 - ii. Building Industry Consulting Service International BICSI
 - iii. International Organization for Standardization IOS
 - iv. American National Standards Institute ANSI
 - v. International Technical Commission ITC
 - vi. Telecommunication Industry Association TIA
 - vii. United Laboratories UL
 - viii. Electronic Industry Alliance EIA
 - ix. Federal Communications Commission FCC
 - x. National Fire Protection Association NFPA
 - xi. WiFi Alliance
 - c. Pathway components and infrastructure
 - i. Open System Inner Connection OSI
 - ii. Networking standards 802 Standard

- iii. Grounding and bonding 607 Standard
- iv. Commercial building standard 568 ANSI/TIA/EIA
- v. Pathways 569 Standard
- vi. Administrative standard for commercial communications infrastructure 606.
- d. Standard compliance systems
 - i. Components
 - ii. Installations
 - iii. Certifications
 - iv. Testing
 - v. Documentation
- e. Equipment
 - i. Racks
 - ii. Grounding bus bar
 - iii. Cabinets
- 3. Manufacturer warranty
 - a. Conditions
 - i. Code and standard compliant
 - ii. Training
 - 1. Product specific
 - 2. Current certifications
 - b. Warrantable equipment
 - i. Test equipment
 - ii. Termination tools
 - iii. Time domain reflectometer (TDR)
 - 1. Copper
 - 2. Optical
 - c. Training
 - i. Product specific
 - ii. Organizational
 - d. Manufacturing warranty
 - i. Transmission speed
 - ii. Cable performance
 - iii. Audit/inspections
 - 1. Authority having jurisdiction (AHJ)
 - 2. Client
 - 3. General contractor
 - 4. Manufacturer
- 4. Testing procedure
 - a. Administrative duties
 - i. Test completion
 - ii. Recordkeeping
 - iii. Results presentation
 - b. Test procedure
 - i. Visual
 - ii. Compliance
 - iii. Documentation
 - c. Documentation
 - i. Job specific
 - ii. Out of service location
 - d. Circuit types
 - i. Optical
 - ii. Twisted pair
 - iii. Coaxial
 - iv. Wireless

Resources

BICSI. *Information Technologies Systems Installation Methods*. 6th. BICSI Tampa, Florida, 2007.

Independent Electrical Contractors Chesapeake and Western Electrical Contractors Association. *Electrical Pre Apprenticeship Workforce Development*. 2013 (Current). Delmar, Cengage Learning Clifton Park, New York, 2007.

Cisco Networking Academy. *Fundamentals of Voice and Data Cabling*. 6th. Cisco Press Indianapolis, IN, 2003.

BICSI. *Telecommunications Cabling Installation Workbook*. {ts '2013-10-06 00:00:00'}.

Resources Other

1. www.tech-faq.com/osi-model.html
2. standards.ieee.org/findstds/standard/communications.htm
3. www1.eere.energy.gov

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