Network and Product Integrity (NPI)
2014 Telcordia Training Programs

Catalog of Course Descriptions
Catalog of Telcordia Course Descriptions

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Introduction
Telcordia has developed several training courses specific to network infrastructure to satisfy the competence needs of our customers. These courses are based on industry requirements, Telcordia Generic Requirements, and industry standards and codes. The courses are fundamental and critical to help ensure the integrity of the network.

Service delivery is supported using various delivery methods including:

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<tr>
<td>![Icon]</td>
<td>Instructor Led Training (ILT)</td>
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<td>Virtual Classroom Training (VCT)</td>
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<td>eLearning (WBL)</td>
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<td>![Icon]</td>
<td>Workshop (WS)</td>
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</table>
Telcordia Installation Quality for Telecom Facilities

LZU1089417

Description

The Telcordia Installation Quality for Telecom Facilities course covers the basics of safe and proper equipment installation and removal processes in telecommunications facilities. The course covers all of the basic knowledge expected of Installation Suppliers of network infrastructure and equipment. At the conclusion of the classroom session, the students will be tested for certification to GR-1275 installation methods as required for Level 1 Installation Supplier personnel (i.e., Level 1 Installers), per the Telcordia standard, GR-1275-CORE, Central Office/Network Environment Equipment Installation/Removal Generic Requirements. Telcordia leads the industry in the development and ongoing maintenance of the installation requirements to address the evolving network infrastructure. Telcordia installation training is provided by a Telcordia installation and quality expert with over 15 years of experience in telecommunications installation quality.

Learning objectives

Key topics covered in this training course include:

- Review of the Telcordia Family of Document (FD) set, FR-INSTALL-19, Central Office/Network Environment Installation Requirements and Services, which includes the GR-1275 document.
  - Building Requirements;
  - Working Safely;
  - Proper Tools;
  - Job Information Memos (JIMs) and Method of Procedures (MOPs);
  - Overhead Ironwork and Cable Racks;
  - Frames and Cabinets;
  - Fire-Stopping Cable Penetrations;
  - Equipment and Location Designations;
  - Equipment Interconnection;
  - Equipment Power;
  - Grounding;
  - Equipment Removals;
  - Proper Handling of Fiber Optic Cables;
  - Installer Skill Levels and Expectations;
  - Raised Floors;
  - Standby Power;
Target audience
This course is designed for equipment installation suppliers/personnel/sub-contractors, managers, and administrators who require an understanding of Central Office (CO) and data center installation/removal procedures. The class is ideal for installation service providers working on site in COs, data centers, and co-location facilities. Companies doing customized design furnish and installation work of carrier solutions would also benefit. Any person needing a practical understanding of carrier installation/removal standards would find this class useful.

Prerequisites
None. However, a general knowledge of CO or data center environments is beneficial.

Duration and class size
The length of the course is 4 days and the maximum number of participants is 10.

Learning situation
The course is based on Instructor-Led Training (ILT) sessions in a classroom environment. There will be 3 days of instruction followed by 1 day of material review and written testing. This interactive classroom promotes a personalized learning environment.

Time schedule
The time required always depends on the knowledge of the attending participants, however, the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review of FR-INSTALL-19, which includes GR-1275.</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Building Requirements;</td>
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<td></td>
<td>Working Safely;</td>
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<td></td>
<td>Proper Tools;</td>
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<td></td>
<td>JIMs and MOPs;</td>
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<tr>
<td>Day</td>
<td>Topics in the course</td>
<td>Estimated time (hours)</td>
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<tr>
<td>2</td>
<td>Overhead Ironwork and Cable Racks; Frames and Cabinets; Fire-Stopping Cable Penetrations; Equipment and Location Designations;</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Equipment Interconnection; Equipment Power; Grounding;</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Equipment Removals; Proper Handling of Fiber Optic Cables; Installer Skill Levels and Expectations; Raised Floors; Standby Power; Hazardous Materials.</td>
<td>8</td>
</tr>
</tbody>
</table>
Telcordia Overview of NEBS™ Requirements

LZU1089418

Description

NEBS™ (Network Equipment - Building System) is the most popular set of Telcordia Generic Requirements documents (GRs) and is applicable to all indoor and outdoor equipment. It is the most common set of safety, spatial, and environmental design guidelines applied to telecommunications equipment in the United States. NEBS is why telephones work after an earthquake or thunderstorm! NEBS requirements are utilized worldwide for a host of commercial, utility, and defense applications.

This course provides a basic understanding of the equipment design and testing requirements contained in the Telcordia documents GR-63-CORE, NEBS™ Requirements: Physical Protection; and GR-1089-CORE, Electromagnetic Compatibility (EMC) and Electrical Safety - Generic Criteria for Network Telecommunications Equipment. These NEBS requirements are widely applied to all carrier telecommunications equipment intended for installation in Central Offices (COs), data centers, and other spaces. Telcordia leads the industry in the development and ongoing maintenance of the NEBS requirements to address the evolving infrastructure of network equipment. Telcordia NEBS training is provided by a NEBS expert with over 15 years of experience in the development of and testing to NEBS requirements.

Learning objectives

Key topics covered in this training course include:

- Review of the Telcordia Family of Document (FD) set, FD-NEBS-01, NEBS™ Physical and Electrical Protection, which includes GR-63 and GR-1089.
- Purpose of the NEBS Requirements;
- Space Planning for Equipment Rooms;
- Operating Temperature Limits and Testing;
- Fire Resistance;
- Shock Resistance;
- Earthquake and Vibration;
- Airborne Contaminants;
- Illumination;
- Electrostatic Discharge (ESD) and Electrical Fast Transient (EFT);
- Electromagnetic Emissions and Immunity;
- Lighting and AC Power Fault;
- Electrical Safety;
- Bonding and Grounding;
- NEBS Levels;
- Carrier-Specific Requirements.

**Target audience**
The target audience for this course is any person who deals with network equipment used in telecommunications facilities (e.g., telecommunications service providers, and equipment suppliers and manufacturers).

**Prerequisites**
None. However, a general knowledge of telecommunications equipment is beneficial.

**Duration and class size**
The length of the course is 2 days and the maximum number of participants is 12.

**Learning situation**
The course is based on Instructor-Led Training (ILT) sessions in a classroom environment. This interactive classroom promotes a personalized learning environment.

**Time schedule**
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time (hours)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Review of FD-NEBS-01, which includes GR-63 and GR-1089, and discussions on the following topics:</td>
<td>8</td>
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<tr>
<td></td>
<td>Purpose of the NEBS Requirements;</td>
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<td></td>
<td>Space Planning for Equipment Rooms;</td>
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<td></td>
<td>Operating Temperature Limits and Testing;</td>
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<td>Fire Resistance;</td>
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<td>Shock Resistance;</td>
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<td>Earthquake and Vibration;</td>
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<td></td>
<td>Airborne Contaminants;</td>
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<td></td>
<td>Illumination;</td>
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</tbody>
</table>
ESD and EFT;
Electromagnetic Emissions and Immunity;
Lighting and AC Power Fault;
Electrical Safety;
Bonding and Grounding;
NEBS Levels;
Carrier-Specific Requirements.
Telcordia Training of the National Electrical Code® (NEC®) and National Electrical Safety Code® (NESC®)

LZU1089467

Description

Part I of this course discusses the National Electrical Code (NEC), or NFPA 70, which is used by all states in the U.S. for industry-wide electrical standards. The NEC is published by the National Fire Protection Association (NFPA). The NEC is adopted into law by local Authorities Having Jurisdiction (AHJ). Students will gain an in-depth understanding of how provisions work to ensure reliable systems and equipment, while reducing the risks of electrical fires, shocks, and other electrical hazards.

Part II of the course focuses on the National Electrical Safety Code (NESC), or IEEE C2. The NESC is published by the Institute of Electrical and Electronics Engineers (IEEE), and governs the installation and maintenance of electric and communications lines and substations.

The course identifies the differences between the NEC and the NESC, and will assist participants in determining what standard applies at which locations.

Upon successful completion of the course, attendees will receive 16 Professional Development Hours.

Learning objectives

Upon completion of this course, the participants will be able to:

- Understand the organization and general application of both the NEC and the NESC.
- Know how to apply the codes and determine which codes to apply in typical installations
- Recognize actions that should be taken for code compliance
- Learn how to use each code to eliminate violations and reduce safety hazards
- Understand how to investigate accidents and prepare for potential legal action resulting from injury or damage
- Learn how to conduct code compliance audits.
Target audience

The target audience for this course is: Technical staff responsible for code compliance.

Prerequisites

None.

Duration and class size

The length of the course is 2 days and the maximum number of participants is 30.

Learning situation

The course is based on Instructor-Led Training (ILT) sessions in a classroom environment.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time (hours)</th>
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<tbody>
<tr>
<td>1</td>
<td>General Principles and Historical Background Code and Standards Demarcation Points – NEC, NESC, NEBS™, Occupational Safety and Health Administration (OSHA) Regulations, etc.</td>
<td>8</td>
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<tr>
<td></td>
<td>Part 1: National Electrical Code (NEC)</td>
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<tr>
<td></td>
<td>Organization</td>
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<td></td>
<td>Application Locations</td>
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<td></td>
<td>Enforcement</td>
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<td></td>
<td>Telecommunications Application</td>
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<td></td>
<td>Bonding and Grounding</td>
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<td></td>
<td>Arc-Flash Concerns</td>
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</tr>
</tbody>
</table>
Part 2: National Electrical Safety Code (NESC)

- Organization
- Application Locations
- Enforcement
- General Safety Precautions and Guidelines
- Visual Pole Inspection
- Aerial Plant Clearances
- Hardware Issues
- Intersystem Bonding and Grounding
- Pole Testing, Inspection, and Strength Requirements
- Locations of Power Units, Amplifiers, and Other Supply Equipment on Joint Use Structures
- Smart Grid and Broadband Devices – Solar Panels, Antennas.
Design Principles and Guidelines for Communications Networks: An Overview of the Telcordia Blue Book (SR-1421)

LZU1089468

Description

This course provides an overview of design principles and guidelines for communications networks with the information modeled on the Telcordia SR-1421, *Blue Book – Manual of Construction Procedures*. The engineering principles, design philosophy, and *National Electrical Safety Code (NESC®)* factors that guide the installation choices and construction activities for communications networks are explored for Outside Plant (OSP) aerial, buried, and underground situations. The *Blue Book* guidelines are the basis of the best Methods & Procedures (M&Ps) and work aids used by major communications/telecommunications carriers.

Upon successful completion of the course, attendees will receive 16 Professional Development Hours.

Learning objectives

Upon completion of this course, the participants will be able to:

- Understand the uniform construction procedures to be used
- Promote reliable network performance
- Encourage safe practices and network configuration through compliance with the NESC and harmonization with current applicable Occupational Safety and Health Administration (OSHA) rules
- Provide a technical basis for developing Joint-Use Agreements (JUAs) and efficient working relationships with power supply companies and other joint users of poles, towers, trenches, conduit systems, and other Outside Plant (OSP) structures.

Target audience

The target audience for this course is: Technical staff responsible for OSP construction as well as installation compliance.

Prerequisites

None.
Duration and class size

The length of the course is 2 days and the maximum number of participants is 30.

Learning situation

The course is based on Instructor-Led Training (ILT) sessions in a classroom environment.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time (hours)</th>
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<tbody>
<tr>
<td>1</td>
<td><strong>General Principles and Historical Background</strong></td>
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<tr>
<td></td>
<td>• NESC and Bell System Practices (BSPs)</td>
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<td></td>
<td>• Code and Standards Demarcation Points – NEC, NESC, NEBS™, and Regulations, etc.</td>
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<td></td>
<td>• Functional Requirements for Product and Network Reliability - Component and Network</td>
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<td>• Role of Joint-Use Agreements (JUAs) and Right-of-Way (RoW) Issues.</td>
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<td></td>
<td><strong>General Safety Precautions and Guidelines</strong></td>
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<td>• Working in the Vicinity of Power</td>
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<td></td>
<td>• Visual Pole Inspection</td>
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<td>• Buried Plant</td>
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<td>• Manholes</td>
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<td>• Fiber Optics</td>
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<td>• Inspection and a Make-Ready Survey Checklist.</td>
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<td><strong>Aerial Plant</strong></td>
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<td></td>
<td>• Clearances</td>
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<td></td>
<td>• Hardware Issues – Strand and Stringing Tension</td>
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<td></td>
<td>✓ Pole Line Attachment Hardware</td>
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<td></td>
<td>✓ Guys and Insulators</td>
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<tr>
<td></td>
<td>✓ Anchors and Guy Rods</td>
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<tr>
<td></td>
<td>• Intersystem Bonding and Grounding</td>
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<tr>
<td></td>
<td>• Pole Testing, Inspection, and Strength Requirements</td>
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<td></td>
<td>• Locations of Power Units, Amplifiers, and other Supply Equipment on Joint Use Structures</td>
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<tr>
<td></td>
<td>✓ Smart Grid and Broadband Devices – Solar Panels, Antenna, etc.</td>
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</table>
Underground Plant

- Manholes – Precautions, Testing, and Work Rules
- Air Monitoring and Purging in Confined Space
- Bonding and Grounding
- Conduits, Ducts, and Duct Liners – Seals and Plugs.

Buried Plant Construction

- Random Separation of Communications and Power Cables
- Bonding and Grounding
- Burial Depth and Trenching
- Direct-Buried Innerduct Construction Guidelines – Trenching/Plowing/Drilling
- High-Air-Speed, Blown (HASB) Cable Installation
- Directional Drilling
- Bonding for Communication Drop Wire and Cable.

Fiber-To-The-X (FTTX) Deployments
Telcordia Hardware Reliability Prediction Procedure (RPP) Training Using the ARPP Tool (Based on SR-332)

Description
Reliability prediction is an important element in the process of selecting reliable equipment for telecommunications and data networks. Telcordia SR-332, *Reliability Prediction Procedure for Electronic Equipment*, provides a recommended method for predicting device and unit-level hardware reliability. These techniques estimate the mean failure rate in FITs (Failures In Time) for electronic equipment.

Phase I of this course provides an overview of basic reliability definitions and the methods described in SR-332 for predicting the reliability of serial systems such as printed circuit boards and non-redundant systems. It covers the various device failure-rate tables and the electrical and environmental stress factors that modify the device failure rates to account for operating conditions. It also discusses how to incorporate field and life test data into reliability predictions.

Phase II of this course covers the use of the Microsoft® Excel®-based software tool provided with SR-332, which is called *Automated Reliability Prediction Procedure (ARPP-11.0)*. This phase covers how to import device description and quantity from parts lists (Bill of Material), selecting device categories and subcategories from a drop-down menu, and selecting various electrical stress, operating temperature, and environmental stress parameters. This is a hands-on demonstration of the ARPP-11.0 tool using actual examples of board-level parts lists.

Learning objectives
Key topics covered in this training course include:

- Steady-State Reliability Definitions;
- Early Life Multiplier;
- Parts Count Prediction Model;
- Model Stress Factors;
• Device Failure Rate Tables;
• Field and Laboratory Data;
• Importing Device Data into the ARPP Tool;
• Classifying Parts and Stress Parameters;
• Sample Report Format.

Target audience
This one-day course is for those interested in learning about the SR-332 prediction method, or for those who have purchased the Telcordia SR-332 document with the ARPP-11.0 software tool and would like training in the use of the tool from a Telcordia expert to reduce the learning time and quickly get started in predicting reliability.

Prerequisites
None. However, a general knowledge of reliability prediction is beneficial.

Duration and class size
The length of the course is 1 day. A maximum class size of 10 students is recommended.

Learning situation
The course is based on Instructor-Led Training (ILT) or Virtual Classroom Training (VCT) sessions using Microsoft® Lync™ meeting software.

Time schedule
The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.
<table>
<thead>
<tr>
<th>Day</th>
<th>Topics in the course</th>
<th>Estimated time (hours)</th>
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<tbody>
<tr>
<td>1</td>
<td>Part I – Introductions</td>
<td>8</td>
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<tr>
<td></td>
<td>Part II – SR-332 Presentation</td>
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</tr>
<tr>
<td></td>
<td>Part II – ARPP Software Tool Presentation</td>
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<tr>
<td></td>
<td>Part IV – Questions &amp; Answers (Q&amp;A)</td>
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