

# **IT113T**

## **Structured Cabling**

### **[Onsite]**

**Course Description:**

This course provides the study of industry standards and practices involved in wiring a computer network, including media and protocol specifications, connection topologies, installation, testing and troubleshooting.

**Prerequisite(s) and/or Corequisite(s):**

Prerequisites: TB143T Introduction to Personal Computers, TB145T Introduction to Computing

**Credit hours: 4**

**Contact hours: 60 (36 Theory Hours, 24 Lab Hours)**

## Syllabus: Structured Cabling

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Instructor: \_\_\_\_\_

Office hours: \_\_\_\_\_

Class hours: \_\_\_\_\_

### Major Instructional Areas

1. Technology and Components of Data Cabling
2. Cabling Specifications and Standards
3. Various Network Media and Connectors
4. Cabling-System Design and Installation
5. Cabling-System Testing, Troubleshooting, and Tips

### Course Objectives

1. Describe the role of a data cable and the transmission passing through it.
2. Determine the relevant cabling standards and constraints for a given project.
3. Analyze different cable system components for different topologies.
4. Compare copper cable to fiber-optic cable.
5. Identify common cabling tools and cable connectors required for cabling system installation.
6. Analyze different types of network interface equipment.
7. Analyze different types of wireless networks.
8. Document a cabling project using the standard industry documents and diagrams.
9. Design a cabling system for a given project.
10. Evaluate the operations of a cable system through testing.
11. Describe the construct of an optical fiber.

12. Use the resources on the ITT Tech Virtual Library to analyze various network cabling techniques.

## SCANS Objectives

SCANS is an acronym for Secretary's Commission on Achieving Necessary Skills. The committee, created by the National Secretary of Labor in the early 1990s, created a list of skills and competencies that the committee feels are necessary for employees to function in a high-tech job market.

1. Select a technology to achieve the desired results.
2. Identify the purpose and procedure for setting up and operating computers and their programming systems.
3. Maintain the technology, which includes identifying, understanding, and performing routine preventative maintenance.
4. Solve problems related to computers and other technologies.
5. Demonstrate how to apply the technology to task.

## Course Outline

Note: All graded activities, except the Project, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Lab 2.1 refers to the 1<sup>st</sup> lab activity in Unit 2.

Unit	Activities
1– Data Cables and Transmissions	<ul style="list-style-type: none"> <li>• Content Covered:               <ul style="list-style-type: none"> <li><i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking:</i> <ul style="list-style-type: none"> <li>○ Chapter 1, "Introduction to Data Cabling"</li> <li>○ Chapter 14, "Cable Connector Installation"</li> </ul> </li> </ul> </li> <li>• Exercises: 1.1</li> <li>• Labs: 1.1</li> </ul>

Unit	Activities
2—Cabling Standards	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking</i>:               <ul style="list-style-type: none"> <li>○ Chapter 2, “Cabling Specifications and Standards”</li> <li>○ Chapter 4, “Cable System and Infrastructure Constraints”</li> </ul> </li> <li>• Exercises: 2.1</li> <li>• Labs: 2.1</li> </ul>
3—Cable Components and Topology	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking</i>:               <ul style="list-style-type: none"> <li>○ Chapter 3, “Choosing the Correct Cabling”</li> <li>○ Chapter 5, “Cabling System Components”</li> </ul> </li> <li>• Quiz 1</li> <li>• Exercises: 3.1</li> <li>• Labs: 3.1</li> </ul>
4—Comparing Copper to Fiber-Optic Cables	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking</i>:               <ul style="list-style-type: none"> <li>○ Chapter 7, “Copper Cable Media”</li> <li>○ Chapter 8, “Fiber-Optic Media”</li> </ul> </li> <li>• Exercises: 4.1</li> <li>• Labs: 4.1</li> </ul>
5—Cabling Tools and Cable Connectors	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking</i>:               <ul style="list-style-type: none"> <li>○ Chapter 6, “Tools of the Trade”</li> <li>○ Chapter 9, “Wall Plates”</li> <li>○ Chapter 10, “Connectors”</li> </ul> </li> <li>• Exercises: 5.1</li> </ul>

Unit	Activities
	<ul style="list-style-type: none"> <li>• Labs: 5.1</li> </ul>
6—Documenting a Cabling Project	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking</i>: <ul style="list-style-type: none"> <li>○ Chapter 16, “Creating a Request for Proposal”</li> <li>○ Chapter 17, “Cabling @ Work: Experience from the Field”</li> </ul> </li> <li>• Read from ITT Tech Virtual Library&gt; Books&gt; Books24x7&gt; <i>IT Project+ Study Guide</i>: <ul style="list-style-type: none"> <li>○ Chapter 2, “Project Initiation”</li> <li>○ Chapter 3, “Scope Planning”</li> </ul> </li> <li>• Read from ITT Tech Virtual Library&gt; Reference&gt; Project Management&gt; Microsoft Project&gt; Project 2003 Help: <ul style="list-style-type: none"> <li>○ “Creating a Project Plan”</li> </ul> </li> <li>• Quiz 2</li> <li>• Exercises: 6.1</li> <li>• Labs: 6.1</li> </ul>
7—Cabling Design and Installation	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking</i>: <ul style="list-style-type: none"> <li>○ Chapter 13, “Cabling System Design and Installation”</li> </ul> </li> <li>• Read from <a href="http://office.microsoft.com/en-us/visio/FX100649221033.aspx">http://office.microsoft.com/en-us/visio/FX100649221033.aspx</a>: <ul style="list-style-type: none"> <li>○ Visio 2003 Help and How-to</li> </ul> </li> <li>• Exercises: 7.1</li> <li>• Labs: 7.1</li> <li>• Project Part I</li> </ul>
8—Cable System	<ul style="list-style-type: none"> <li>• Read from <i>Cabling: The Complete Guide to Copper and Fiber-</i></li> </ul>

Unit	Activities
Testing	<p><i>Optic Networking:</i></p> <ul style="list-style-type: none"> <li>○ Chapter 15, “Cable System Testing and Troubleshooting”</li> </ul> <ul style="list-style-type: none"> <li>● Exercises: 8.1</li> <li>● Labs: 8.1</li> <li>● Project Part II</li> </ul>
9–Extending the Network	<ul style="list-style-type: none"> <li>● Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking:</i> <ul style="list-style-type: none"> <li>○ Chapter 11, “Network Equipment”</li> <li>○ Chapter 12, “Wireless Networks”</li> </ul> </li> <li>● Quiz 3</li> <li>● Exercises: 9.1</li> <li>● Labs: 9.1</li> <li>● Project Part III</li> </ul>
10–Fiber-Optic	<ul style="list-style-type: none"> <li>● Read from <i>Cabling: The Complete Guide to Copper and Fiber-Optic Networking:</i> <ul style="list-style-type: none"> <li>○ Chapter 20, “Basic Principles of Light”</li> <li>○ Chapter 21, “Optical Fiber Construction and Theory,” pp. 537-542</li> <li>○ Chapter 22, “Optical Fiber Characteristics,” pp. 553-566</li> </ul> </li> <li>● Labs: 10.1</li> </ul>
11–Final Exam	<ul style="list-style-type: none"> <li>● Final Exam</li> </ul>

## Instructional Methods

The Structured Cabling course will help advance your career by helping you acquire skills to successfully design, plan, manage, and troubleshoot a cabled infrastructure. You will use the textbook, lab sessions, classroom lessons, electronic resources, such as CDs and Web references, to speed up and enhance your learning.

Throughout the course, you will get the opportunity to apply and test your knowledge through a multiple part project, quizzes, exams, and labs. The activities and assignments are practical and directly relate to the objectives of the course.

The classroom session will include lectures with demonstration of procedures and illustration of concepts as well as multimedia animation to illustrate visual concepts. Whenever possible, instructors will use real-world examples and scenarios for illustrating the objectives being taught. The lectures are based on the content in the course textbook.

The lab assignments are designed to assess you on the concepts and procedures covered during the lecture period.

## **Instructional Materials and References**

### **Student Textbook Package**

Oliviero, Andrew, and Bill Woodward. *Cabling: The Complete Guide to Copper and Fiber-Optic Networking*. 4<sup>th</sup> ed. Alameda: Wiley Publishing, 2009. (Custom edition)

### **Student Companion Web Site**

Oliviero, Andrew, and Bill Woodward. *Cabling: The Complete Guide to Copper and Fiber-Optic Networking*. 4<sup>th</sup> ed. Flash Animations: Wiley Publishing, 2011.

### **References**

#### **ITT Tech Virtual Library**

Log on to the ITT Tech Virtual Library at <http://www.library.itt-tech.edu/> to access online books, journals, and other reference resources selected to support ITT Tech curricula.

#### Books

You may click “Books” or use the “Search” function on the home page to find the following books.

#### Books24x7

- Dean, Tamara. *CompTIA Network+ 2009 in Depth*. Boston, MA: Cengage Learning, 2009.
- Heldman, William, and Lona Cram. *IT Project+ Study Guide. 2<sup>nd</sup> ed. (Exam PKO-002)* Alameda, CA: Sybex, 2004.

#### Ebrary

- Barnett, David, David Groth, and Jim McBee. *Cabling: The Complete Guide to Network Wiring. 3<sup>rd</sup> ed.* Alameda, CA: Sybex, 2004.
- Fuller, Ron (Contributor), Tim Blakenship (Contributor), and Robert Padjen (Contributor). *Building a Cisco Wireless LAN*. Rockland, MA: Syngress Publishing, 2002.
- Gilster, Ron, and Helen Heneveld. *HTI+ Home Technology Integration and CEDIA Installer I All-in-One Exam Guide*. Emeryville, CA: McGraw-Hill Osborne, 2004.
- Ross, John. *Book of Wireless: A Painless Guide to Wi-Fi and Broadband Wireless. 2<sup>nd</sup> ed.* San Francisco, CA: No Starch Press, 2008.
- Trulove, James. *LAN Wiring*. Blacklick, OH: McGraw-Hill Professional Publishing, 2005.
- Wetteroth, Debbra. *OSI Reference Model for Telecommunications*. Blacklick, OH: McGraw-Hill Professional Publishing, 2001.

#### Gale Virtual Reference Collection

- Green, James (Ed.). *Structured Cabling Systems. 5<sup>th</sup> ed. Irwin Handbook of Telecommunications*.



Periodicals

You may click “Periodicals” or use the “Search” function on the home page to find the following periodicals.

## ProQuest Computing

- “MRV Communications, Inc.; MRV Debuts Next-Gen 10G Media Converter for Network Cabling Flexibility and Distance Extension up to 100 km.” Anonymous. *Network Business Weekly*. Atlanta: Jan 25, 2010. p. 7.
- “SIEMON: New Siemon white paper on delivering video over the structured cabling network.” Anonymous. *M2 Presswire*. Coventry: Oct 29, 2009.

Reference

You may click “Reference” or use the “Search” function on the home page to find the following reference resources.

## Additional reference resources&gt; Project Management

- Microsoft Project

## Additional reference resources&gt; Grammar, Writing &amp; Style

- APA Formatting and Style Guide
- APA Style
- Basics of APA Style Tutorial
- Dr. Grammar

School Of Study

You may click “School Of Study” or use the “Search” function on the home page to find the following resources.

## School of Information Technology &gt; Recommended Links

- PC MAGAZINE
- PC WORLD

**Other References**

The following resources may be found **outside** of the ITT Tech Virtual Library, whether online or in hard copy.

Web sites

- Cabling Business Magazine: This is the Web site of the cabling business magazine.  
[www.cablingbusiness.com/](http://www.cablingbusiness.com/) (accessed March 24, 2010)
- Cabling Installation and Maintenance: This Web site provides information on how to install and maintain cabling systems.  
<http://www.cablinginstall.com/index.html> (accessed March 24, 2010)
- Data Communications Cabling FAQ: This Web site provides information sources, standards, implementation methods and definitions for data communications cabling.  
[www.faqs.org/faqs/LANs/cabling-faq/](http://www.faqs.org/faqs/LANs/cabling-faq/) (accessed March 24, 2010)
- ethermanage.com: This Web site provides valuable information on Ethernet LAN systems.  
[www.ethermanage.com/ethernet/](http://www.ethermanage.com/ethernet/) (accessed March 24, 2010)
- IEEE Standards Association: This is the home page of the IEEE 802 workgroup on standards.  
<http://standards.ieee.org/getieee802/> (accessed March 24, 2010)

- IHS Standards Store: This Web site is a source of information for various electronic and electrical equipments and products.  
<http://global.ihs.com/> (accessed March 24, 2010)
- Microsoft Office Online: This Web site provides useful tips and tricks for using Microsoft Visio 2003.  
<http://office.microsoft.com/en-us/visio/FX100649221033.aspx?CTT=96&Origin=CL100636311033>  
(accessed March 24, 2010)
- National Electrical Code: This Web site provides information about important electrical code terms for contractors, electricians, engineers, inspectors, instructors, safety specialists, and other electrically related individuals.  
<http://www.mikeholt.com/index.php?id=homegeneral> (accessed March 24, 2010)
- Premises Networks: This Web site provides marketplace to search for network-related equipments.  
<http://www.premisesnetworks.com/?VNETCOOKIE=NO> (accessed March 24, 2010)
- Protocols.com: This Web site provides information on various data communication protocols.  
[www.protocols.com/](http://www.protocols.com/) (accessed March 24, 2010)
- TechFest Networking: This Web page provides information on networking concepts.  
[www.techfest.com/networking/](http://www.techfest.com/networking/) (accessed March 24, 2010)
- Whatis.com: This Web site is a computer dictionary for computer and information technology (IT)-related terms.  
<http://whatis.techtarget.com/> (accessed March 24, 2010)
- Wiring.com: This Web site provides important information on wired and wireless networks.  
[www.wiring.com/](http://www.wiring.com/) (accessed March 24, 2010)

Following is a list of vendors and manufacturers of the cabling field:

- Anixter: [www.anixter.com/AXECOM/US.NSF/HomePage](http://www.anixter.com/AXECOM/US.NSF/HomePage) (accessed March 24, 2010)
- Erico International Corporation: [www.erico.com/](http://www.erico.com/) (accessed March 24, 2010)

- Fluke Networks: [www.flukenetworks.com/fnet/en-us](http://www.flukenetworks.com/fnet/en-us) (accessed March 24, 2010)
- IDEAL Industries, Inc.: [www.idealindustries.com/](http://www.idealindustries.com/) (accessed March 24, 2010)
- Labor Saving Devices, Inc.: [www.lsdinc.com/content/main](http://www.lsdinc.com/content/main) (accessed March 24, 2010)
- MilesTek: [www.milestek.com/](http://www.milestek.com/) (accessed March 24, 2010)
- Ortronics: [www.ortronics.com/](http://www.ortronics.com/) (accessed March 24, 2010)
- Panduit: <http://www.panduit.com/index.htm> (accessed March 24, 2010)
- Siemon: [www.siemon.com/](http://www.siemon.com/) (accessed March 24, 2010)
- Superior Essex: [www.superioressex.com/](http://www.superioressex.com/) (accessed March 24, 2010)

All links to Web references outside of the ITT Tech Virtual Library are always subject to change without prior notice.

## Course Evaluation and Grading

### Evaluation Criteria Table

The final grades will be based on the following categories:

CATEGORY	WEIGHT
Exercises	15%
Labs	20%
Quizzes	15%
Project	25%
Final Exam	25%
<b>Total</b>	<b>100%</b>

Note: Students are responsible for abiding by the Plagiarism Policy.

### Grade Conversion Table

The final grades will be calculated from the percentages earned in the course, as follows:

A	90-100%	4.0
B+	85-89%	3.5
B	80-84%	3.0
C+	75-79%	2.5
C	70-74%	2.0
D+	65-69%	1.5
D	60-64%	1.0
F	<60%	0.0

*(End of Syllabus)*