

Hands-On

# DSL - Digital Subscriber Line Installation, Maintenance & Troubleshooting

including: CAT5 & CAT6 Preparation, Installation & Testing



## BICSI CECs

This course has been approved for CEC credits by BICSI. Please read below for a breakdown of the credits that we offer for this course. For more information regarding BICSI please visit our website.

RCDD: 14	NTS: 14	OSP: 14	Inst: 14	Tech: 14	Cert. Trainer: 14
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## Course Description

This 2-day Hands-On course provides in-depth instruction for Installing, Maintaining and Troubleshooting DSL services. Attendees will learn the inner workings as to how the DSL works and the loop parameters required providing uninterrupted service.

This will include residential, commercial and industrial environments. This is a Hands-On course that uses state of the art testing equipment. Meters will be used to check loop parameters and will train your technicians Line pre-qualification, line performance, DSL customer-end equipment installation and troubleshooting is the primary focus of this course.

You can't afford to operate on a "plug and pray" basis in today's competitive market. Our SMEs have the field experience to find the answers to real live scenarios, providing students with a Real-World Experience

## Students Will Learn

- **DSL Applications**
- **Cable Channels Over the Copper Pair, Internet Access,**
- **Video on Demand, Video Conferencing, Voice Over IP, more...**
- **All Types of xDSL**
- **ADSL , ADSL2, ADSL2+, ISDL, HSDL, RADSL, SDSL, VDSL, VDSL2+, CDSL, UDSL**
- **DSL System Components & Configurations for Residential & Business Modems, Splitters, Filters, more**
- **Hands-on Exercises using Sunrise, EXFO, Fluke, JDSU (Acterna, TTC), DynaTel, Sidekick, and any additional meters to synchronize with DSLAM, and interpret results...**
- **Turn up Results Margin Capacity, Upstream, Downstream, Maximum Bit rates, more.**
- **DSL Loop Parameters & Cable Acceptance Distances, Speeds, Cable Pair-Testing and Qualifications.**

- **CAT5 / CAT6 Cable Preparation, Install & Testing Latest Standards, Tools, and Techniques used for cable installations, plus Speeds, Cable Testing and Qualifications.**
- **Hands-On Testing & Troubleshooting DSL Circuits, Test Equipment, and more...**
- **Troubleshooting Identify Customers Related Problems, Defective Lines and Equipment.**
- **And More**

## Target Audience

OSP Technicians, CO Technicians, ILEC Installation, Repair and Maintenance Technicians, CLEC/ASI ADSL Installation Technicians, CLEC/ASI Network Technicians, DSL Technical Support Technicians, DSL Group Managers Sales & Marketing Support Managers and anyone requiring Hands-On skills for supporting, installation and/or maintenance of DSL services.

## Prerequisites

Basic electrical / telephony concepts. This information can be obtained in our  
 -TeleCom I or II  
 -Basic Telephony & TeleCom Electronics

## Course Outline

Module I: Understanding xDSL

Terms and Acronyms

History of xDSL

Types of xDSL

ADSL

ADSL2/ADSL+

SDSL

HDSL

VDSL

VDSL2+

IDS

RADSL

CSDL

UDSL

xDSL and Applications

Cable Channels Over the Copper Pair

Internet Access

Video on Demand

Video Conferencing

Voice Over IP

## Module II: Components of a DSL System

- Modems
- Splitters
- Filters
- ATU-C/ATU-R
- DSLAMs

## Module III: Digital Transmission

- Explanation of bits and bytes
- CAP/DMT line code
- Converting digital to analog
- Error detection schemes
- Frames and Superframes
- System parameters
- Design applications
- Examples of download/upload systems
- Loop parameters
  - Capacity
  - Margin
- Interpreting LINK TRUN-UP RESULTS
  - Bits Graphic
  - Explanation of all DSL connection results

## Module IV: Loop Qualification & Testing

- Distance versus bit rate
  - Gauge/quality of cable
- Bridge taps
- Load coils/Smart coils
- Power influence
- Explanation of test equipment used in ADSL
  - Sunrise/Dynatel/Harris/Sidekick/Any type brought to class
- Complete a 10 step troubleshooting procedure
  - Field tested and proven successful
- Testing and explanation of physical faults
  - Shorts/grounds/crosses/splits/opens (high joints)
- Interferers
  - T1/AM radio/other high frequency interference issues
- Insertion loss
- TDR traces and testing

## Module V: CAT5 & CAT6 Cable Preparation, Installation and Troubleshooting

- Codes and Standards
- Pulling Cables
- Supporting Cables
- Cable Obstacles
- Cable Documentation
- Pathways

- Special Tools
- Pair Twist Limits
- Bend Radius
- Connector Types
- Cable Management
- Cable Performance Specifications
- Quality Workmanship
- Cable Terminating
- Termination Tools
- Termination
- Testing

#### Module VI: Case Studies & Troubleshooting Tips

Discussion of issues associated with customers  
Aerial and buried drops  
    Twisting/bonding and grounding  
    Protectors  
Inside wire  
    Cat 3/Cat 5/Cat 6  
Basic troubleshooting tips at the PC  
    Correct cords  
    Network Interface Card Installation (NIC)

### **Delivery Method**

Instructor led with numerous Hands-On labs and exercises.

### **Equipment Requirements**

**(This apply's to our hands-on courses only)**

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

### **Course Length**

2 Days