

Hands-On

Special Circuits for Santa Clara Valley Water District



Course Description

This customized Special-Service Circuits Maintenance course provides extensive information on the design, maintenance, and troubleshooting of the Santa Clara telecom data network. The course will provide the skills necessary to perform day-to-day maintenance, plus show how to troubleshoot service-affecting faults. Various test equipment will be introduced and demonstrated. This course should also greatly assist personnel when working with major service providers such as Verizon and AT&T.



The course is based upon BTS existing Data Networking courses, and provides an in-depth discussion of the existing network elements, how modems work, and how to best use

test equipment for the type of network topology used. It also will show how to setup performance monitoring of lines, to help predict where faults are starting to occur, even in cases where the fault may be some distance away.

Students Will Learn

- **How the existing voice and data network works, and how it connects to the telco service providers**
- **The types of faults that occur with the data lines and with modems**
- **How to find the physical location of a fault**
- **The types of test equipment available, and how to most effectively use it for fault-finding**
- **How to repair a line correctly, with minimum down-time and maximum reliability**
- **Use other trouble-mitigating techniques and features to prevent future problems**
- **And More...**

Target Audience

Intended for employees who are responsible for the maintenance and troubleshooting of special-service circuits used to send and receive data traffic, used in the operations of the Santa Clara municipal government.

Course Outline

Module 1 Line Basics

The Public Switched Telephone Network (PSTN)
Plain-Old Telephone Service (POTS)
Lines AC & DC voltages, dB, impedance, wiring color code
Analog Transmission VF waveforms, transmitter & receiver
Digital Transmission data transmission, A/D conversion
Line Faults noise, high-impedance short circuits

Module 2 Modems

How Modems Work
Features LL, RT, scrambling, level, impedance
Setup DIP switches, jumpers, user docs
Modem Faults noise, surges, drop-outs, transients

Module 3 Special Service Circuits

What Is A Special Service Circuit?
Schematic Symbols & Elements
Circuit Designs
Santa Clara Monitoring Network

Module 4 Test Equipment

Meters voltage, noise, power (dB)
Telephone Test Sets (Butt-in)
Transmission Impairment Measurement Set (TIMS)
Time-Domain Reflectometer (TDR)
Patch Cord Types

Santa Clara Valley Water District: Special-Service Circuits Maintenance

Santa Clara Special-Service Circuits Maintenance Course Page 3 of 4
Copyright 2018 BTS, Inc. All Rights Reserved 1-877-Info-2-Day | www.BTStraining.com
Module 5 Troubleshooting

Voice & Data What are the differences?
Verify the Fault
Checking for Noise
Checking for Short Circuits

Checking for Levels
Checking for Transients
Logging Data, and Interpreting the results
Splicing
Verify the Repair

Module 6 Preventative Maintenance
Pro-active Maintenance Routines
Modem Features
Line Conditioning
Power Conditioning

Notes

The course is designed to run for 2 1&82602 days in a classroom setting for up to 12 students, but additional length could be added if needed to provide a greater understanding of telecom networks (i.e. to provide a tier-2 expert level of support) to some students. Field trips to actual equipment premises can be used to allow students an opportunity to see and understand where all the parts of the system are found, what they do, and provide a better end-to-end understanding of the network.

Delivery Method

Instructor-led with a flexible approach that adjusts content most relevant to students. Includes various labs, demonstrations, and exercises to help students focus on and retain the material presented.

Equipment Requirements

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

BTS can provide all the necessary test, measurement, and training equipment for a successful, hands-on course, but also encourages attendees to bring their own equipment, such as laptops, meters, and Transmission Impairment Measurement Set (TIMS) test sets. This provides an opportunity for valuable training, as students learn the features and capabilities of the actual equipment they will be using in their jobs.

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

3 Days