

Hands-On  
**CO Power**  
Central Office Power



### 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: 16	Inst: 15	Tech: 16	Cert. Trainer: 16
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### Course Description

This 2-day Hands-On course is designed for Central Office Technicians with responsibility for the installation, maintenance, troubleshooting and repair of Central Office power equipment. The course provides a well-rounded basic study of Central Office power that most technicians work with on a regular basis. Theory is effectively combined with a practical hands-on approach that enhances the students learning experience and maximizes their value as Central Office Technicians.

Objectives Upon completion of this course the student will have a solid foundation of knowledge and experience to work effectively with Central Office power equipment to perform maintenance, troubleshooting and repair with minimal supervision.

This course will cover the following topics

- AC power equipment maintenance and repair (AC power Functions, AC Surge Arrestors, AC Transfer Switches, Stand-by Generators)
- DC power equipment and distribution (Operations and Maintenance of Batteries, Rectifiers, Inverters, Power Cabling)
- Breakers and fuses
- Grounding & protection
- Test equipment
- Central Office battery rundown test performed in the Maintenance Window.
- And much more

### Students Will Learn

- **Central Office power background topics covered in this class are basic electricity and basic telephony that provide a solid background for understanding Central Office power. The training course then covers**

- **AC power equipment maintenance and repair (AC power Functions, AC Surge Arrestors, AC Transfer Switches, Stand-by Generators)**
- **DC power equipment and distribution (Operations and Maintenance of Batteries, Rectifiers, Inverters, Power Cabling)**
- **Breakers and fuses**
- **Grounding & protection**
- **Test equipment**
- **Central Office battery rundown test performed in the Maintenance Window.**
- **And much more**

## Target Audience

Vendors and telecommunications personnel (engineers, planners, supervisors and technicians) responsible for Central Office equipment installation, maintenance, troubleshooting & repair.

## Prerequisites

An understanding of basic electrical concepts, telecommunications equipment terminologies and OSP Bonding & Grounding is required. This knowledge can be obtained in these BTS courses

Basic Electricity  
 TeleCom I  
 OSP Bonding & Grounding  
 CO Bonding & Grounding

## Course Outline

### Lesson 1 - Basic Electrical Principles

A general knowledge of basic electricity is required to understand the operation and maintenance of Central Office power equipment. This lesson covers basic AC and DC electrical theory and related concepts necessary to form a fundamental understanding to build on.

Objectives: After completing this lesson the student will understand the terms and principle concepts of basic electricity related to Central Office power equipment. The student will be able to define Voltage, Current and Resistance and how they are used with Ohms Law; describe AC and DC current; and calculate power and circuit loss in actual circuits.

### Lesson 2 Basic Telephony

Understanding basic telephone theory and practical application is needed to fully understand the use for DC power in the

CO. This lesson covers the concepts and real use of telephone equipment that is the very basis of all telecommunications.

Objectives: After this lesson, the student will be able to describe the analog VF signal, cable pair characteristics and the effects of VF transmission on cable pairs. The student will be able to identify sources of noise and methods of noise reduction. The student will understand the MDF layout, and identify safety issues inside the Central Office.

### **Lesson 3 General Central Office Power**

Nearly all Central Office equipment requires DC power to operate; therefore, a solid basic understanding of the source and distribution of DC power is essential to understanding how all Central Office equipment works. This lesson covers AC power, the conversion from AC to DC power, DC power distribution, and the use of fuses and breakers.

Objectives: After completing this lesson, the student will be able to describe the different elements that make up the AC and DC power scheme in the Central Office.

### **Lesson 4 AC Power Equipment in the Central Office**

This lesson studies the power source for the entire CO: Commercial AC. Areas covered in this lesson are:

- Main AC Disconnect switch
- AC surge arrestor
- AC transfer switch
- Standby Generator
- AC sub-panels

Objectives: After completing this lesson, the student will be able to describe the different elements that make up the AC Central Office power.

### **Lesson 5 DC Power Equipment in the Central Office**

This lesson studies the protection and distribution of DC power in the Central Office. Areas covered in this lesson are:

- Rectifiers; including settings and connections
- Battery; including function, routine maintenance and testing
- Main power board; including DC breaker, shunt, ammeter and A&B feeds
- Power distribution and cabling; including sizing, length, connections and routing
- Fuse and breaker panels
- Equipment power feeds.

Objectives: After completing this lesson, the student will be able to describe the different elements that make up the DC power distribution in the Central Office.

### **Lesson 6 Central Office Battery Rundown Test (Optional)**

This Optional lesson is a Maintenance Window activity that must be pre-arranged and scheduled by the local telephone company. This exercise will take approximately 4 hours.

The only sure method of verifying the true reserve power of the Central Office battery is to perform a load test of the entire

battery for an extended period of time. The load test requires that the rectifiers AC Input breakers be turned off and the battery allowed to carry the office load for 1 to 4 hours until discharge data is sufficient to predict the battery reserve.

In this lesson, the student will perform a step-by-step Central Office battery rundown test and determine the real reserve of the battery.

Objectives: After the student completes this lesson, they will know the step-by-step procedure for performing a Central Office battery rundown test and will be able to determine the real reserve time of the battery.

## **Lesson 7 Central Office Grounding and Protection**

Central Offices are required to have an effective bonding & grounding and protection arrangement installed for the protection of personnel and sensitive electronic equipment inside the Central Office building per the National Electrical Code. This lesson studies the concepts and practical application of the Central Office grounding and protection system requirements, and the methods used to test the integrity of the grounding system.

Objectives: After completing this lesson, the student will be able to describe the reasons for having a good Central Office grounding system, the function of the Master Ground Bar and the prescribed methods of testing the integrity of the Central Office grounding system.

## **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