

System Operations Program

Online Training

Essential training for system operators

The SOS System Operations training program features a full list of CEH applicable material, providing training to meet your CEH needs and stay up-to-date on what you need to know. Using a systematic approach to training and the latest in adult learning theory, we provide a range of NERC continuing education courses to meet your training needs.

This program is available online 24/7, so you can access and complete training 24/7. SOS reports earned CEHs to the NERC SOCCED database.

Area Control Error Equation 1:CEH

Students will learn the application and importance of the ACE equation, including:

- How to define, describe, and properly calculate the ACE equation
- Calculating Net Interchange Actual and Net Interchange Scheduled
- Understanding and calculating Actual and Scheduled Frequency
- Causes of Inadvertent Interchange
- Generator reaction due to loss or increase of load within the ACE equation



Basic Electricity Fundamentals 5: CEH

Basic Electricity Fundamentals covers the underlying concepts that govern the use of electricity. Students look at the consistent relationship existing between various properties of electrical circuits while gaining an understanding of Coulomb's Law, Ohm's Law, and Kirchoff's Laws.

Basics of Power System Operations 1: CEH

This course reviews basic concepts of Power System Operations including:

- Monitoring and analyzing operating data to maintain a stable and reliable power system
- Identifying potential areas of risk and preparing for credible contingencies
- Understanding how generation, transmission equipment, and load affect power flow

Blackout Events 1:CEH

This courses provide students with an understanding of the history of reliability and major blackouts. Key subjects include:

- Root causes of the six most significant blackouts in North America
- Regulations, processes, and procedures NERC established to help prevent blackouts from recurring

Critical Infrastructure Protection Version 6 3:CEH 2:STD

This course introduces students to the security measures established to protect facilities, equipment, and data against compromise that could lead to misoperation or instability in the BES. Students will learn:

- How to identify and protect BES Cyber Assets
- How to use the prevent, detect, defend, and recover strategy to protect BES Cyber Assets
- How to establish physical access controls to protect BES Cyber Assets
- How to establish electronic access controls to protect BES Cyber Assets
- How to respond to and recover from a cyber incident

CREDIT HOURS:

63.5:CEH 34.5:STD 16.5:EO[†]

[†] CEHs offered for students already NERC certified prior to attending class.

[‡] For PER compliance, EO training must be applicable to each individual organization. SOS hours are recommendations only. Please check with your compliance group for eligibility.



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SOS Intl. and NERC ID SOS_INTL_001 is recognized by the North American Electric Reliability Corporation as a continuing education provider who adheres to NERC Continuing Education Program Criteria.

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Distribution and Shift Factors 1:CEH

This course demonstrates how System Operators keep the power system within its System Operating Limits by utilizing distribution and shift factors. The course explores the tools used to assist a System Operator to determine how to best maintain a reliable Bulk Electric System.

Effective Communications 4:CEH 2:STD

This course is designed to improve personal communication with elements focusing on industry-specific communications techniques. Students review examples of good and poor verbal, written, and electronic communication of information, while following a learning path tied specifically to an area of expertise – System Operations, Power Delivery and Field Operations, and Customer Service. Students will understand:

- The five elements of effective communication
- Three-part communication
- The five W's of effective communication
- Barriers to effective communication
- Best practices for effective communication
- Practical aids to communication

Electric Power Principles 8:CEH 8:STD 1:EO

Electric Power Principles provides a foundation of knowledge for anyone working in the bulk electric industry. Your new staff will learn about:

- Ohm's Law and the basic power and energy formulas
- Circuits in series and in parallel
- Electromagnetism, inductance, capacitance, and the relationship between voltage and current
- Phasors, phase angles, power angles, torque angles, and synchronizing
- The basic operation of transformers, conductors, and generators

Electric System Restoration 4.5 CEH 4.5 STD 4.5 EO

Understanding how to recover from a system loss is critical for system operators. This course will provide students with a basic understanding of:

- Blackstart
- Load restoration
- Operating concerns of restoration

FERC Standards of Conduct (SOC) 1:CEH

The FERC Standards of Conduct (SOC) course is designed to educate students on the FERC SOC and how employees in the transmission and marketing areas of a public utility or interstate natural gas pipeline should apply them in day-to-day activities. Course details include:

- The overall functions of FERC and the FERC SOC expectations
- The Independent Functioning Rule and the Conduit Rule

Fundamentals of System Protection

6.5:CEH 4:STD

Your new recruits will learn about safeguards built into the BES including:

- Types of protective relays and relay technologies
- Functions and limitations of various system protection equipment types
- How relays work together for total system protection
- Recognition of fault conditions including some practice in fault event detection
- How system protection schemes operate to minimize equipment damage

Geomagnetic Disturbances 1.5:CEH

This course explores the roots and impacts of geomagnetic disturbances (GMDs) within the electric utility industry, including:

- Definition of GMDs
- The causes of GMDs
- The impact of GMDs on the BES
- How the SpaceWeather Prediction Center predicts and reports upcoming GMDs
- Proper operator reaction to GMDs

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Power System Fundamentals 6.5:CEH

This course provides an overview of the BES and the components used in the generation, transmission, and distribution of electricity as well as the NERC Reliability Standards that govern grid operations. This course is designed for non-engineer power professionals to understand technical aspects of the electric grid such as:

- Interconnected power system operations
- Generation and power plant characteristics
- Transmission
- Substation and system protection
- Control center operations
- Other basic components of the power system

Reactive Power Fundamentals and Voltage Control 3:CEH 2:STD 3:EO

In this course students become familiar with the concept of voltage control and learn to work with the associated equipment and controls:

- NERC Standards that pertain to voltage control
- Various equipments' capabilities in effective voltage control
- Voltage control use in real time operations
- Problem solving and diagnosis with voltage control equipment
- Various techniques for utilizing voltage control equipment in real time operations

Transmission Equipment Principles 5:CEH 5:STD 5:EO

New power industry workers need to understand how the power gets from the plant to the consumer. In this course your staff will learn:

- The principles of transformers
- The various types of transformers
- The construction and significant components of circuit breakers
- Switching devices
- The various types of switching

Finally, they will learn how to recall and apply the appropriate NERC Reliability Standards to the issues surrounding transmission facilities.

Transmission Fundamentals 3.5:CEH

Transmission Fundamentals provides an overview of transmission stations and switchyards. After completing this training, students will gain an understanding of:

- Transmission stations and switchyards
- Transformer principles
- Circuit breakers and disconnects
- Transmission lines
- Transmission station protection, monitoring, and control equipment

Understanding Power Markets 5:CEH

This course teaches an overview of electric power markets, including:

- Market concepts
- Regulators, RTOs, ISOs, Long Term Power supply
- Near Term and Day Ahead Power Supply
- Hour Ahead and Real Time Power Supply
- Ancillary Services
- Risk Protection

Voltage Control 3:CEH 1:STD 2:EO

In this course, students learn how system operators work to ensure voltage levels, reactive flows, and reactive resources are monitored, controlled, and maintained within limits in Real-time to protect equipment and ensure reliable operation of the Interconnection, including:

- Electric power principles
- Generators and transmission lines
- Voltage and power control equipment

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SYSTEM OPERATIONS PROGRAM – ONLINE

| | PRICE | CEH | STAND | SIM | EO |
|---|----------|------|-------|-----|-------------------|
| SYSTEM OPERATIONS | \$ 2,650 | 63.5 | 34.5 | - | 16.5 [†] |
| <i>(Savings off individual pricing \$ 925.00)</i> | | | | | |
| Area Control Error Equation | | 1 | - | - | - |
| Basics of Power System Operations | | 1 | - | - | - |
| Basic Electricity Fundamentals | | 5 | - | - | - |
| Blackout Events | | 1 | - | - | - |
| Critical Infrastructure Protection Version 6 | | 3 | 2 | - | - |
| Distribution and Shift Factors | | 1 | - | - | - |
| Effective Communications | | 4 | 2 | - | - |
| Electric Power Principles | | 8 | 8 | - | 1 [†] |
| Electric System Restoration | | 4.5 | 4.5 | - | 4.5 [†] |
| FERC Standards of Conduct | | 1 | - | - | - |
| Fundamentals of System Protection | | 6.5 | 4 | - | - |
| Geomagnetic Disturbances | | 1.5 | - | - | - |
| Power System Fundamentals | | 6.5 | - | - | - |
| Reactive Power Fundamentals & Voltage Control | | 3 | 2 | - | 3 [†] |
| Transmission Equipment Principles | | 5 | 5 | - | 5 [†] |
| Transmission Fundamentals | | 3.5 | - | - | - |
| Understanding Power Markets | | 5 | 4 | - | - |
| Voltage Control | | 3 | 3 | - | 3 |

CHOOSE ANY 30 CEHs PRICE
\$ 1,400

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

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