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## **30-Hour Electrical Power System Training - Analysis and Design, Protection and Coordination, Arc Flash Analysis and Study - March 8-9, March 29-30 and April 12, 2021**

Contact us Today for a FREE quotation to deliver this course at your company's location.

<https://www.electricityforum.com/onsite-training-rfq>

Our 5-Day (30 hour) Electrical Power System Training course This Power System Engineering course is actually three separate courses: Design and Analysis, Relay Protection and Coordination, and Arc Flash Analysis/Study. The three courses together are designed to help both junior and experienced electrical engineers understand electrical power systems as they apply to industrial, commercial and institutional buildings and facilities. **NOTE: Course Includes FULL Demo Power System Analysis Software License.**

Electrical Power System Training - Our 5 day (30 hours) live online instructor-led course is actually a series of three courses:

1. [Electrical power System Analysis](#) - March 8-9 and October 4-5, 2021
2. [Power System Protection Training](#) - March 29-30, 2021 and October 18-19, 2021
3. [Arc Flash Analysis/Study - IEEE 1584 Update](#) - April 12, 2021 and October 25, 2021

**Course #1 - Power System Analysis And Design - (Regular Price: \$599)**

<https://www.electricityforum.com/electrical-training/power-system-analysis-course>

Power System Analysis And Design starts with sound design. A proper functioning electric power distribution system is vital to safety, maintenance, troubleshooting and the efficient operation of a modern industrial plant. The power distribution system includes high voltage utility tie circuit breakers, main transformers, medium voltage switchgear, distribution transformers, motor control centers, electric motors, variable speed drives, etc. This course is designed to address all aspects of industrial power distribution systems, including system planning, equipment selection, specification and application, system grounding, protection and conformity with electrical code requirements, etc. Typical one-line and relaying diagrams will be discussed for various applications.

**Course #2 - Power System Protection And Coordination - (Regular Price: \$599)**

<https://www.electricityforum.com/electrical-training/power-system-protection-training>

The Power System Protection And Coordination section of the course will provide a practical and comprehensive description of the principles and concepts of analysis, application and operation of protection schemes for various power system elements such as feeders, transformers, motors, buses, generators, etc. The Power Systems Coordination course makes extensive use of in-class curve drawing exercises and actual case histories to familiarize trainees with the art of power systems coordination. Selection of time/current characteristics, protection, selectivity and deriving protective device settings consistent with National Electric Code and ANSI Standard requirements are emphasized in this course. This

course covers the subject of power system protection from a practical perspective, and includes important functional aspects such as testing and coordination of protection systems. This course is designed for individuals who are involved with industries and utilities which depend on proper system protection for operational efficiency and minimizing damage to equipment.

**Course #3 - Arc Flash Analysis/Study - IEEE 1584 Update - (Regular Price: \$299)**

<https://www.electricityforum.com/electrical-training/arc-flash-analysis-training>

These three Electrical Engineering Courses will demonstrate electrical engineering software Simulation and Calculations engineering course will provide students with an in-depth review of fault analysis problems in industrial, commercial and institutional power systems and provide the means for solving such problems, and discusses the impact of short-circuit fault currents on equipment selection.

**Complete Course Details Here: (Bundle Price: \$999)**

<https://www.electricityforum.com/electrical-training/electrical-power-system-training>

#### **WHO SHOULD ATTEND**

Our Power System Design, Analysis, Protection and Arc Flash Study course is designed for utility, industrial, commercial and institutional power system electrical engineering personnel, electrical consulting engineers, as well as electrical design engineers, who are responsible for the reliable design, engineering and operation and of industrial, commercial and insitutional electric power distribution systems. Plant, facility, and corporate electrical engineers dealing with one or more company distribution systems and consulting and utility engineers dealing with clients' systems. Consultants, architect-engineers will also find this course very beneficial.

## STUDENTS RECEIVE

### STUDENTS RECEIVE

- This Course Includes Our Latest Electrical Protection and Arc Flash Safety Handbooks!! (Value \$20)
- **\$100 Coupon** Toward Any Future Electricity Forum Event (Restrictions Apply)
- 3.0 Continuing Education Unit (CEU) Credits
- **FREE** Magazine Subscription (Value \$50.00)

## COURSE OUTLINE

### Course #1 - Power System Analysis Live Online Training Course Outline

#### DAY ONE

##### Introduction to Industrial and Commercial Power Systems

- Elements Of Industrial Power Systems
- Typical Industrial Power Systems
- One Line Diagram

##### System Design Considerations:

- Safety
- Reliability
- Flexibility
- Voltage Considerations

##### System Planning

- Load Demand & Survey
- Local Generation
- Utility Service & Requirements
- Substation Configuration
- Protection Consideration
- Special Loads

### **Equipment Selection:**

- Substation Transformers
- Switchgears & Circuit Breakers
- Fuses & Fuse Disconnects
- Power Distribution Centers
- Motor Control Centers
- Surge Arresters
- Voltage/Current Transformers
- Relays & Protection Schemes

### **Power factor considerations**

- Power Flow Fundamentals
- Benefits Of PF Improvements
- Voltage Improvement
- Techniques To Improve PF

### **Application of power system Analysis**

- Why A Study?
- Most Common System Studies

## **DAY TWO**

### **Short Circuit Studies:**

- Short Circuit Terminology
- Types Of Short Circuits
- Sources Of Fault Currents
- Database & System Modeling
- Short Circuit Results & Comparison With Equipment Ratings
- Limiting Short Circuit Currents

### **Coordination of Protective Devices:**

- Purpose Of Protection
- Overcurrent Protection
- Ground Fault Protection
- Differential Protection
- Transformer Protection
- Motor Protection, Cable Protection & Bus Protection

### **Grounding**

- Types Of System Grounding
- Selection Of System Grounding
- Impact Of System Grounding
- Equipment Grounding

### **Power Flow Analysis**

- Database And System Modeling
- Voltage Regulation & Voltage Control
- Normal & Emergency Operations

### **Harmonics in Power Systems**

- Harmonic Problems And Solutions
- Sources Of Harmonic Currents And Voltages
- Resonance Conditions
- Effects Of Harmonics
- Harmonic Analysis

## **Course #2 - Power System Protection and Coordination Training**

### **DAY ONE**

#### **Power System Protection**

#### **Short Circuit Theory and Analysis**

- Effect Of Short Circuit
- Fault Current Sources
- Fault Current Types
- Fault Calculations
- Typical Industrial Power Systems

### **System Design Considerations:**

- Safety
- Reliability
- Flexibility
- Voltage Considerations

### **Electrical Equipment Ratings:**

- Switchgear Rating And Selection Criteria
- Low Voltage Fuse
- Molded Case Circuit Breakers
- Busway
- Conductors

### **Switchgear Ratings & Selection Criteria:**

- Low Voltage Power Circuit Breakers
- Power Fuse
- Load Interrupters
- Medium Voltage Power Circuit Breakers

### **Transformer Protection**

- Objectives In Transformer Protection
- Transformer Primary Protective Device
- Factors Affecting Transformer Protection

### **Generator Protection**



- Short-Circuit Performance
- Generator Protective Device

### **Conductor and Bus Protection:**

- Types Of Conductor Circuits
- Protection Of Cables
- Busway Protection

### **Motor Protection**

- Factors To Consider
- Types Of Protection
- MV Motor Protection

## **DAY TWO**

### **Power System Coordination**

#### **Overcurrent Coordination**

- Effect Of Short Circuit
- Fault Current Sources
- Fault Current Types
- Fault Calculations
- Typical Industrial Power Systems
- **Overcurrent Coordination Fundamentals:**
- Overcurrent Protection General Consideration
- Protection Guidelines
- TCC Plots

- CTIs

### **Fuse Characteristics:**

- Low Voltage Fuses
- Power Fuses
- TCC Curves
- Fuse Coordination Criteria

### **LV Circuit Breaker Characteristics:**

- Molded Case Circuit Breakers (MCCBs)
- Low Voltage Power Circuit Breakers
- TCC Curves
- Coordination Criteria

### **Time overcurrent relays**

- Introduction
- Electromechanical Relays
- Relay Characteristics
- Solid State Relays
- CTIs

**Course #3 - Arc Flash Analysis/Study - IEEE 1584 Update**

## **Introduction to Arc Flash**

- Arc Blast And Calories
- Arcing Current
- Incident Energy
- Flash Protection Boundary
- Factors Affecting An Arc Flash
- Personal Protective Equipment

## **An Overview of Fault Current Analysis**

- Fault Current Sources
- Short Circuit Current Parameters
- Actual Fault Types
- Balanced Fault Analysis
- Impedance Diagrams
- Fault Current Calculations

## **Relevant Arc Flash Standards and Their Significance**

- CSA Z462
- IEEE Standard 1584
- NESC 410A3

## **Arc Flash Analysis Process**

- Data Collection
- Fault Current Sources
- Fault Current Calculations
- Modes Of Operation

- Arc Duration
- Incident Energy Calculation

### **Data Collection Process**

- How To Improve Outcomes
- Data Collection Activities & Skillsets
- Obstacles In Data Collection
- Required Equipment/Device Information
- Understanding Short-Circuit Ratings

### **Calculation Methodology**

- Protective Device Settings
- Protective Device Responses
- Understanding Time-Current Curves
- Fault Current Vs. Energy Released
- Arc Flash Label

### **Mitigating Risk of Arc Flash Hazards**

- Electrical Equipment Type And Incident Energy
- Arc Flash Level Reduction
- Fuse-Protected Vs. Non-Fuse-Protected Circuit Breakers
- Arc-Resistant Switchgear

### **Software Application for Arc Flash Analysis**

- System Modelling
- Arc Flash Calculation

**COURSE SCHEDULE:**

**All days:**

Start: 10 a.m. Eastern Time

Finish: 4:30 p.m. Eastern Time

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