

# POWER SYSTEM ANALYSIS, COORDINATION AND SYSTEM STUDIES

September 24-28, 2018 - Mississauga, ON

October 15-19, 2018 - Calgary, AB

November 19-23, 2018 - Richmond, BC



**5-DAY  
COURSE \$1599**

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## DAY ONE

8:00am

### 1: POWER SYSTEM FUNDAMENTALS

- Three-Phase vs. Single-Phase Systems
- Balanced Three-Phase Loads
- Unbalanced Three-Phase Loads
- Effects of frequency, single and three-phase balanced loads and unbalanced power loads
- 3 Group Exercises

### 2: SYSTEM DESIGN CONSIDERATIONS

- Analytical approach of a Power System design
- Standards and Codes
- Major loads
- Spare capacity and calculations
- Static and Dynamic Loads, e.g. Electrical Motors
- Separating static and dynamic loads
- Major Equipment and Components
- Design requirements
- Design considerations
- Configuration options

### 3: POWER SYSTEM SUBSTATION CONFIGURATION

- Functions of a substation, design considerations, radial, loop, and selective systems, and one-line diagrams.

...and more

## DAY TWO

### 1. LINE AND MOTOR STARTING VOLTAGE DROP CALCULATIONS

- Factors affecting voltage drop, voltage drop formulas and calculations procedures.
- Effects on plant equipment and methods of motor starting.
- EasyPower Software Demonstration and 6 Group Exercises

## 2. POWER FACTOR CORRECTION

- Power factor fundamentals, power factor correction sources, benefits of power factor correction, capacitor bank locations, and capacitor bank concerns.
- Capacitor ratings and power factor correction calculation procedures.
- EasyPower Software Demonstration and 2 Group Exercises

## 3. SHORT CIRCUIT STUDIES

- Terminology and Theory
- Types of Faults
- Symmetrical and Asymmetrical Currents
- Balanced Fault Calculations
- Purposes of fault calculations, effects of short circuits, fault current sources, machine reactance modeling, and fault current characteristics.
- Types of faults/magnitudes and fault calculation procedures.
- EasyPower Software Demonstration and 2 Group Exercises

...and more

## DAY THREE

### 1. LOW VOLTAGE EQUIPMENT RATINGS AND SELECTION

- Introduction, low voltage fuses, and molded case circuit breakers.
- Busway and conductors.
- EasyPower Software Demonstration and 6 Group Exercises

### 2. SWITCHGEAR RATINGS AND SELECTION CRITERIA

- Introduction and low voltage power circuit breakers.
- Power fuses, load interrupters, and medium

voltage power circuit breakers.

- EasyPower Software Demonstration and 3 Group Exercises

## 3. OVERCURRENT COORDINATION FUNDAMENTALS

- General procedures, data requirements.
- EasyPower Software Demonstration and 2 Group Exercises on Coordination Scaling Factors. (2)

...and more

## DAY FOUR

### 1. CONDUCTOR AND BUS SELECTION & PROTECTION

- Low voltage and medium voltage conductor protection fundamentals.
- Cable Damage Criteria
- Low and Medium Voltage
- Tie Line Protection
- EasyPower Software Demonstration and 2 Group Exercises on Conductor Protection.
- EasyPower Software Demonstration and 1 Group Exercise on Tie Line Protection.

### 2. TRANSFORMER SELECTION & PROTECTION

- Transformer Protection
- Overload Protection
- Phase and Ground Fault Protection
- Primary Fuse Protection
- Primary Breaker Protection
- Transformer protection characteristics, transformer data, and basic transformer protection.
- Factors affecting transformer protection.
- EasyPower Software Demonstration and 2 Group Exercises on Transformer Protection

...and more

## DAY FIVE

### 1. AC INDUCTION MOTOR SELECTION & PROTECTION

- NEC and ANSI/IEEE Standards
- Motor TCC Curves
- MCP Low Voltage Protection
- NEMA Class E2 Controllers
- Thermal Overload Protection
- Thermal Locked Rotor Protection
- Phase and Ground Fault Protection
- Miscellaneous Protection (Undervoltage, Single-Phasing, etc.)
- Industry motor standards, motor nameplates
- ANSI/IEEE device numbers and functions
- Motor TCC curves
- Medium voltage motor protection.
- EasyPower Software Demonstration and 2 Group Exercises on Motor Protection

### 2. ARC FLASH STUDIES AND SOFTWARE SIMULATION

- IEEE 1584 versus NFPA 70E
- Bolted fault versus arcing fault
- Example of an ARC Flash calculation, with different scenarios
- Interpretation of the results of the ARC Flash Calculations
- Active and passive methods of determining ARC Flash mitigation

### 3: TOOLS FOR SELECTION AND CONFIGURATION

- Available power system design software:
- Category, classification and level of trust
  - Requirements of the software design tool
  - Standards incorporated in software tool
  - Data validation for modeling a power system
  - Output Validation of a Simulation using Software Tools

...and more

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## WHEN & WHERE

**Toronto, ON - Sept. 24-28, 2018**

Hampton Inn and Suites  
3279 Caroga Drive, Mississauga, ON  
**Tel:** 905-671-4730

**Calgary, AB - Oct. 15-19, 2018**

Holiday Inn Calgary Airport  
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**Tel:** 403-230-1999

**Richmond, BC - Nov. 19-23, 2018**

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## WAYS TO REGISTER



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