

## **2018 CANADIAN ELECTRICAL CODE**

### **LEARNING OUTCOMES**

With improving the quality and safety of our design, installation, maintenance, and operation of our electrical systems in mind, this course:

- Helps you understand the structure of the Code including sections, tables, diagrams, articles, appendices, etc.
- Provides you with brief explanation of different sections and how to steer through different sections of the Code in an efficient and effective way
- Provides you with more familiarity with the language of the Code as well as how to investigate and understand the intent of the code.
- Aids you in a better understanding of the components of an electrical system such as conductors, overcurrent devices, transformers, motors, raceways, cable trays, etc.
- Makes you familiar with the concept of hazardous areas.
- Increases your proficiency for calculating and specifying the components of the electrical systems.
- Advances your understanding of the application of different articles of the code, which in turn help do a better job during construction and maintenance.
- Increases your awareness of applicable electrical safety regulations and procedures as they apply to different industries and facilities as well as those directed by the authority having jurisdiction.
- Ultimately, with advancing your knowledge of the code, you would be able to implement more cost-effective installations and maintenance by reducing rework and applying better practices.

### **COURSE OUTLINE - 2 DAYS**

#### **Day 1**

##### **Overview of the Canadian Electrical Code**

- Introduction to the Code
- History of the Code
- Understanding overall organization of the Code
- Understanding organization of each Code Section
- Part 1 versus Part 2 of the Code
- The Code Handbook

##### **Section 0 - Objective, Scope, and Definitions**

- Objectives of the Code
- Scope of the Code
- Understanding Code definitions

## **Section 2 – General Rules**

- Permit requirements
- Application for inspection
- Use of approved equipment
- Deviation from the Code
- Marking of equipment
- Electrical equipment ratings
- Rebuilt equipment
- Field modification of approved equipment
- Shock and arc flash protection
- Working space around electrical equipment
- Accessibility for maintenance
- Enclosures
- CSA versus NEMA versus IP ratings

## **Section 4 - Conductors**

- Conductors ampacities and sizes
- Ampacity correction factors
- Conductors termination temperature
- Sheath currents and eddy currents
- Neutral conductor
- Identified conductor
- Colour of conductors
- Flame spread ratings

## **Section 6 – Service and Service Equipment**

- Customer service
- Service conductors

## **Section 8 - Circuit Loading**

- Voltage drop
- Maximum circuit Loading
- Intermittent loads versus continuous loads
- Feeder conductors

## **Section 10 - Grounding and Bonding**

- Fundamental of an electrical circuit
- Objectives of grounding and bonding
- System grounding versus equipment bonding
- Ground conductor versus bonding conductor
- Ground fault

- Grounding and bonding methods
- Grounding electrode
- Lightning arresters and protection

## **Section 12 – Wiring Methods**

- Type of Conductors
- Underground installations
- Conductors in parallel
- Radii of bends in conductors
- Armoured cable
- Teck cable
- Raceways
- Cable trays installation
- Ampacity of conductors in cable trays

## **DAY TWO**

### **Section 14 - Protection and Control**

- Overcurrent protective devices
- Series rated combinations
- Overcurrent protection of conductors
- Tap conductors
- Rating of overcurrent devices
- Interrupting rating of overcurrent devices
- Ground fault protection
- Fuses, circuit-breakers, and switches

### **Section 18 - Hazardous Locations**

- General definitions of hazardous locations
- Area classifications zones and divisions
- Installation in Zones 0, 1, 2 Locations
  1. Equipment
  2. Wiring methods
  3. Sealing
- Installation in Zones 20, 21, 22 Locations
  1. Equipment
  2. Wiring methods
  3. Sealing

- Pressurized equipment or rooms
- Intrinsically safe and non-incendive circuits

## **Section 26 - Installation of Electrical Equipment**

- Capacitors
- Transformers
- Panelboards

## **Section 28 - Motors**

- Motor circuit, control, and protective device
- Nameplate data
- Feeder and branch circuit conductors sizing
- Overcurrent and overload protection
- Grouped of motors on a single branch circuit
- Motor disconnecting means
- Motor controls

## **Section 32 - Fire Alarm Systems and Fire Pumps**

- Fire alarm systems
- Fire Pumps

## **Section 36 - High Voltage Installations**

- Overcurrent protection
- Grounding and bonding
- Station ground electrode and resistance
- Available fault current and ground potential rise
- Step and touch voltages
- Sample substation grounding and fence
- Electrical rooms

## **Section 46 - Emergency Power Supply**

- Type of emergency power supply
- Overcurrent protection
- Emergency generator
- Emergency lighting
- Exit signs

## **INSTRUCTOR**

**Mark Moosaei, B.A.Sc., M.A.Sc., PMP, P.Eng. – Principal, Rastin Engineers Inc.**

Mark Moosaei graduated with B.A.Sc. in electrical engineering from the Isfahan University of Technology in 1993, and obtained M.A.Sc. Degree from the Concordia University, Montreal, in 2003. Mark is a principal engineer with Rastin Engineers, and has over 21 years of experience working for major EPCM consulting engineering firms in Canada and Internationally.

Mark's areas of expertise includes designing, commissioning, and managing electrical, instrumentation, and control systems for Port and Terminal, Mining, Water and Wastewater, Oil and Gas, Utility, Pulp and Paper, and Metal Refining. His expertise also includes practical experience with industrial power distribution systems, emergency systems, analysis software, motor controls, VFDs, PLCs, and HMIs. Mark has a thorough knowledge of the Canadian Electrical Code, industry standards and safety codes.

Mark is a Project Management Professional (PMP) and registered electrical engineer (P.Eng.) in British Columbia and Alberta. He has published academic papers on the topic of control systems with the Institute of Electrical and Electronics Engineers (IEEE).

## **WHO SHOULD ATTEND**

Different levels of electrical professionals such as engineers, engineers-in-training, electricians, construction contractors, designers, project managers, maintenance managers and supervisors, as well as any other individual who wants to refresh their knowledge of the Code.

## **WHEN & WHERE**

T.B.D.

## **REGISTRATION FEES**

CAD \$775 + GST includes hardcopies of the 2-day course presentation materials, and refreshments and lunch for both days.

Get \$50 off the price for new university/college graduates and students. The \$50 amount will be refunded after the successful completion of the course.

For companies, register 3 persons and get the 4th person registration free of cost.