



9058

ELECTRICAL WIRING
METHODS (11C)

30S/30E/30M

An Electrical Trades Technology Course

9058: ELECTRICAL WIRING METHODS (11C)

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Course Description

Students will be introduced to alternative wiring methods and the CEC codes associated with them. They will work with various types of raceways and cables, and become familiar with the tools, techniques, materials, and devices associated with them.

Goal 1: Describe and apply **health and safety** practices.

GLO 1.1: Describe and apply **health and safety** practices.

SLO 11C.1.1.1: Identify safety and health requirements. (A2.1)

- overview of *The Workplace Safety and Health Act* (“the Act”)
 - rights and responsibilities of employees under the *Act*
 - rights and responsibilities of employers under the *Act*
 - rights and responsibilities of supervisors under the *Act*
- fourteen (14) regulations
- codes of practice
- guidelines
- right to refuse
- Explanation of right to refuse process
 - rights and responsibilities of employees
 - rights and responsibilities of employers
 - rights and responsibilities of supervisors under the *Act*

SLO 11C.1.1.2: Describe the importance of using personal protective equipment (PPE), and identify PPE and procedures related to PPE. (A2.2) (TSA 16)

- employer and employee responsibilities as related to personal protective equipment.
- standards: Canadian Standards Association (CSA), American National Standards Institute (ANSI) and guidelines
- work protective clothing and danger if it fits poorly.
- gloves—Importance of proper glove selection (when handling chemicals, cold items, slivers, etc.)

- headwear—appropriate protective headwear when required and the approved type of headwear
- eye protection—comparison and distinction of everyday eyeglasses, industrial safety glasses and safety goggles
- foot protection—when required according to safety standards
- hearing protection
 - hazards of various noise levels (hearing protection must be worn)
 - laws
 - types of hearing protection
- respiratory protection—types, overview of proper selection
- fall protection—Manitoba requirements standards guidelines
 - ANSI (U.S.A. standards), etc.
- ladders and scaffolding
- safety principles for working with or around industrial trucks site-specific (forklifts, pallet trucks, etc.)

SLO 11C.1.1.3: Outline the safety principles for working on and around electrical equipment. (A2.3) (TSA 18)

- effects of electric current on the human body
- three factors that affect the severity of an electric shock
- the effects of arc and blast on the human body and equipment
- work with energized equipment

SLO 11C.1.1.4: Identify fire safety and outline workplace fire safety principles. (A2.4) (TSA 19)

- types of fires
- types of firefighting equipment
- classifications of fire extinguishers (A, B and C)
- location of fire extinguishers and fire exits
- fire alarms and drills

- SLO 11C.1.1.5: Recognize and control hazards. (A2.6)
- safe work practices
 - basic risk assessment
 - injury prevention and control measures
 - identification of hazards involved in pneumatic tool use and explanation of how to guard against them
- SLO 11C.1.1.6: Identify the hazards in confined spaces and the preparation needed to work in a confined space. (A2.7) (TSA 20)
- identification of a confined space
 - hazards of a confined space
 - physical
 - biological
 - working in a confined space
 - emergency response plan
 - self-contained breathing apparatus (SCBA)
- SLO 11C.1.1.7: Identify first aid/CPR. (A2.8)
- overview of first-aid regulation
 - obligations of employers regarding first aid
 - • Who is certified to provide first aid?
 - • What to do while waiting for help?
 - • Where is first-aid kit?
 - describe basic first-aid requirements and techniques
 - scope and limits of first-aid intervention
 - specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
 - What is it?
 - interface with other services and agencies (e.g. Workers Compensation claims)
 - Describe basic Cardiopulmonary Resuscitation (CPR) requirements and techniques
 - How do you get certified?
 - scope and limits of CPR intervention (include varieties of CPR certification)

SLO 11C.1.1.8: Explain the Workplace Hazardous Material Information System (WHMIS), and identify the safety requirements as they apply to WHMIS. (A2.9) (TSA 13)

- WHMIS is a system
- Provincial Regulation under The Workplace Safety and Health Act
- Each province has a WHMIS regulation
- Federal Hazardous Products Act
- WHMIS generic training:
 - WHMIS defined and the format used to convey information about hazardous materials in the workplace
 - Information found on supplier and workplace labeling using WHMIS
 - Hazardous materials in accordance with WHMIS
 - Compliance with government safety standards and regulations
- Description of WHMIS (include varieties of WHMIS Certification)
 - Typology of WHMIS labels, symbols, and classifications
 - Scope and use of Materials Safety Data Sheets (MSDS)

SLO 11C.1.1.9: Identify and control hazards. (A2.10)

- basic control measures (injury prevention)
- safe work procedures
- explanation on the importance of industrial housekeeping
- employer responsibilities
- how and where to store materials
- safety measures related to walkways, stairs and floor openings

explanation of how to protect the worker and others when working in traffic paths

SLO 11C.1.1.10: Create and maintain a safe and organized working environment.

GLO 1.2: Demonstrate awareness of electrical safety as it pertains to the ***Trade Safety Awareness Manual***.

No applicable SLOs.

Goal 2: Demonstrate the safe and appropriate **identification, selection, operation, maintenance, and management of equipment and tools.**

GLO 2.1: Demonstrate the safe and appropriate **identification, selection, operation, maintenance, and management of equipment and tools.**

SLO 11C.2.1.1: Demonstrate the safe and appropriate identification, selection, and operation of equipment and tools.

SLO 11C.2.1.2: Demonstrate the safe and appropriate maintenance and management of equipment and tools.

Goal 3: Demonstrate the safe and appropriate **identification, selection, installation, maintenance, and management of devices and materials.**

GLO 3.1: Demonstrate the safe and appropriate **identification, selection, installation, maintenance, and management of devices and materials.**

SLO 11C.3.1.1: Correctly identify devices and materials used in residential wiring.

SLO 11C.3.1.2: Maintain and manage devices and materials.

SLO 11C.3.1.3: Select and install residential wiring devices and materials according to the Canadian Electrical Code (CEC).

Goal 4: Demonstrate an understanding of **electrical theory (fundamentals).**

GLO 4.1: Demonstrate an understanding of **electrical theory.**

No applicable SLOs.

Goal 5: Demonstrate an understanding of the **design, layout, and interpretation of branch circuits and systems.**

GLO 5.1: Demonstrate an understanding of the **design, layout, and interpretation of branch circuits and systems.**

SLO 11C.5.1.1: Read, interpret, and communicate information from a schematic diagram used in alternative wiring methods.

SLO 11C.5.1.2: Design and draw basic residential branch circuits and systems that utilize alternative wiring methods.

SLO 11C.5.1.3: Create a wiring diagram from a schematic.

SLO 11C.5.1.4: Select materials and devices based on the information found on the wiring diagrams.

Goal 6: Demonstrate the procedures used to **install and terminate branch circuits and systems.**

GLO 6.1: Demonstrate the procedures used to **install and terminate branch circuits and systems.**

- SLO 11C.6.1.1: Demonstrate the ability to work with common industrial wiring types (e.g., AC 90, Teck, EMT pipe)
- SLO 11C.6.1.2: Terminate branch circuits using other common industrial wiring types (e.g., AC 90, Teck, EMT pipe).
- SLO 11C.6.1.3: Describe and perform installation of voice data video (VDV) structured fibre optic cabling systems, and community antenna television (CATV) systems. (A6.2)
- CEC requirements
 - installation requirements and procedures
 - testing and troubleshooting procedures

Goal 7: Demonstrate an understanding of the **testing, troubleshooting, and documentation of branch circuits and systems.**

GLO 7.1: Demonstrate an understanding of the **testing, troubleshooting, and documentation of branch circuits and systems.**

- SLO 11C.7.1.1: Test, troubleshoot, and document alternative wiring methods.

Goal 8: Describe and demonstrate the transferable **cross-curricular** knowledge and skills.

GLO 8.1: Read, interpret, and communicate information.

No applicable SLOs.

GLO 8.2: Apply the knowledge and skills from **mathematics.**

No applicable SLOs.

GLO 8.3: Apply the knowledge and skills from the **sciences.**

No applicable SLOs.

GLO 8.4: Apply the knowledge and skills from **information and communication technology.**

- SLO 11C.8.4.1: Demonstrate awareness of apps or software used in the electrical trades.

Goal 9: Understand **career opportunities and working conditions**.

GLO 9.1: Describe **apprenticeship, education, career opportunities, professional organizations, and working conditions** related to electrical trades technology and associated fields.

No applicable SLOs.

Goal 10: Demonstrate awareness of **sustainability**.

GLO 10.1: Describe the impact of **human sustainability** on the health and well-being of tradespersons working in the electrical trades and those who use their services.

No applicable SLOs.

GLO 10.2: Describe the electrical trade's **sustainability practices and impact on the environment**.

SLO 11C.10.2.1: Minimize wastage of materials.

SLO 11C.10.2.2: Demonstrate an awareness of the effects of energy-saving electrical devices installed in alternative wiring methods.

SLO 11C.10.2.3: Demonstrate an awareness of the advantages (in terms of sustainability) of using raceways over cable.

GLO 10.3: Describe **sustainable business practices** within the electrical trades.

SLO 11C.10.3.1: Design circuits with alternative wiring using a minimum of materials while meeting code requirements.

Goal 11: Demonstrate awareness of **ethical and legal standards** as they pertain to the electrical trades.

GLO 11.1: Demonstrate awareness of **ethical and legal standards**.

No applicable SLOs.

GLO 11.2: Demonstrate an understanding of **electrical codes**.

SLO 11C.11.2.1: Demonstrate an understanding of the CEC as it relates to electrical wiring methods.

Goal 12: Demonstrate employability skills.**GLO 12.1: Demonstrate fundamental employability skills.**

- SLO 11C.12.1.1: Demonstrate regular and punctual attendance.
 - SLO 11C.12.1.2: Demonstrate the ability to communicate respectfully and effectively with teachers, supervisors, co-workers, and students.
 - SLO 11C.12.1.3: Demonstrate accountability by taking responsibility for their actions.
 - SLO 11C.12.1.4: Demonstrate adaptability, initiative, and effort.
 - SLO 11C.12.1.5: Demonstrate teamwork skills.
 - SLO 11C.12.1.6: Demonstrate the ability to stay on task and effectively use time in class and work environments.
 - SLO 11C.12.1.7: Demonstrate the responsible use of wireless communication devices.
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GLO 12.2: Demonstrate an awareness of cultural competence and its importance in the workplace.

No applicable SLOs.

GLO 12.3: Demonstrate an understanding of the business operation of an electrical trades facility.

- SLO 11C.12.3.1: Participate in classroom and workstation cleanup.
 - SLO 11C.12.3.2: Demonstrate an awareness of inventory control.
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GLO 12.4: Demonstrate critical thinking skills in planning, procedures, analysis, and diagnosis.

- SLO 11C.12.4.1: Demonstrate critical-thinking skills while troubleshooting alternative wiring methods.
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Goal 13: Understand the evolution, technological progression, and emerging trends in the electrical trades.**GLO 13.1: Understand the evolution, technological progression, and emerging trends in the electrical trades.**

- SLO 11C.13.1.1: Demonstrate an understanding of the history, technological progression, and emerging trends in electrical wiring methods.
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