



9038

INTRODUCTION TO
ELECTRONICS TECHNOLOGY (10)

20S/20E/20M

An Electronics Technology Course

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Course Description

Students will be introduced to electronics technology by studying DC circuit theory. Areas of study include instrumentation, measurement, component recognition, value determination, and fabrication. Students will learn Ohm's Law as it relates to series, parallel, and combination circuits.

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

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

- SLO 10.1.1.1: Create and maintain a safe work environment.
 - SLO 10.1.1.2: Describe and utilize personal protective equipment (PPE) and follow prescribed procedures.
 - SLO 10.1.1.3: Demonstrate an awareness of electrical safety.
 - SLO 10.1.1.4: Demonstrate an awareness of fire safety.
 - SLO 10.1.1.5: Recognize and control hazards.
 - SLO 10.1.1.6: Demonstrate an understanding of how Ohm's law relates to electrical safety.
 - SLO 10.1.1.7: Demonstrate awareness of emergency procedures related to electrical shock.
 - SLO 10.1.1.8: Demonstrate awareness of shop safety procedures.
 - SLO 10.1.1.9: Demonstrate awareness of accident reporting procedures.
 - SLO 10.1.1.10: Demonstrate awareness of the rights and responsibilities of employees, employers, and supervisors under the Workplace Health and Safety Act (Manitoba).
 - SLO 10.1.1.11: Demonstrate awareness of the rights and responsibilities of employees, employers, and supervisors as they relate to the right to refuse work as described in the Workplace Health and Safety Act (Manitoba).
 - SLO 10.1.1.12: Identify the safety requirements as they apply to WHMIS for products used in an electronics technology facility.
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Goal 2: Demonstrate the **identification, selection, utilization, and maintenance** of **tools and materials**.

GLO 2.1: Demonstrate the **identification** and **selection** of tools and materials.

SLO 10.2.1.1: Identify and select appropriate tools and materials.

GLO 2.2: Demonstrate the **utilization** of tools and materials.

SLO 10.2.2.1: Demonstrate the appropriate utilization of tools and materials.

GLO 2.3: Demonstrate the **maintenance** of tools and materials.

SLO 10.2.3.1: Demonstrate the appropriate maintenance of tools and materials.

Goal 3: Demonstrate the **identification, selection, value determination, and utilization** of **components**.

GLO 3.1: Demonstrate the **identification** and **selection** of components.

SLO 10.3.1.1: Identify and select appropriate components.

GLO 3.2: Demonstrate the appropriate value determination of components.

SLO 10.3.2.1: Determine values of components.

GLO 3.3: Demonstrate the appropriate **utilization** of components.

SLO 10.3.3.1: Demonstrate the appropriate utilization of components.

SLO 10.3.3.2: Describe the purpose of fuses and circuit breakers.

Goal 4: Demonstrate the **utilization and maintenance** of **equipment**.

GLO 4.1: Demonstrate the **utilization and maintenance** of **equipment other than diagnostic equipment**.

SLO 10.4.1.1: Demonstrate the appropriate utilization and maintenance of equipment other than diagnostic equipment.

GLO 4.2: Demonstrate the **utilization and maintenance** of **diagnostic equipment**.

SLO 10.4.2.1: Demonstrate the appropriate utilization and maintenance of diagnostic equipment (i.e., VOM).

Goal 5: Demonstrate schematic reading.

GLO 5.1: Read, understand, and interpret **schematic diagrams**.

SLO 10.5.1.1: Read, understand, and interpret basic schematic diagrams.

GLO 5.2: Demonstrate **rendering**.

SLO 10.5.2.1: Render basic schematic diagrams.

GLO 5.3: Demonstrate **breadboarding**.

SLO 10.5.3.1: Demonstrate the appropriate utilization of components.

Goal 6: Demonstrate an understanding of electrical theory and the analysis of electrical circuits.

GLO 6.1: Demonstrate an understanding of **electrical theory**.

SLO 10.6.1.1: Demonstrate an understanding of material sciences (i.e., conductors, semi-conductors, insulators).

SLO 10.6.1.2: Demonstrate an understanding of the four electrical quantities (voltage, current, resistance, and power).

SLO 10.6.1.3: List sources of electrical energy.

SLO 10.6.1.4: Explain the difference between primary cells and secondary cells.

SLO 10.6.1.5: Demonstrate an understanding of different cell configurations and how the configurations affect voltage and the life of the battery.

SLO 10.6.1.6: Demonstrate an understanding of different voltaic cell chemistries.

SLO 10.6.1.7: Demonstrate an understanding of the parts of a basic circuit and the direction of electron flow.

SLO 10.6.1.8: Demonstrate an understanding of Ohm's Law.

SLO 10.6.1.9: Explain the function of resistors, potentiometers, and rheostats.

SLO 10.6.1.10: Demonstrate an understanding of the difference between series, parallel, and combination circuits.

SLO 10.6.1.11: Explain the function and construction of capacitors.

SLO 10.6.1.12: Calculate the total capacitance of series and parallel capacitive networks.

GLO 6.2: Demonstrate the procedures for **analyzing electrical circuits**.

- SLO 10.6.2.1: Demonstrate appropriate procedures for measuring electrical quantities with a VOM.
 - SLO 10.6.2.2: Demonstrate appropriate procedures for measuring electrical quantities in various circuit configurations.
 - SLO 10.6.2.3: Perform analysis of a series circuit.
 - SLO 10.6.2.4: Perform analysis of a parallel circuit.
 - SLO 10.6.2.5: Perform analysis of a combination circuit.
 - SLO 10.6.2.6: Analyze the operation of a capacitor in a DC circuit.
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Goal 7: Demonstrate **soldering skills, fabricating printed circuit boards, and selecting and installing** components.

GLO 7.1: Demonstrate **soldering** skills.

- SLO 10.7.1.1: Demonstrate appropriate soldering skills.
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GLO 7.2: Demonstrate the procedures for **selecting and installing components**.

- SLO 10.7.2.1: Appropriately select and install components.
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GLO 7.3: Demonstrate the procedures for **fabricating printed circuit boards**.

- SLO 10.7.3.1: Fabricate circuit boards.
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Goal 8: Describe and demonstrate the transferable **cross-curricular** knowledge and skills as they apply to electronics technology.

GLO 8.1: **Read, interpret, and communicate** information.

- SLO 10.8.1.1: Read, interpret, and communicate information related to electronics technology.
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GLO 8.2: Apply the knowledge and skills from **mathematics**.

- SLO 10.8.2.1: Perform calculations related to the four electrical quantities (voltage, current, resistance, and power).
 - SLO 10.8.2.2: Perform calculations related to Ohm's Law.
 - SLO 10.8.2.3: Perform conversion calculations using scientific notation and industry prefixes (i.e., K, M, μ)—the last symbol is the Greek letter *mu*.
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GLO 8.3: Apply the knowledge and skills from the **sciences**.

SLO 10.8.3.1: Define the terms: matter, element, compound, molecule, atom, ion, electron, and valence electron.

SLO 10.8.3.2: Demonstrate an understanding of atomic theory, including the parts of the atom.

SLO 10.8.3.3: Demonstrate an understanding of static electricity.

Goal 9: Understand **education, career opportunities, employment conditions,** and **professional organizations** in the electronics industry.

GLO 9.1: Understand **education, career opportunities, employment conditions,** and **professional organizations** in the electronics industry.

SLO 10.9.1.1: Demonstrate awareness of career opportunities in electronics technology.

Goal 10: Demonstrate awareness of **sustainability** as it pertains to electronics technology.

GLO 10.1: Describe the impact of **human sustainability** on the health and well-being of electronics technicians and those who use their products.

SLO 10.10.1.1: Discuss the benefits of electronics technology to people's lives.

SLO 10.10.1.2: Discuss the long-term health concerns related to the use of materials containing heavy metals, including solder containing lead.

GLO 10.2: Describe the electronic technology's sustainability practices and impact on the **environment**.

SLO 10.10.2.1: Discuss the impact of discarded electronics equipment on the environment.

Goal 11: Demonstrate awareness of the **ethical standards and legal issues**.

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

SLO 10.11.1.1: Demonstrate awareness of ethical standards.

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

- SLO 10.12.1.1: Demonstrate regular and punctual attendance.
 - SLO 10.12.1.2: Demonstrate the ability to communicate respectfully and effectively with teachers, supervisors, co-workers, and students.
 - SLO 10.12.1.3: Demonstrate accountability by taking responsibility for one's actions.
 - SLO 10.12.1.4: Demonstrate adaptability, initiative, and effort.
 - SLO 10.12.1.5: Demonstrate the ability to accept and follow direction and feedback.
 - SLO 10.12.1.6: Demonstrate teamwork skills.
 - SLO 10.12.1.7: Demonstrate the ability to stay on task and effectively use time in class and work environments.
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GLO 12.2: Demonstrate an awareness of cultural proficiency, and its importance in the workplace.

- SLO 10.12.2.1: Demonstrate an awareness of culture.
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GLO 12.3: Demonstrate critical thinking skills in planning, procedures, analysis, and diagnosis.

- SLO 10.12.3.1: Discuss the need for critical thinking.
 - SLO 10.12.3.2: Discuss the need for problem-solving skills.
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Goal 13: Understand the evolution, technological progression, and emerging trends in electronics technology.**GLO 13.1: Describe the evolution, technological progression, and emerging trends in electronics technology.**

- SLO 10.13.1.1: Demonstrate awareness of the evolution, technological progression, and emerging trends in electronics technology.
 - SLO 10.13.1.2: Discuss the role of nanotechnology in battery and capacitor technology.
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