

# Electrotechnologies 11

## Learning Outcomes

1. Students will be expected to apply appropriate techniques, including component assembly procedures, to construct and analyze basic electronic circuits.
2. Students will be expected to apply appropriate techniques, including component assembly procedures, to construct and test power distribution and conversion devices.
3. Students will be expected to identify, select, and apply integrated circuits to solve practical problems.
4. Students will be expected to formulate, apply, and test the principles governing the forms and functions of control systems.
5. Students will work alone or in groups to extend, apply, or explore in depth, ideas, issues, or skills introduced in modules 1, 2, 3, and/or 4.

## Specific Curriculum Outcomes

Students will be expected to

### Module 1: Concepts and Components (Compulsory)

- 1.1 identify the variables involved in electronic circuits (current, voltage, and resistance)
- 1.2 explain the relationship among variables involved in electronic circuits
- 1.3 use a multimeter to measure the variables involved in electronic circuits
- 1.4 arrange electronic components in series, parallel, and combination configurations
- 1.5 predict the behaviour of electric circuits using their knowledge of the variables involved in electronic circuits
- 1.6 solve problems involving series, parallel, and combination circuits
- 1.7 demonstrate their ability to use industrially accepted fabrication techniques
- 1.8 describe circuits using electronic symbols and conventions
- 1.9 describe applications of series, parallel, and combination circuits
- 1.10 identify appropriate construction methods to fabricate a circuit board
- 1.11 lay out and construct a simple electronic circuit board using approved construction techniques
- 1.12 use a PC board and accepted fabrication techniques to assemble a project

The following outcomes of Module 1 are addressed in all modules of Electrotechnologies 11.

- 1.13 practise the appropriate health and safety procedures outlined in the Nova Scotia *Occupational Health and Safety Act*
- 1.14 practise safety procedures applicable to chemical, electronic, and other equipment as appropriate
- 1.15 use computer software to conduct investigations and solve problems
- 1.16 use the Internet to search for and gather learning resource materials
- 1.17 make connections among their learning, their own lives, and their communities

## Module 2: Power Distribution and Conversion

Outcomes 1.13–1.17, as well as the following:

- 2.1 explain the relationship between electricity and magnetism
- 2.2 construct electromagnetic devices that illustrate the relationship between electricity and magnetism
- 2.3 describe a range of electromagnetic applications in a range of settings
- 2.4 describe various types of AC and DC power supplies
- 2.5 construct a simple power supply
- 2.6 demonstrate an understanding of the environmental impact of a range of power generation systems
- 2.7 explain electromotive principles as applied to direct current (DC) and single phase alternating current (AC) motors
- 2.8 explain the operational characteristics of AC motors
- 2.9 practise the appropriate health and safety procedures outlined in the Nova Scotia *Occupational Health and Safety Act*
- 2.10 use computer software to conduct investigations and solve problems
- 2.11 use the Internet to search for and gather learning resource materials
- 2.12 make connections among their learning, their own lives, and their communities

## Module 3: Control Systems

Outcomes 1.13–1.17, as well as the following:

- 3.1 describe the binary numbering system
- 3.2 relate the binary number system to electronic concepts
- 3.3 describe basic logic gates
- 3.4 construct basic logic gates
- 3.5 verify basic logic gates using multimeters
- 3.6 construct a simple logic circuit and explain its functions
- 3.7 distinguish between analog and digital systems
- 3.8 identify and describe the major components of a logic system such as a microcomputer system
- 3.9 identify the major integrated circuit (IC) families and describe their unique functions
- 3.10 identify and interface components with small-scale integration IC families
- 3.11 identify components and construct a prototype of typical small-scale and complex logic networks using integrated circuits
- 3.12 practise the appropriate health and safety procedures outlined in the Nova Scotia *Occupational Health and Safety Act*
- 3.13 use computer software to conduct investigations and solve problems
- 3.14 use the Internet to search for and gather learning resource materials
- 3.15 make connections among their learning, their own lives, and their communities

## Module 4: Control Systems

Outcomes 1.13–1.17, as well as the following:

- 4.1 describe a variety of everyday problems that are solved by control systems
- 4.2 identify how control systems are used in residential and commercial applications
- 4.3 explain how basic process control systems function
- 4.4 describe the operation of devices used for process control using standard terms
- 4.5 construct basic process control circuits using passive devices
- 4.6 distinguish between digital and analog systems
- 4.7 construct basic control systems to process input information in order to achieve a desired result
- 4.8 practise the appropriate health and safety procedures outlined in the Nova Scotia *Occupational Health and Safety Act*
- 4.9 use computer software to conduct investigations and solve problems
- 4.10 use the Internet to search for and gather learning resource materials
- 4.11 make connections among their learning, their own lives, and their communities

## Module 5: Electrotechnologies Project

Outcomes 1.13–1.17, as well as the following:

- 5.1 develop and refine a proposal for an inquiry or the development of a product or electronic device
- 5.2 identify information needs, and locate evaluate resources
- 5.3 identify and extend, refine and/or acquire required skills
- 5.4 share research and reflections made by themselves and their peers
- 5.5 make project decisions which demonstrate creativity, innovation, and a willingness to take risks
- 5.6 set deadlines and develop a work plan to manage time and resources
- 5.7 develop a plan for monitoring their progress and judging success
- 5.8 contribute to the criteria used for evaluation
- 5.9 gather, organize, and synthesize information and ideas
- 5.10 use their knowledge and skills to conduct an inquiry or create a product or electronic device
- 5.11 present the results of their investigation or product
- 5.12 reflect on and assess their own learning and the learning of others
- 5.13 practise the appropriate health and safety procedures outlined in the Nova Scotia *Occupational Health and Safety Act*
- 5.14 use computer software to conduct investigations and solve problems
- 5.15 make connections among their learning, their own lives, and their communities
- 5.16 respond to challenges for which prescribed solutions do not already exist.