

## **COURSE ELT2140: ROBOTICS 2**

**Level:** Intermediate

**Prerequisite:** ELT1130: Robotics 1  
OR  
ELT1140: Robotics Applications

**Description:** Students demonstrate the fundamental concepts of sensor devices and control systems by building an electronic circuit to control a direct wire or mobile robot.

**Parameters:** Access to a multimeter, a power supply, soldering stations, hand tools and related resources.

**Outcomes:** The student will:

- 1. design and build a sensor device and control system for the robotic system**
  - 1.1 demonstrate the principles of photoelectric, sound, tactile, proximity and thermal sensors
  - 1.2 explain the operation of the electronic components and circuits used to build sensor controls
  - 1.3 explain how sensor control systems are used to control the drive circuit
  - 1.4 assemble electronic components to build a sensor
- 2. identify sensor control systems and subsystems used in robotic systems**
  - 2.1 draw and explain the various blocks in a sensor control system
  - 2.2 describe and explain sight, sound and tactile sensor devices
  - 2.3 explain the fundamentals of the control system operating the motor drives in the robotic system
  - 2.4 identify the differences among drive systems, sensor control systems and processing systems
- 3. explain sensory control circuits and components used in the robotic control system**
  - 3.1 research the benefits and drawbacks of various sensory devices that are used to control the robot
  - 3.2 describe where industry is making use of sensory control robots
- 4. operate and demonstrate the capabilities of a robotic system equipped with sensor controls**
  - 4.1 demonstrate a knowledge of sensory control systems by building a sensor control for the robot system selecting from the following:
    - 4.1.1 photoelectric
    - 4.1.2 sound
    - 4.1.3 tactile
    - 4.1.4 proximity
    - 4.1.5 thermal
  - 4.2 prototype a sensory control system and construct the circuit so that the sensor controls the motors on the robot
  - 4.3 build a sensory control and mount the sensory control on the control robot
  - 4.4 draw the schematic diagram of the sensor control circuit
- 5. demonstrate established laboratory procedures and safe work practices**
  - 5.1 demonstrate safe wiring practices when building a sensory control system
  - 5.2 use protection devices for all circuits including fusing and temperature cutoff
  - 5.3 operate robotic systems within design tolerances

**6. demonstrate basic competencies**

- 6.1 demonstrate fundamental skills to:
  - 6.1.1 communicate
  - 6.1.2 manage information
  - 6.1.3 use numbers
  - 6.1.4 think and solve problems
- 6.2 demonstrate personal management skills to:
  - 6.2.1 demonstrate positive attitudes and behaviours
  - 6.2.2 be responsible
  - 6.2.3 be adaptable
  - 6.2.4 learn continuously
  - 6.2.5 work safely
- 6.3 demonstrate teamwork skills to:
  - 6.3.1 work with others
  - 6.3.2 participate in projects and tasks

**7. identify possible life roles related to the skills and content of this cluster**

- 7.1 recognize and then analyze the opportunities and barriers in the immediate environment
- 7.2 identify potential resources to minimize barriers and maximize opportunities