COURSE ELT1140: ROBOTICS APPLICATIONS

Level: Introductory

Prerequisite: ELT1010: Electro-assembly 1

Description: Students apply the fundamentals of robotics systems and basic robotics functions.

Parameters: Access to a programmable robotics system.

Outcomes: The student will:

1. **describe the evolution and applications of programmable robotics systems**
   1.1   research the evolution and trends of programmable robotics systems
   1.2   distinguish between various programmable robotics designs
   1.3   explore areas where programmable robotics systems are used including outer space, medicine, manufacturing and military
2. **identify and classify programmable robotics systems and subsystems**
   2.1   distinguish between subsystems and their applications
   2.2   identify and distinguish between teach pendant and software programming
3. **identify and describe various alternative types of power sources**
   3.1   identify and describe the following power sources:
       3.1.1   electrochemical
       3.1.2   pneumatic
       3.1.3   solar (traditional and fuel cell)
       3.1.4   wind
       3.1.5   hydraulic
       3.1.6   biological
       3.1.7   electromagnetic
4. **build and program a programmable robotics system**
   4.1   identify program download strategies including:
       4.1.1   teach pendant
       4.1.2   hardwire
       4.1.3   wireless
5. **design and build a direct control robotics system**
   5.1   prototype a robot by:
       5.1.1   identifying a problem/task for a robotics system
       5.1.2   constructing using an engineered system
       5.1.3   performing serial and/or parallel operations
       5.1.4   demonstrating operation of a robot through its predetermined set of functions
   5.2   demonstrate an understanding of DC motor controls to include:
       5.2.1   switching motor states using a program
6. **demonstrate established laboratory procedures and safe work practices**
   6.1   follow laboratory safety procedures
   6.2   adhere to safe equipment practices and personal protection

7. **demonstrate basic competencies**
   7.1 demonstrate fundamental skills to:
      7.1.1 communicate
      7.1.2 manage information
      7.1.3 use numbers
      7.1.4 think and solve problems
   7.2 demonstrate personal management skills to:
      7.2.1 demonstrate positive attitudes and behaviours
      7.2.2 be responsible
      7.2.3 be adaptable
      7.2.4 learn continuously
      7.2.5 work safely
   7.3 demonstrate teamwork skills to:
      7.3.1 work with others
      7.3.2 participate in projects and tasks

8. **make personal connections to the cluster content and processes to inform possible pathway choices**
   8.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
   8.2 create a connection between a personal inventory and occupational choices