EET-1100: INTRODUCTION TO ROBOTICS

Cuyahoga Community College

Viewing: EET-1100 : Introduction to Robotics

Board of Trustees:
May 2019

Academic Term:
Fall 2019

Subject Code
EET - Electrical/Electronic Engineer

Course Number:
1100

Title:
Introduction to Robotics

Catalog Description:
Introduction to direct current circuits and supporting mathematics, binary and hexadecimal numbering systems, and learning a programming language that is constrained to an embedded training platform.

Credit Hour(s):
2

Lecture Hour(s):
1

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
None.

Outcomes

Course Outcome(s):
Demonstrate programming language skills by completing assignments based upon the syntax of the language.

Essential Learning Outcome Mapping:
Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Transpose numbers between bases 10, 2 and 16.
2. Transpose signed numbers between base 2 and base 10 (not order specific).
3. Write key programming language statement in a structured language that include selector statements (if, switch), iteration statements (while, do-while, for) and process statements.
4. Convert a problem statement into a flowchart or similar design document.
5. Convert a problem statement into a plan (flowchart, pseudo code, state diagram) that enables a program-based (application) that solves the problem.
6. Explain, write and test functions.
7. Explain, write and test interrupts.
8. Write functions that integrate various sensors that include but are not limited to ultrasonic, infrared, wheel encoders, light emitting diodes, etc.
9. Use a dubugger to find and correct program errors.

Course Outcome(s):

Use mathematics as a tool for the design of programs, circuits and mechanics that associate with a problem statement.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Write a multiplication table between 0 and 100.
2. Find a common denominator and least common denominator for fractions.
3. Add, subtract, multiply and divide fractions.
4. Convert fractions to mixed numbers and mixed numbers to fractions.
5. Solve simple equations with one variable.
6. Use scientific and Engineering notation to represent numbers.

Course Outcome(s):

Use basic electrical laws and equations in the design and/or analysis of a project.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Use Ohm's law to find voltage, current or resistance in a circuit.
2. Use power equations to find power, voltage, current or resistance in a circuit.
3. Find the energy rating of a battery and determine how long a charged battery would sustain with a specified load.
4. Explain why safety glasses are needed when working with lithium (or related technology) batteries.
5. Explain why a battery should not be shorted, punctured or overcharged.
6. Measure current, voltage and resistance.
7. Explain the operation of a sensor (used in a project) and how that sensor would be tested.

Course Outcome(s):

Use mechanical components to construct a project.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Explain the difference between blade, Phillips and Torx screws with associated fastens (nuts) and demonstrate their use.
2. Explain why washers and lockers are needed.
3. Explain why wearing safety glasses in mandatory when working with tools.
4. Measure and calculate distance moved by the rotation of a wheel.
5. Demonstrate how excessive force can damage components.

Methods of Evaluation:

1. Quizzes
2. Homework
3. Tests
4. Lab assignments
5. Completion of a project
6. Math placement test

Course Content Outline:

1. 1. Structured programming language
    a. Programming
    b. Problem statements
    c. "if" statements
    d. "switch" statements
    e. "for" statements
    f. "while" statements
    g. "do-while" statements
    h. Functions
    i. Interrupts
    j. Debugging
    k. Design documents
    l. Flowcharts
    m. Pseudo code
    n. State tables
2. Mathematical Concepts
    a. Base 2 to base 10 conversion
    b. Base 10 to base 2 conversion
    c. Base 2 to base 16 conversion
    d. Base 10 to base 2 conversion
    e. Scientific Notation
    f. Engineering notation.
    g. Solving equations with one variable
    h. Common denominator
    i. Lowest common denominator
    j. Adding fractions
    k. Subtracting fractions
    l. Multiplying fractions
    m. Dividing fractions
    n. Converting fractions to and from mixed numbers
3. Basic electrical laws and equations
    a. Ohm's law
    b. Voltage
    c. resistance
    d. Current
    e. Power
    f. Safety
    g. Energy
    h. Batteries
4. Building projects(s)
    a. Screws
    b. Fasteners
    c. Using and testing sensors

Resources

YTA instructors/staff. *EET-1100 Lab Manual*. Updated as needed. Cleveland, OH: Cuyahoga Community College, 2018.

YTA instructors/staff. *YTA Project Text, EET-1100*. Updated as needed. Cleveland Ohio: Cuyahoga Community College, 2018.

YTA instructors/staff. *EET-100 Workbook*. Updated as needed. Cleveland Ohio: Cuyahoga Community College, 2018.

Top of page
Key: 1608