Washtenaw Community College Comprehensive Report

ROB 110 Robotics I - II
Effective Term: Fall 2022

Course Cover

College: Advanced Technologies and Public Service Careers
Division: Advanced Technologies and Public Service Careers
Department: Advanced Manufacturing
Discipline: Robotics
Course Number: 110
Org Number: 14430
Full Course Title: Robotics I - II
Transcript Title: Robotics I - II
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Consultation with all departments affected by this course is required.
Course description
Outcomes/Assessment
Objectives/Evaluation
Rationale: We are updating the master syllabus with newer content so that we can assess it.
Proposed Start Semester: Fall 2022
Course Description: This is the second course of the robotics series. In this course, students will learn to create entry-level robot programs that utilize subroutines and offsets. The primary emphasis of this course is to introduce students to industrial robot programming practices. The course will instruct the student to utilize subroutines, variables, loops, offsets, position types, inputs and outputs, and field devices.

Course Credit Hours

Variable hours: No
Credits: 2
Lecture Hours: Instructor: 15 **Student:** 15
Lab: Instructor: 30 **Student:** 30
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 45 **Student:** 45
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

No Level Required

Requisites

Prerequisite
ROB 101 minimum grade "C"; may enroll concurrently

General Education

Degree Attributes
High School articulation approved

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Recognize and write subroutines, variables, and loops in a robot program.
   Assessment 1
   Assessment Tool: Outcome-related multiple-choice and open ended short answer questions on the final exam
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key with rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher
   Who will score and analyze the data: Departmental faculty

2. Recognize different offset and position types in a robot program.
   Assessment 1
   Assessment Tool: Outcome-related multiple-choice questions on the final exam
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 75% of students will score 75% or higher
   Who will score and analyze the data: Departmental faculty

3. Identify feedback and input/output (I/O) data types.
   Assessment 1
   Assessment Tool: Outcome-related multiple-choice questions on the final exam
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 75% of students will score 75% or higher
   Who will score and analyze the data: Departmental faculty

4. Create an entry-level robot program that applies subroutines, variables, loops and also accounts for the differentiation of offset and position types.
   Assessment 1
   Assessment Tool: Robot program
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students

How the assessment will be scored: Departmentally-developed rubric
Standard of success to be used for this assessment: 75% of students will score 75% or higher
Who will score and analyze the data: Departmental faculty

Course Objectives

1. Identify different methods of utilizing subroutines.
2. Identify how the program stack and program pointer operate.
3. Identify different variable data types.
4. Utilize different methods of looping a program.
5. Identify the differences between Cartesian positions and joint positions.
6. Identify when to use a Cartesian position versus a joint position.
7. Identify how to utilize tool-based offsets.
8. Identify how to utilize work object or user frame-based offsets.
9. Identify and utilize different types of inputs and outputs (I/O).
10. Identify the difference between open and closed-loop control systems.
11. Understand the importance of feedback in a closed-loop control system.
12. Identify different applications for sensors.
13. Demonstrate how to wire input devices.
14. Demonstrate how to wire output devices.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Sean Martin	*Faculty Preparer*	*Feb 08, 2022*
Department Chair/Area Director:		
Allan Coleman	*Recommend Approval*	*Feb 08, 2022*
Dean:		
Jimmie Baber	*Recommend Approval*	*Feb 09, 2022*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*May 31, 2022*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Jun 13, 2022*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Jun 14, 2022*

Washtenaw Community College Comprehensive Report

ROB 110 Robotics I - II
Effective Term: Winter 2017

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Industrial Technology
Discipline: Robotics
Course Number: 110
Org Number: 14430
Full Course Title: Robotics I - II
Transcript Title: Robotics I - II
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Consultation with all departments affected by this course is required.
Course description
Pre-requisite, co-requisite, or enrollment restrictions
Objectives/Evaluation
Rationale: Periodic review.
Proposed Start Semester: Winter 2017
Course Description: This course continues the robotic series and includes additional information on the types of robots, application of flexible automation, tooling and various types of sensors and their operation. Integrating the use of inputs and outputs (I/O) and counters into structured robot programs is also covered. Field trips to local manufacturing firms that use robotic equipment will help the students understand and witness concepts presented in class. This course contains material previously taught in ROB 121. ROB 110 is generally offered in the second 7 1/2 week session.

Course Credit Hours

Variable hours: No
Credits: 2
Lecture Hours: Instructor: 15 **Student:** 15
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College-level Reading & Writing

College-Level Math

No Level Required

Requisites

Prerequisite

ROB 101 minimum grade "C"; may enroll concurrently

General Education

Degree Attributes

High School articulation approved

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Read and interpret beginning level robot programs.

Assessment 1

Assessment Tool: departmental exam
Assessment Date: Fall 2016
Assessment Cycle: Every Three Years
Course section(s)/other population: all sections
Number students to be assessed: all students
How the assessment will be scored: The departmental exam will be scored using the answer key.
Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
Who will score and analyze the data: Departmental faculty will blind-score and analyze the data.

2. Identify the function of various end effectors.

Assessment 1

Assessment Tool: departmental exam
Assessment Date: Fall 2016
Assessment Cycle: Every Three Years
Course section(s)/other population: all sections
Number students to be assessed: all students
How the assessment will be scored: The departmental exam will be scored using the answer key.
Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
Who will score and analyze the data: Departmental faculty will blind-score and analyze the data.

3. Utilize sensors in robot programs.

Assessment 1

Assessment Tool: Student written robot program.
Assessment Date: Fall 2016
Assessment Cycle: Every Three Years
Course section(s)/other population: all sections
Number students to be assessed: all students
How the assessment will be scored: Department developed rubric.
Standard of success to be used for this assessment: 70% of all students will score a 3 of 5 or higher on all items of the rubric.
Who will score and analyze the data: Departmental faculty will blind-score and analyze the data.

Course Objectives

1. Read simple relay logic electrical diagrams.
2. Power up, calibrate and execute fundamental programs on two different industrial robots.
3. Write fundamental robot programs.
4. Define the difference between "accuracy" and "repeatability."
5. Define the term "resolution" as it relates to robot tool positioning.
6. Describe the difference between joint and linear interpolated motion.
7. Describe how the "Right Hand Rule" relates to Cartesian coordinates.
8. Describe three different types of sensors used for discrete inputs.
9. Describe the difference between absolute and incremental feedback.

New Resources for Course

Course Textbooks/Resources

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Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Gary Schultz	*Faculty Preparer*	*Apr 20, 2016*
Department Chair/Area Director:		
Thomas Penird	*Recommend Approval*	*Apr 28, 2016*
Dean:		
Brandon Tucker	*Recommend Approval*	*May 19, 2016*
Curriculum Committee Chair:		
David Wooten	*Recommend Approval*	*Sep 19, 2016*

Assessment Committee Chair:

Michelle Garey	*Recommend Approval*	*Sep 22, 2016*

Vice President for Instruction:

Bill Abernethy	*Approve*	*Oct 04, 2016*