Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Robotics	110	ROB 110 08/12/2019- Robotics I - II
Division	Department	Faculty Preparer
Vocational Technologies	Industrial Technology	Hari Kandasamy
Date of Last Filed Assessment Report		

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

   No

2. Briefly describe the results of previous assessment report(s).

   3.

4. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

   5.

II. Assessment Results per Student Learning Outcome

Outcome 1: Read and interpret beginning level robot programs.

- Assessment Plan
  - Assessment Tool: departmental exam
  - Assessment Date: Fall 2016
  - 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.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2018, 2017		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
56	55

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Of the total 56 enrolled students, 55 students were included in this assessment. Students who participated in the final exam (written and hands-on) were all included in this assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

For both Fall 2017 and Fall 2018, ROB110 was conducted as two sections (day and evening classes), enabling regular full-time students (including WTMC students) and part-time students to enroll and complete the course.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Regular quizzes, lab activity and written final exam were used to assess the learning outcome. This learning outcome was assessed by including 30 questions on the topic in the written portion of the final exam. Students were provided with different application scenarios and presented with multiple choice questions.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
Based on the data compiled, 93% of students assessed scored 70% or higher. In ROB110, students were presented with multiple programs during lecture and were introduced to reading and understanding robot programs. Students were able to

successfully interpret the programs given during the written exam. The standard of success, as described in the learning outcome, was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students did well in interpreting beginning level robot programs, evident from the written and hands-on tests administered. Students were able to interpret small code snippets and write entry-level programs.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

We plan to continue to emphasize interpreting robot programs and conduct continued assessment through quizzes and oral questions during lab activities.

Outcome 2: Identify the function of various end effectors.

- Assessment Plan
    - Assessment Tool: departmental exam
    - Assessment Date: Fall 2016
    - 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.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2018, 2017		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
56	55

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Of the total 56 enrolled students, 55 students were included in this assessment. Students who participated in the final exam (written and hands-on) were all included in this assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

For both Fall 2017 and Fall 2018, ROB110 was conducted as two sections (day and evening classes), enabling regular full-time students (including WTMC students) and part-time students to enroll and complete the course.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Different types of End effectors and EOAT, and their applications: related questions were included in the written final exam and used to assess the learning outcome. This learning outcome was assessed by including 20 questions (approx.) on the topic in the written portion of the final exam. Students were provided with different application scenarios and presented with multiple choice questions.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
Based on the data compiled, 96% of students assessed scored 70% or higher. Students were successful in identifying the correct type of end effectors and their relevant application in automated manufacturing. The standard of success, as described in the learning outcome, was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students were familiar with the different types of end effectors used in the industry and their applications. Students were also successful in identifying the correct end effector for a specific application in their tests.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

More course materials (videos, case studies) on end effectors can be included. Exposure to different end effector hardware in the lab can assist in visual reinforcement of the theoretical concept.

Outcome 3: Utilize sensors in robot programs.

- Assessment Plan
    - Assessment Tool: Student written robot program.
    - Assessment Date: Fall 2016
    - 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.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2018, 2017		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
56	55

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Of the total 56 enrolled students, 55 students were included in this assessment. Students who participated in the final exam (written and hands-on) were all included in this assessment.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

For both Fall 2017 and Fall 2018, ROB110 was conducted as two sections (day and evening classes), enabling regular full-time students (including WTMC students) and part-time students to enroll and complete the course.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A written final exam and a hands-on test were used to assess the learning outcome. This learning outcome was assessed by including 15 questions on the topic in the written portion of the final exam. In addition, hands-on portion of the assessment tests students' capability to write a robot program utilizing sensors in their activity.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
The current assessment standard of 70% students scoring 3 out of 5 has been modified to better suit the student work. A standard of 70% of the students scoring more than 70% of the maximum points is used instead. Based on the data compiled, 98% of total students assessed scored either 70% or higher. Students were all able to successfully complete the hands-on portion of the lab and were able to answer the questions posted orally during sign-off of the hands-on test. The standard of success, as described in the learning outcome, was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students were able to complete the programs required for their hands-on finals exam utilizing sensors and I/Os.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

This learning outcome is focused primarily on robot programming utilizing sensors and I/O devices. We plan to continue providing laboratory activities that focus on programming using sensors and I/O.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

No previous assessment report exists.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

The course meets the overall need of the students. Through the programming activities, students seem to enjoy the hands-on work compared to lecture topics. As this course follows the introductory robotics course, ROB101, students are eased into programming along with robotic systems-related topics.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

The report will be shared with AMT faculties during the departmental meeting.

4. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Provide additional reading material on end effectors/EOAT that includes pictorial representation of the EOAT and their corresponding application scenarios. Additional reading materials will be introduced during lecture, and available to students as supplementary material on the Blackboard course page.	As end effectors/EOAT are the business end of the robotic workcells, student awareness on proper identification of appropriate end effector for an application is paramount. This supplementary material will provide exposure to varied EOAT and their corresponding applications.	2019

Other: Lab activities	Provide lab activities utilizing Input and Output (I/O) operations (in addition to existing labs), laying emphasis on using multiple different I/O operations in a single robot programming.	In the real world, a robot program will contain multiple different I/O operations in a single robot program and student work needs to align with real world scenarios. Additionally, more practice activities help students get comfortable with the concept and prepares them for future robotics courses, where multiple I/O operations are the norm.	2019

5. Is there anything that you would like to mention that was not already captured?

None.

III. Attached Files

ReportData_F17_F18_ROB110
ROB110_HandsOnFinals_SampleQs
ROB110_WrittenFinals_SampleQs

Faculty/Preparer:	Hari Kandasamy	**Date:**	08/14/2019
Department Chair:	Thomas Penird	**Date:**	08/14/2019
Dean:	Brandon Tucker	**Date:**	09/12/2019
Assessment Committee Chair:	Shawn Deron	**Date:**	10/22/2019