

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Numerical Control	121	NCT 121 08/21/2017- Manual Programming and NC Tool Operation
Division	Department	Faculty Preparer
Advanced Technologies and Public Service Careers	Industrial Technology	Thomas Penird
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Construct programs using G&M machine tool language in proper module format.

- Assessment Plan
 - Assessment Tool: Capstone Projects
 - Assessment Date: Fall 2015
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
 - Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the capstone project.
 - Who will score and analyze the data: Department Faculty

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)
2016, 2016	2017, 2016, 2015	

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

# of students enrolled	# of students assessed
26	18

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.

All students were assessed. A few dropped or withdrew from the class at various points for various reasons.

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.

All students were assigned competency-based work. All parts were collected at the end of each week.

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

All projects incorporated written programs, debugging of the programs and machining parts to specifications at the drawing. Students were given the opportunity to redo work as necessary to achieve their goal.

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

All students completing the class were successful in completing more than 85% of the competencies to 90% satisfaction.

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

When students are given the opportunity to work at a competency until they have met 100% of its requirements, they are better when moving on to the next step. Some students take significantly longer to achieve the goal, but given good attitude and additional time there is no reason for not being successful.

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 have started opening up labs on weekends for students to spend more time at task. This is helping those students that need more time to accomplish the competencies.

Outcome 2: Apply the appropriate process for machining a product from start to finish.

- Assessment Plan
 - Assessment Tool: Capstone Projects
 - Assessment Date: Fall 2015
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
 - Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the capstone project.
 - Who will score and analyze the data: Department Faculty

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)
2016, 2016	2017, 2016, 2015	

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

# of students enrolled	# of students assessed
26	26

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.

All students completing the program were assessed.

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.

All students submitting work were assessed using multiple capstone projects. Each project had a specific competency targeted.

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

Each project had a set of instructions. Students' programs were written based on the set of instructions. These programs were evaluated for sequence of events and correct math (feeds, speeds and part locations). The programs were submitted with machine parts. The machined parts (within dimensional specification) were an overall evaluation of student success.

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

Having students start with instructions and finish with machined parts brings all the pieces together. As a customer I might purchase a product that has a part within made by one of our students. 50% correct or 75% correct does not reflect a returning customer. Student see and feel this with the machine part. Red ink is not needed when the results are evident at the end of the machining process. Machined parts that look and measure like that of the drawing is an instant indicator of success. The results of allowing the students to work on the assignment until completion, where completion was a program that ran from start to finish and a part that was complete and within specification, is gratifying to all involved.

The standard of success was met. All students completing the projects were within the success parameters identified.

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

Students having to start with instruction and finish with a machined part either followed key rules or learned them visually the hard way.

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.

I think adding more complexity to midterm and final projects will draw out the need for process.

Working with multifaceted parts could do this as well.

Outcome 3: Troubleshoot and debug programs at the CNC machine tool controllers yielding parts to specification.

- Assessment Plan

- Assessment Tool: Department Exam
- Assessment Date: Fall 2015
- Course section(s)/other population: All
- Number students to be assessed: All
- How the assessment will be scored: The department exam will be scored using an answer sheet.
- Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the exam.
- Who will score and analyze the data: Department Faculty

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)
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# of students enrolled	# of students assessed
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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.

All students who were enrolled completed the class and were assessed.

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.

All students were assessed using a grading rubric identifying relevant points assigned to each of the components of the part.

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

All students taking the department final exam are given a rubric identifying the point criteria for each of the processes identified in the instructions. Students were required to write the program and submit it, then take the program into the lab, debug, and cut the part.

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

All students completing this exam scored greater than 70%. All students were successful at pockets, profile cuts, and holes. Some weaknesses are seen in the math to calculate tool center locations about the profile of the part geometry.

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

Debugging is the area that slows students down. In the past I have used red ink to make corrections on typed programs. This strengthened my ability to see issues and debug but did very little to improve students' debugging abilities. With instruction to completed part students have to work through all these issues I would highlight with red ink. It forces them through the whole process of manufacturing a part.

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.

I believe planting bugs in programs, as a test to see students' techniques to isolate and solve it, is a component I need to add. Good students might find roles as group leaders in industry. Having good troubleshooting skills is very important.

Outcome 3: Troubleshoot and debug programs at the CNC machine tool controllers yielding parts to specification.

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II. Course Summary and Action Plans Based on Assessment Results

- 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 assessment reflects the need to do more with competency-based learning.

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

This data has been shared with other department members as well as part-time faculty and advisors.

- Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Course Assignments	Add troubleshooting components to the class.	Students who write good programs do not get the opportunity to dig deep into problem-solving. Good employees (group leaders) should have these skill sets. Exposure to problems in part	17

		manufacturing/programming I think is crucial to get students to the next level.	
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4. Is there anything that you would like to mention that was not already captured?

5.

III. Attached Files

[Sample Foam Cut Final](#)

[Sample Preliminary Foam Cut Parts](#)

[Final Capstone Grade Rubric](#)

Faculty/Preparer: Thomas Penird **Date:** 08/21/2017

Department Chair: Thomas Penird **Date:** 08/21/2017

Dean: Brandon Tucker **Date:** 08/23/2017

Assessment Committee Chair: Michelle Garey **Date:** 11/28/2017