**Course Assessment Report**
**Washtenaw Community College**

| Discipline | Course Number | Title |
|---|---|---|
| Numerical Control | 101 | NCT 101 03/31/2016-Introduction to Computerized Machining (CNC) - I |
| 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: Students will improve ability to recognize and apply nomenclature to CNC controllers.

- Assessment Plan
    - Assessment Tool: Pre Test - Post Test This tool is utilized to identify those students returning for retraining and identify improvement.
    - Assessment Date: Fall 2011
    - Course section(s)/other population: All
    - Number students to be assessed: All
    - How the assessment will be scored: Immersive software scores and shows Pre-test, post-test results
    - Standard of success to be used for this assessment: There will be a minimum increase of 30% in score on average from the combined pre-test to the combined post-test results, for all students.
    - Who will score and analyze the data: Departmental 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) |
|---|---|---|
| 2015 | | |

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

| # of students enrolled | # of students assessed |
|---|---|

| | |
|---|---|
| 24 | 16 |

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 present the day(s) of 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.

This class only runs face-to-face.

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

**The Immersive Software collapsed on us during the semester. Difficulties in keeping the software running, and a cost associated with maintenance fees lead to us dropping this software from the program.**

**We currently are using quiz materials, developed by the department to reflect growth in students' development. We see a sharp improvement from day one in the semester through the end of the 7.5 week semester. With code challenge pretest sheets and introduction to controller terminology students, on average, come in with knowledge on the topic below 10%. (Note; Some students are coming from employers and have been lightly exposed to the equipment.) On topics including G&M codes, absolute and incremental positioning, work offsets, verification codes and, abbreviations, terms and definitions at the machine control unit.**

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

**Quizzes gain ground in topic material as the semester progresses.**

**Students start with fundamentals of basic G & M code.**

**Pre –test scores are in the 5-10% range.**

**Scores for the first quiz on this topic average 50%.**

**By the end of the semester we see 80-85% retention on this material.**

**Similar results were seen in coordinate positioning, work offset and definitons.**

**Weak areas are seen in developing the verification codes given scenarios at the machine tools, as well as critical thinking question related to the machine tool controllers.**

**The student averages in these situations are at 40-50%. This is to be expected and is a great foundation for the second half of the setup class (NCT110 CNC Setup and Oper II).**

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

Identification of G&M codes, work offset vales, machine tool definitions, and terminology are strengths for the group

**Weak areas are seen in developing the verification codes given scenarios at the machine tools, as well as critical thinking questions related to the machine tool controllers.**

**The student averages in these situatons are at 40-50%. This is to be expected and is a great foundation for the second half of the setup class (NCT110 CNC Setup and Oper II).**

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.

Based on past data, student progression for the first 7.5 weeks in the program are at an expected level.

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| Soft spots in the program are centered around lathe work, as we have fewer pieces of equipment, and therefore fewer opportunities for students to work with the controllers.<br><br>I will address this in the future with capital equipment needs/Perkins funds. |

Outcome 2: Identify the layers of the machine tool controllers.

- Assessment Plan
    - Assessment Tool: Quizzes
    - Assessment Date: Fall 2011
    - Course section(s)/other population: All
    - Number students to be assessed: All
    - How the assessment will be scored: Quizzes are scored using an answer key
    - Standard of success to be used for this assessment: 75% of the students will score 75% or greater on all questions selected.
    - 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) |
|---|---|---|
| 2015 | | |

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

| # of students enrolled | # of students assessed |
|---|---|
| 24 | 16 |

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.

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| All who were present on the day(s) of 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.

**This is reflected in the hands-on assessment test at the end of the semester, as well as in the written portion of the final in the definitions section of the test.**

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

This was accomplished using a hands-on competency test as well as a written final.

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 average for all students at the controller's duing the hands-on segment of the final was 95%.**

**The written portion of the test was significantly lower at 69%. This does not disappoint me; by the end of the second half of the setup class (NCT110 CNC Setup and Oper II), I expect this number to be significantly higher.**

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

**The average for all students at the controllers during the hands-on segment of the final was 95%.**

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.

The lathe controllers are the weak spot. Although the students met the standard of sucess established, it would be nice to offer more time at the lathe controllers.

I will address this in the future with capital equipment needs/Perkins funds.

Outcome 3: Recognize setup and operation procedures needed to manufacture parts.

- Assessment Plan

- Assessment Tool: Project
- Assessment Date: Fall 2011
- Course section(s)/other population: All
- Number students to be assessed: All
- How the assessment will be scored: Students projects (parts) will be determined complete or incomplete.
- Standard of success to be used for this assessment: 75% of the students will be successful at completing all parts.
- Who will score and analyze the data: Department Faculty

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

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|---|---|---|
| 2015 | | |

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

| # of students enrolled | # of students assessed |
|---|---|
| 24 | 16 |

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.

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| All students who were present on the day(s) of 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.

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| All students were responcible for completion of set-up and cutting parts at each of the 5 stations during the semester. |

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

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| **Mill Projects; Included; (alignment of fixtures, setting work and tool length offsets, applying verification codes, running machines)**<br>- **Red Wing Keytag. Two-sided key tag with hole for ring**<br>- **Turner's Cube – Six facets with multiple stepped pockets** |

- **Andy's Cube – Six facets with varying shapes**

**Lathe Projects; Included (loading of tools, setting tool geometry, applying verification codes, running machines)**

**Chess Piece - Rook**

**BaseBall Bat**

**This is also reflected in the hands-on assessment test at the end of the semester, as well as in the written potion of the final in the definitions section of the test.**

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 |
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| **All students were successful at manufacturing all parts assigned. Students missing classes were able to utilize the weekend open labs to attain 100% on this segment of the class. This semester students manufactured;**<br><br>**The average for all students at the controllers during the hands- on segment of the final was 95%.** |

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

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| All Students complete the (5) Projects assigned, as well as plotted their student art project.<br><br>**The average for all students at the controllers during the hands-on segment of the final was 95%.** |

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.

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| The lathe controllers are the weak spot. Although the students met the standard of success established, it would be nice to offer more time at the lathe controllers.<br><br>I will address this in the future with capital equipment needs/Perkins funds**.** |

Outcome 4: Apply the key processes in creating geometry CAD CAM system.

- Assessment Plan
    - Assessment Tool: Project
    - Assessment Date: Fall 2011
    - Course section(s)/other population: All
    - Number students to be assessed: All
    - How the assessment will be scored: Students will use the software to develop geometry for a capstone project at the CNC machine tool. The project will be evaluated using a rubric.
    - Standard of success to be used for this assessment: The overall average score of the student project will be 75% (3of 4 or better)
    - Who will score and analyze the data: Department Faculty

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

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|---|---|---|
| 2015 | | |

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

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| 24 | 16 |

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 present on day(s) of 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.

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| THis class is only offered as face-to-face. |

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

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| **Students: created their own art for a nightlight they will machine in the NCT 110 class. This will be cut into pieces of acrylic and then edge lit.**<br><br>**Student Part (Art) 350points min blocked letters etc. do not count = 20%**<br><br>Art – Outlined on graph paper<br><br>X-Y Data points entered into Excel spreadsheet<br><br>X-Y data pasted into Notepad file (.txt)<br><br>Program start – end – z moves added to x-y data file<br><br>Program uploaded into EDIT-NC and debugged<br><br>Program run at CNC MILL (Pen Plot – 1 for student 1 for instructor)<br><br>*Note: We will cut this into aluminum blanks in the NCT110 class*<br><br>Students were required to complete a capstone project. See attached rubric for details |

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.

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| Met Standard of Success: Yes |
| All students completing the class were successfull at meeting the 350 point minimum. 9 of 16 exceeded expectations to earn an A. |

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

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| All students completed their student art projects for passing grades. 9/16 completed with the minimum points required to achieve an A. |

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.

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| With the grading rubric and the steps outlined, I do not believe we need to take any measures to improve this process at this time. |

**II. Course Summary and Action Plans Based on Assessment Results**

1. 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?

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| Students are able to move on to the the next stage, which incorporates advanced set-up and manufacturing parts to specification. The transition from operation to controller manipulation is transparent with the next level of training. |

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

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| This information has been shared with other machine tool faculty. |

3. Intended Change(s)

| Intended Change | Description of the change | Rationale | Implementation Date |
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| No changes intended. | | | |

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

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| 5. |

**III. Attached Files**

NCT101 Assessment Tables and Pictures

**Faculty/Preparer:** Thomas Penird **Date:** 03/31/2016

**Department Chair:** Thomas Penird **Date:** 04/04/2016

**Dean:** Brandon Tucker **Date:** 05/19/2016

**Assessment Committee Chair:** Michelle Garey **Date:** 08/03/2016