

**Course Assessment Report
Washtenaw Community College**

Discipline	Course Number	Title
Heating, Ventilation, Air Conditioning and Refrigeration	205	HVA 205 07/19/2023-Hydronic Systems
College	Division	Department
Advanced Technologies and Public Service Careers	Advanced Technologies and Public Service Careers	Heating, Ventilation and A/C
Faculty Preparer		Robert Carter
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?

Yes
Through Fall 2015.

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

Students met the standard of success for all four outcomes.

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

There were no intended changes listed. However, there were areas for improvement in student learning that were listed in Outcomes 2-4:

Outcome 2: Some steam system operation controls could use more discussion.

Outcome 3: Continue to emphasize the wiring of various hydronic systems.

Outcome 4: The previous assessment showed that a little more hands-on troubleshooting of the steam system would be valuable for student success.

II. Assessment Results per Student Learning Outcome

Outcome 1: Identify hydronic systems.

- Assessment Plan

- Assessment Tool: Departmental final exam will be used to assess understanding of key concepts
- Assessment Date: Winter 2020
- Course section(s)/other population: All
- Number students to be assessed: All
- How the assessment will be scored: Answer key
- Standard of success to be used for this assessment: A minimum of 70% of the students should achieve a score of 70% or higher
- 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)
2022, 2021		

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

# of students enrolled	# of students assessed
21	21

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.

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 sections were face-to-face and taught in the evening.

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

This outcome was assessed using multiple-choice questions from the final exam related to the outcome and scored with an answer key.

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: <u>Yes</u>
71% of students (15/21) scored 70% or higher on the outcome-related questions, meeting the standard of success.
Fall 2022: 8/10 students met the standard of success.
Fall 2021: 7/11 students met the standard of success.

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

Students displayed an accurate understanding of existing hydronic piping systems and are adapting to the new applications of infloor radiant systems.

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 continue to stress that proper piping configurations of hydronic systems are important for system operation and consumer comfort.
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Outcome 2: Identify hydronic system components.

- Assessment Plan
 - Assessment Tool: Departmental final exam will be used to assess understanding of key concepts
 - Assessment Date: Winter 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Answer key
 - Standard of success to be used for this assessment: A minimum of 70% of the students should achieve a score of 70% or higher
 - 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)
2022, 2021		

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

# of students enrolled	# of students assessed
21	21

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.

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 sections were face-to-face and taught in the evening.

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

This outcome was assessed using multiple-choice questions from the final exam related to the outcome and scored with an answer key.

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
95% of students (20/21) scored 70% or higher on the outcome-related questions, meeting the standard of success.

Fall 2022: 10/10 students met the standard of success.

Fall 2021: 10/11 students met the standard of success.

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

Student strengths included the ability to identify hydronic system components as well as how each safety and operation control component affects the proper functioning of the hydronic system.

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.

Students consistently perform well on skills assessed in this outcome.

We will continue to incorporate newer technology that has been added to the field into class discussions (e.g. tankless water systems and infloor radiant).

Outcome 3: Demonstrate proper wiring of hydronic zoning systems.

- Assessment Plan
 - Assessment Tool: Student project
 - Assessment Date: Winter 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Departmentally-developed rubric
 - Standard of success to be used for this assessment: A minimum of 70% of the students should achieve a score of 70% or higher
 - 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)
2022, 2021		

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

# of students enrolled	# of students assessed
21	21

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.

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 sections were face-to-face and taught in the evening.

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

The assessment plan lists a student project as the assessment tool for this outcome. Students do have the opportunity to complete eight wiring projects during lab time; however, not all students complete the same wiring projects depending on time constraints (some students wire faster than others). The wiring diagram described below is an assessment tool completed by all students.

This outcome was assessed using multiple-choice questions from the final exam related to the outcome and scored with an answer key.

The final exam questions related to this outcome provide a diagram of components that must be wired correctly to operate a heat motor or a 24-volt driven motor zone valve that is controlled by a thermostat and sends a signal to the boiler aquastat relay which energizes the pump and the burner circuits (see attached diagram).

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

90% of students (19/21) scored 70% or higher on the outcome-related questions, meeting the standard of success.

Fall 2022: 10/10 students met the standard of success.

Fall 2021: 9/11 students met the standard of success.

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

Students demonstrated field-level skills needed to wire various hydronic zoning systems according to industry standards.

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 will continue to use manufacturer wiring diagrams and any new components brought into the industry to provide with students with up-to-date skills to wire correctly into a system.

Outcome 4: Troubleshoot basic hydronic system components.

- Assessment Plan
 - Assessment Tool: Departmental final exam will be used to assess understanding of key concepts
 - Assessment Date: Winter 2020
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: Answer key
 - Standard of success to be used for this assessment: A minimum of 70% of the students should achieve a score of 70% or higher
 - 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)
2022, 2021		

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

# of students enrolled	# of students assessed
21	21

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.

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 sections were face-to-face and taught in the evening.

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

This outcome was assessed using multiple-choice questions from the final exam related to the outcome and scored with an answer key.

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

71% of students (15/21) scored 70% or higher on the outcome-related questions, meeting the standard of success.

Fall 2022: 7/10 students met the standard of success.

Fall 2021: 8/11 students met the standard of success.

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

Through labs, students identify and learn the purpose of components related to proper operation of a hydronic system. The hands-on practice and simulated field situations are used to allow students to apply theoretical knowledge to demonstrate their diagnostic skills and use correct service practices.

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 will continue to update existing labs to enhance the students' ability to service newer designs of equipment.

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.

Outcome 2: Greater detail has been added to the lectures explaining the different steam components, their operation and necessity for correct sequence operation.

Outcome 3: Students are applying wiring theory to the labs to change various configurations.

Outcome 4: The previous assessment showed that more hands-on troubleshooting of the steam system would be valuable for student success. Students are now removing and replacing parts according to system problems.

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 overall performance of the students is above expectation, as students met the standard of success for all outcomes. The level of understanding has improved from the previous assessment.

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

This report will be shared at the next department meeting with all HVA instructors.

- 4.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Assessment Tool	We will need to ensure all students complete one of the eight potential wiring projects to be able to collect lab-related assessment data for Outcome 3.	We had to use an alternate assessment tool for the current assessment, but we'd like to incorporate hands-on assessment data from these lab projects for future assessment.	2023
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Outcome 1: Continue to emphasize the importance of proper piping configurations of hydronic systems. Outcome 2: Continue to incorporate newer	Continuous improvement	2023

	<p>technology into class discussions.</p> <p>Outcome 3: Continue to use manufacturer wiring diagrams and any new components brought into the industry to provide students with up-to-date wiring skills.</p> <p>Outcome 4: Continue to update existing labs to enhance the students' ability to service newer designs of equipment</p>		
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5. Is there anything that you would like to mention that was not already captured?

Fall 2020 data should have been included in this assessment. Due to multiple issues with Blackboard recovering data and producing reports with the tools aligned with the Goals Tool, I was not able to include this data in the current assessment.

III. Attached Files

[oc4-f22-hva-205](#)
[oc1-f21-hva-205](#)
[oc2-f21-hva-205](#)
[oc2-f22-hva-205](#)
[oc3-f21-hva-205](#)
[oc1-f22-hva-205](#)
[oc3-f22-hva-205](#)
[oc4-f21-hva-205](#)
[HVA 205 Assessment Data](#)
[Bell & Gossett Wiring](#)

Faculty/Preparer: Robert Carter **Date:** 08/04/2023
Department Chair: Brian Martindale **Date:** 08/08/2023
Dean: Jimmie Baber **Date:** 08/09/2023

Assessment Committee Chair: Jessica Hale

Date: 12/11/2023

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Mathematics	097	MTH 097 04/13/2021- Foundations of Algebra
College	Division	Department
	Math, Science and Engineering Tech	Math & Engineering Studies
Faculty Preparer		Robert Hatcher
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?

Yes

Summer 2019 with data from Fall 2018.

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

The data collected from Fall 2018 suggested improved student understanding in most areas as compared to the previous assessment in Winter 2015. The continuation of increased communication with all MTH 097 faculty surrounding successful teaching methods of difficult topics was recommended.

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

Plans for workshops related to teaching difficult MTH 097 topics were delayed due to the COVID-19 outbreak as the type of support full and part-time faculty required drastically changed. In Fall 2019, we did hold a lightly attended KALPA session centered around creating math skill practice for MTH 097. These practice websites could be used by students, faculty, and tutors. Development of the website is still in progress.

II. Assessment Results per Student Learning Outcome

Outcome 1: Represent and solve linear equations graphically, analytically and verbally.

- Assessment Plan

- Assessment Tool: Common departmental final exam.
- Assessment Date: Fall 2021
- Course section(s)/other population: Common final exams will be collected from all sections.
- Number students to be assessed: A random sample of at least 75 exams with at least 4 student exams from each section
- How the assessment will be scored: A rubric developed by the course mentor with input from the department
- Standard of success to be used for this assessment: 75% of the students will score 75% or higher
- Who will score and analyze the data: The course mentor

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)

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

# of students enrolled	# of students assessed
	72

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.

Due to COVID-19, this assessment was more challenging than in previous years. As MTH 097 had always been taught in a traditional face-to-face classroom, we had always required instructors to include common questions on paper and pencil final exams. As the course was taught virtually in Summer 2020, instructors were given the freedom to choose their own tools for assessing student learning. Although all of the instructors included questions similar to the common exam questions, many used a different tool that created incomparable questions. The 72 students selected in this assessment represent all of the students in 5 sections of the course who took a comparable final exam using ConnectMath.

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 sections of MTH 097 were offered in the virtual format in **Fall 2020**. The enrollment for Fall 2020 was not available in CurricUNET to select.

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

Due to the nature of the exam, the assessment process outlined in the master syllabus was not possible as individual student scores were not accessible. The data available were the success rates of each section of students on each question on the exam. These success rates were weighted depending on the number of students in the section. Then the average student success on each question was calculated.

Questions #1-7 on the common final exam questions were used to assess this outcome. Each question was graded as either correct or incorrect (no partial credit).

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

While it is not possible to evaluate if the students met the standard of success outlined in the master syllabus, an average of 72% on the outcome-related questions is quite good. Topics that students struggled with were Solving Linear Inequalities, Writing Equations of Lines, and Graphing Linear Inequalities.

Overall success on all seven questions: 72%

Success Rate on Question #1: 49.7%

Success Rate on Question #2: 95.5%

Success Rate on Question #3: 90.0%

Success Rate on Question #4: 81.7%

Success Rate on Question #5: 51.4%

Success Rate on Question #6: 66.8%

Success Rate on Question #7: 69.3%

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

As evident in the average scores for questions 2, 3, and 4, students have a strong understanding of how to solve linear equations, solve absolute value equations, and graph linear equations in two variables.

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.

Students need improvement in solving inequalities. More work needs to be done to investigate if the improvement needs to center on isolating the variable in the inequality or expressing the solution in set-builder or interval notation.

As always, students in this assessment struggled when given the multi-step task of finding the equation of a line. Given the modified assessment tool, an analysis of the steps students took while solving these problems is not possible.

These two topics will be foci of future math department professional development sessions.

Outcome 2: Solve systems of two linear equations graphically and analytically.

- Assessment Plan
 - Assessment Tool: Common departmental final exam.
 - Assessment Date: Fall 2021
 - Course section(s)/other population: Common final exams will be collected from all sections.
 - Number students to be assessed: A random sample of at least 75 exams with at least 4 student exams from each sections
 - How the assessment will be scored: A rubric developed by the course mentor with input from the department
 - Standard of success to be used for this assessment: 75% of the students will score 75% or higher
 - Who will score and analyze the data: The course mentor
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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2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
	72

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.

Due to COVID-19, this assessment was more challenging than in previous years.

As MTH 097 had always been taught in a traditional face-to-face classroom, we had always required instructors to include common questions on paper and pencil final exams. As the course was taught virtually in Summer 2020, instructors were given the freedom to choose their own tools for assessing student learning. Although all of the instructors included questions similar to the common exam questions, many used a different tool that created incomparable questions. The 72 students selected in this assessment represent all of the students in 5 sections of the course who took a comparable final exam using ConnectMath.

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 sections of MTH 097 were offered in the virtual format in **Fall 2020**. The enrollment for Fall 2020 was not available in CurricUNET to select.

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

Due to the nature of the exam, the assessment process outlined in the master syllabus was not possible as individual student scores were not accessible. The data available were the success rates of each section of students on each question on the exam. These success rates were weighted depending on the number of students in the section. Then the average student success on each question was calculated.

Question #8 on the common final exam was used to assess this outcome. This question was graded as either correct or incorrect (no partial credit).

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: <u>Yes</u>
While it is not possible to evaluate if the students met the standard of success outlined in the master syllabus, an average of 84% on the question is very high.
Overall success on question #8: 84.0%

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

The results indicate that students have a strong understanding of how to solve systems of linear equations in two variables.
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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.

Here we will stress to all faculty that students are doing well in this area and encourage continued sharing of successful teaching methods.
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Outcome 3: Add, subtract, multiply, and factor polynomial expressions.

- Assessment Plan
 - Assessment Tool: Common departmental final exam.
 - Assessment Date: Fall 2021
 - Course section(s)/other population: Common final exams will be collected from all sections.
 - Number students to be assessed: A random sample of at least 75 exams with at least 4 student exams from each section
 - How the assessment will be scored: A rubric developed by the course mentor with input from the department
 - Standard of success to be used for this assessment: 75% of the students will score 75% or higher
 - Who will score and analyze the data: The course mentor

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)

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

# of students enrolled	# of students assessed
	72

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.

Due to COVID-19, this assessment was more challenging than in previous years.

As MTH 097 had always been taught in a traditional face-to-face classroom, we had always required instructors to include common questions on paper and pencil final exams. As the course was taught virtually in Summer 2020, instructors were given the freedom to choose their own tools for assessing student learning. Although all of the instructors included questions similar to the common exam questions, many used a different tool that created incomparable questions. The 72 students selected in this assessment represent all of the students in 5 sections of the course who took a comparable final exam using ConnectMath.

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 sections of MTH 097 were offered in the virtual format in **Fall 2020**. The enrollment for Fall 2020 was not available in CurricUNET to select.

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

Due to the nature of the exam, the assessment process outlined in the master syllabus was not possible as individual student scores were not accessible. The data available were the success rates of each section of students on each question on the exam. These success rates were weighted depending on the number of students in the section. Then the average student success on each question was calculated.

Questions #9 and 10 on the common final exam were used to assess this outcome. Each question was graded as either correct or incorrect (no partial credit).

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

While it is not possible to evaluate if the students met the standard of success outlined in the master syllabus, an average of 93.7% on the question is very high.

Overall success on question #9 and 10: 93.7%

Success Rate on Question #9: 96.2%

Success Rate on Question #10: 91.3%

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

The data indicates that students have a strong understanding of these topics.

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.

Here we will stress to all faculty that students are doing well in this area and encourage continued sharing of successful teaching methods.

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.

As the mode of instruction and testing tool used for this assessment were drastically different than what we have used in the past, I hesitate to draw any comparisons to previous semesters. The overall success of the students on the assessment questions speaks to the quality of our instructors, their ability to be nimble in the face of adversity, and our commitment to helping each other.

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?

Student success on question #1 on inequalities seems to have declined dramatically from the previous two assessments. This was a surprise and will be addressed in future department meetings.

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

I plan to share this information with all MTH 097 instructors during the Fall 2021 in-service.

4.

Intended Change(s)

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

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

6.

III. Attached Files

[MTH 097 Fall 2020 Assessment Data](#)

Faculty/Preparer: Robert Hatcher **Date:** 04/13/2021

Department Chair: WCC Default **Date:** 05/26/2021

Dean: Victor Vega **Date:** 06/16/2021

Assessment Committee Chair: Shawn Deron **Date:** 08/04/2021

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Mathematics	097	MTH 097 07/31/2019- Foundations of Algebra
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Math & Engineering Studies	Robert Hatcher
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?

Yes Winter 2015

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

Two of the three outcomes met the standard of success. Success was defined as 75% of students achieving an average of 3 or better on questions related to the objective. Outcome 1: Represent and solve linear equations - standard of success was met. Outcome 2: Solve systems of two linear equations - standard of success was not met. Outcome 3: Represent and solve quadratic equations - standard of success was met.
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3. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

Our student population needed to improve in the following areas: <ul style="list-style-type: none">○ Finding an equation of a line given two points on the line○ Finding an equation of a line given a point on the line and a parallel line○ Solving systems line linear equations with elimination and substitution

II. Assessment Results per Student Learning Outcome

Outcome 1: Represent and solve linear equations graphically, analytically and verbally.

- Assessment Plan
 - Assessment Tool: Common departmental final exam.
 - Assessment Date: Fall 2021
 - Course section(s)/other population: Common final exams will be collected from all sections.
 - Number students to be assessed: A random sample of at least 75 exams with at least 4 student exams from each section
 - How the assessment will be scored: A rubric developed by the course mentor with input from the department
 - Standard of success to be used for this assessment: 75% of the students will score 75% or higher
 - Who will score and analyze the data: The course mentor

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		

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

# of students enrolled	# of students assessed
333	94

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.

As the task of grading all 197 final exams submitted by faculty would be overly tedious, 94 exams were graded. This should be enough to attain an accurate view of the performance of the population of 333 students. In addition, not all students enrolled in the course take the final exam.
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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.

None of the sections of MTH 097 offered are DL or MM. All students in all sections were given 11 common questions created by the department. These common questions were included on a paper and pencil final exam. 197 final exams were submitted, and 94 of these exams were selected at random for assessment.

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

Questions 1, 2, 3, 4, 5, 6, and 7 on the common final exam were used to assess this outcome. All questions were graded on a scale from 0 to 4 (0-problem not attempted; 1-problem attempted with little supporting work; 2-problem attempted with some supporting work; 3-problem solved with one or two small errors; 4-problem solved correctly).

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

Overall results: On questions 1 thru 7, 87.1% of the responses (573 out of 658) earned a 3 or better. This passes the standard of success for this outcome.

In addition, the standard of success was also achieved for each individual question.

Question 1: 90.4% (85 of the 94) of students earned a 3 or better.

Question 2: 95.7% (90 of the 94) of students earned a 3 or better.

Question 3: 86.2% (81 of the 94) of students earned a 3 or better.

Question 4: 86.2% (81 of the 94) of students earned a 3 or better.

Question 5: 79.8% (75 of the 94) of students earned a 3 or better.

Question 6: 80.9% (76 of the 94) of students earned a 3 or better.

Question 7: 90.4% (85 of the 94) of students earned a 3 or better.

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

Students performed very well on this outcome. Not only has the success rate for all the questions increased (76.1% in Winter 2015 to 87.1 % in Fall 2018), but the success rates for individual questions went up as well.

The exception is for question 2 involving solving a linear equation that may necessitate the distributive property. This question had a very high success rate of 97.5% in Winter of 2015 and a success rate of 95.7% in Fall 2018. Although this rate went down, 95.7% is still considered an overwhelming success.

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 improvement of student understanding in this area from Winter 2015 to Fall 2018 indicates that we should keep on the path we have established. Creating opportunities for full and part-time instructors to share ideas of how to teach difficult topics and create student success.

Outcome 2: Solve systems of two linear equations graphically and analytically.

- Assessment Plan
 - Assessment Tool: Common departmental final exam.
 - Assessment Date: Fall 2021
 - Course section(s)/other population: Common final exams will be collected from all sections.
 - Number students to be assessed: A random sample of at least 75 exams with at least 4 student exams from each sections
 - How the assessment will be scored: A rubric developed by the course mentor with input from the department
 - Standard of success to be used for this assessment: 75% of the students will score 75% or higher
 - Who will score and analyze the data: The course mentor
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		

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

# of students enrolled	# of students assessed
333	94

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.

As the task of grading all 197 final exams submitted by faculty would be overly tedious, 94 exams were graded. This should be enough to attain an accurate view of the performance of the population of 333 students.

In addition, not all students enrolled in the course take the final exam.

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.

None of the sections of MTH 097 offered are DL or MM. All students in all sections were given 11 common questions created by the department. These common questions were included on a paper and pencil final exam. 197 final exams were submitted, and 94 of these exams were selected at random for assessment.

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

Question 8 on the common final exam was used to assess this outcome. All questions were graded on a scale from 0 to 4 (0-problem not attempted; 1-problem attempted with little supporting work; 2-problem attempted with some supporting work; 3-problem solved with one or two small errors; 4-problem solved correctly).

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

83.0% (78 out of 94) of students earned a 3 or better on this question.

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

Performance on this outcome has increased from 72.2% in Winter 2015 to 83% in Fall 2018. It is very encouraging to see that we have hurdled the standard of success on this topic from the last assessment.

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.

Again, the upward trend in student understanding is encouraging. We plan to stay on the same course of providing space for instructors to share best practices.

Outcome 3: Add, subtract, multiply, and factor polynomial expressions.

- Assessment Plan
 - Assessment Tool: Common departmental final exam.
 - Assessment Date: Fall 2021
 - Course section(s)/other population: Common final exams will be collected from all sections.
 - Number students to be assessed: A random sample of at least 75 exams with at least 4 student exams from each section
 - How the assessment will be scored: A rubric developed by the course mentor with input from the department
 - Standard of success to be used for this assessment: 75% of the students will score 75% or higher
 - Who will score and analyze the data: The course mentor

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		

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

# of students enrolled	# of students assessed
333	94

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.

As the task of grading all 197 final exams submitted by faculty would be overly tedious, 94 exams were graded. This should be enough to attain an accurate view of the performance of the population of 333 students.

In addition, not all students enrolled in the course take the final exam.

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.

None of the sections of MTH 097 offered are DL or MM. All students in all sections were given 11 common questions created by the department. These common questions were included on a paper and pencil final exam. 197 final exams were submitted, and 94 of these exams were selected at random for assessment.

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

Question 10 on the common final exam was used to assess this outcome. All questions were graded on a scale from 0 to 4 (0-problem not attempted; 1-problem attempted with little supporting work; 2-problem attempted with some supporting work; 3-problem solved with one or two small errors; 4-problem solved correctly). The mean score from each question was calculated.

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

88.3% (83 out of 94) of students earned a 3 or better on this question.

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

In the assessment from Winter 2015, the success rate was 82.3% and in Fall of 2018, it was 88.3%.

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.

Again, the upward trend in student understanding is encouraging. We plan to stay on the same course of providing space for instructors to share best practices.

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.

Sessions where all instructors who teach the course were invited to share best practices, lesson studies on specific topics and informal email discussions are all seen as tools that led to improved performance on the outcomes for the course.

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?

As students are achieving the course outcomes, an investigation of how our MTH 097 students perform in the next math course will be an area of inquiry in the next assessment report. There are few (if any) courses on campus outside the math department that require MTH 097, so student success in their next math course is a significant measure of success.

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

This information will be shared with the faculty with the instructors who attend the full department meeting during August 2019 in-service. It will be discussed further in the mathematics department meeting during the Fall 2019 semester.

4. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Other: Instructor collaboration	Continue creating opportunities for full and part-time instructors to share ideas for teaching difficult topics and encouraging student success.	These opportunities seem to have led to improved performance for the current assessment and will continue to help students improve in the course.	2020

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

6.

III. Attached Files

[Assessment Data F2018](#)

Faculty/Preparer: Robert Hatcher **Date:** 08/07/2019
Department Chair: Lisa Manoukian **Date:** 08/12/2019
Dean: Victor Vega **Date:** 09/26/2019
Assessment Committee Chair: Shawn Deron **Date:** 11/08/2019

**Course Assessment Report
Washtenaw Community College**

Discipline	Course Number	Title
Mathematics	097	MTH 097 05/19/2015- Foundations of Algebra
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Mathematics	Robert Hatcher
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Represent and solve linear equations graphically, analytically and verbally.

- Assessment Plan
 - Assessment Tool: Common final exam created by the department.
 - Assessment Date: Winter 2011
 - Course section(s)/other population: sample of at least four from 12 sections
 - Number students to be assessed: All students in selected sections (approximately 50)
 - How the assessment will be scored: departmentally-developed rubric
 - Standard of success to be used for this assessment: 75% of the students will achieve an average of 3 or better on the assessment.
 - Who will score and analyze the data: Members of the Math Department will blind-score each test item 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)
	2015	

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

# of students enrolled	# of students assessed
618	79

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 354 exams that were turned in, a sample of 79 student exams 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.

None of the sections of MTH 097 offered at the college are DL or MM. All students in all sections were given 11 common questions on the paper and pencil final exam created by the department. 354 exams were turned in from approximately 24 of the 29 existing sections of the course. 79 of the 354 were selected at random.

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

Questions 1, 2, 3, 4, 5, 6, and 7 on the common final exam were used to assess this outcome. All questions were graded on a scale from 0 to 4 (0 problem not attempted; 1 problem attempted with little supporting work; 2 problem attempted with some supporting work; 3 problem solved with one or two small errors; 4 problem solved correctly).

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

Overall results: On questions 1 thru 7, 76.1% of the responses (421 out of 553) earned a 3 or better. However, there is some work to do with individual questions (#4 thru 7).

Individual Results:

Question 1: 83.5% (66 of the 79) of students earned a 3 or better.

Question 2: 97.5% (77 out of 79) of students earned a 3 or better.

Question 3: 78.5% (62 out of 79) of students earned a 3 or better.

Question 4: 73.4% (58 out of 79) of students earned a 3 or better.

Question 5: 65.8% (52 out of 79) of students earned a 3 or better.

Question 6: 60.8% (48 out of 79) of students earned a 3 or better.

Question 7: 73.4% (58 out of 79) of students earned a 3 or better.

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

Students' work included in the assessment demonstrated deep understanding of solving linear equations and graphing linear equations (questions 1 thru 3).

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.

Students need the most work on finding equations of lines given two points on the line and given a parallel line and a point on the line (question 5 and 6).

Outcome 2: Solve systems of two linear equations graphically and analytically.

- Assessment Plan
 - Assessment Tool: Common final exam created by the department.
 - Assessment Date: Winter 2011
 - Course section(s)/other population: sample of at least four from 12 sections
 - Number students to be assessed: All students in selected sections (approximately 50)
 - How the assessment will be scored: departmentally-developed rubric
 - Standard of success to be used for this assessment: 75% of the students will achieve an average of 3 or better on the assessment.
 - Who will score and analyze the data: Members of the Math Department will blind-score each test item 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)
	2015	

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

# of students enrolled	# of students assessed
618	79

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 354 exams that were turned in, a sample of 79 student exams 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.

None of the sections of MTH 097 offered at the college are DL or MM. All students in all sections were given 11 common questions on the paper and pencil final exam created by the department. 354 exams were turned in from approximately 24 of the 29 existing sections of the course. 79 of the 354 were selected at random.

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

Question 8 on the common final exam was used to assess this outcome. All questions were graded on a scale from 0 to 4 (0 problem not attempted; 1 problem attempted with little supporting work; 2 problem attempted with some supporting work; 3 problem solved with one or two small errors; 4 problem solved correctly).

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: No

72.2% (57 out of 79) of students earned a 3 or better.

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

Students who solved the systems with matrices and row reduced the matrices on their calculator performed quite well on this outcome.

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 need to work on solving systems with the elimination (addition) method and the substitution method. Our department will hold workshops with instructors of MTH 097 in the 2015-2016 academic year to discuss best practices in teaching this topic along with weaknesses in outcome 1.

Outcome 3: Represent and solve quadratic equations and functions analytically.

- Assessment Plan
 - Assessment Tool: Common final exam created by the department.
 - Assessment Date: Winter 2011
 - Course section(s)/other population: sample of at least four from 12 sections
 - Number students to be assessed: All students in selected sections (approximately 50)
 - How the assessment will be scored: departmentally-developed rubric
 - Standard of success to be used for this assessment: 75% of the students will achieve an average of 3 or better on the assessment.
 - Who will score and analyze the data: Members of the Math Department will blind-score each test item 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)
	2015	

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

# of students enrolled	# of students assessed
618	79

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 354 exams that were turned in, a sample of 79 student exams 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.

None of the sections of MTH 097 offered at the college are DL or MM. All students in all sections were given 11 common questions on the paper and pencil final exam created by the department. 354 exams were turned in from approximately 24 of the 29 existing sections of the course. 79 of the 354 were selected at random.

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

Question 10 on the common final exam was used to assess this outcome. All questions were graded on a scale from 0 to 4 (0 problem not attempted; 1 problem attempted with little supporting work; 2 problem attempted with some supporting work; 3 problem solved with one or two small errors; 4 problem solved correctly). The mean score from each question was calculated.

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

82.3% (65 out of 79) of students earned a 3 or better.

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

Students performed quite well on this outcome. This is an important result for students moving on to MTH 169.

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.

It seems that this topic is well covered, but we could include more complicated factoring polynomials problems in future master syllabi changes.

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?

Overall, students who take the final appear to be successful in the course. Areas for improvement include:

1. Finding equations of lines.
2. Solving systems of linear equations by the substitution method or addition method.

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

This information was shared with the part-time instructors of MTH 097 at our full math department meeting during August 2015 in-service. It will be discussed further in a department meeting during the Fall 2015 semester.

3. Intended Change(s)

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

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

5.

III. Attached Files

[Common Final Exam Questions](#)
[097 Assessment Data 8.2015](#)

Faculty/Preparer: Robert Hatcher **Date:** 09/10/2015
Department Chair: Lisa Rombes **Date:** 10/19/2015
Dean: Kristin Good **Date:** 10/20/2015
Assessment Committee Chair: Michelle Garey **Date:** 11/09/2015