

**Course Assessment Report
Washtenaw Community College**

Discipline	Course Number	Title
Heating, Ventilation, Air Conditioning and Refrigeration	207	HVA 207 09/24/2021-Commercial Industry Standards with Competency Exams
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		11/07/2016

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

10/06/2016

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

Outcome number 1 relates to the codes. Students seemed to do quite well, but student progress will be closely monitored to support their success to make sure they do not fall below the standard of success. Outcome number 2 related to the ESCO exam. We achieved the success standard percentage that was set. The report stated that we would have more time dedicated to review the questions on the ESCO test to prepare students to be successful on the exams.

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

More review time for the ESCO tests will be provided and related classes have recently added material found in the ESCO tests. However, upon reviewing the questions on the tests, there is some ambiguity as to the correct answers according to the ESCO test writers. We have already taken steps to discuss with them the material in question.

II. Assessment Results per Student Learning Outcome

Outcome 1: Identify the Michigan Mechanical Code and International Fuel Gas Code used when servicing and installing HVAC equipment.

- Assessment Plan
 - Assessment Tool: Departmental final exam will be used to assess understanding of key concepts
 - Assessment Date: Winter 2019
 - 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 students should achieve a score of 70% or higher
 - 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)
	2021, 2020, 2019, 2018, 2017, 2016	

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

# of students enrolled	# of students assessed
55	54

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.

54 out of the 55 enrolled students completed the first tool used to assess the first outcome. The student that did not complete the exam withdrew from the course.

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.

2016 - Students met face-to-face (F2F) - 10 students
 2017 - Students met F2F – 8 students

2018 - Students met F2F – 10 students

2019 - Students met F2F – 11 students

2020 - Students started the semester F2F and finished the remained virtually or online. Students could also receive an Incomplete to allow more time to complete lab work until July 30th of 2021. – 11 students

2021 - Students met as an MML. The lectures were online and the labs held on campus. - 4 students

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

Outcome number one is scored using a departmentally-developed outcome related test that consists of 40 questions. 20 questions related to the Michigan Mechanical Code (MMC) and 20 questions related to the International Fuel Gas Code (IFGC). The test is scored with an answer key with each question valued at 1 point. One question (#40) relating to the International Fuel Gas Code is worth 8 points.

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

Looking at the data from the exam in its entirety, with the exception of question 40, the overall success rate is 91.5%. We identified the first 20 questions from the test relating to the Michigan Mechanical Code and the success rate for these questions is 90.6%. 20 questions related to the International Fuel Gas Code. The overall success rate for these questions was 92.8%. The last question, #40, was scored differently and the overall success rate for it was 88.7%.

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

Overall, students scored very well on the outcome-related exam questions. We have the ability to identify the two main areas of the outcome and align the questions that relate to each of the main topics of the outcome, even down to the question level, to measure student 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.

Having data at the question level, we identified three questions where students scored 75% or below. These questions point to information asking about specific codes and related content. One outcome-related question identified that students made simple math errors. Moving forward, we will review the questions as a department to improve student success on the learning outcome.

Outcome 2: Identify commercial refrigeration, commercial air conditioning and residential low pressure hydronic heat systems.

- Assessment Plan
 - Assessment Tool: The ESCO Institute's commercial air conditioning, commercial refrigeration and residential low pressure hydronic heat competency test
 - Assessment Date: Winter 2019
 - Course section(s)/other population: All
 - Number students to be assessed: All
 - How the assessment will be scored: ESCO electronic scoring
 - Standard of success to be used for this assessment: A minimum of 70% of students should achieve a score of 70% or higher
 - Who will score and analyze the data: ESCO electronic scoring system

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)
	2021, 2020, 2019, 2018, 2017, 2016	

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

# of students enrolled	# of students assessed
55	47

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.

47 out of the 55 enrolled students attempted the ESCO exams.
 The ESCO exam is broken down into three parts and 46 out of the 47 attempted all 3.

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.

2016 - 10 students met F2F

2017 - 8 students met F2F

2018 - 9 students met F2F

2019 - 11 students met F2F

2020 - Students started the semester F2F and finished the remained virtually or Online. Students could also receive an Incomplete to allow more time to complete lab work until July 30th of 2021. – 6 Students completed all three parts of the exam. -5 students took the second and third parts of the exam.

2021 - 3 Students met as a Mixed Mode Lab. The lectures were online and the labs held on campus.

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

The ESCO exams that relate to this outcome are broken down into three separate parts. The exam data that we were able to collect is only if students pass or fail after the students' attempts. The three separate parts are content-specific and relate to Light Commercial Air Conditioning (LCACER), Light Commercial Refrigeration Employment Ready (LCRER) or Hydronic Low-Pressure Heat Employment Ready (HLPHER).

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

Students scored with an overall pass rate of 62.6% on the entire exam.

Breaking the data we have available down we see students' scores:

On the LCACER 61.7% of students passed.

On the LCRER students passed at an overall rate of 80.4%.

On the HLPHER students passed at an overall rate of 45.7%.

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

Currently the third party ESCO test is scored as a pass or fail. We do not have the ability to get granular question-level detailed data. However, we were able to spread the test out into the three separate content specific areas; LCACER, LCRER and the HLPHER. The data indicates that students are scoring better on the LCRER content.

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 noticed students' scores were significantly lower in the LCACER and HLPHER content areas. We can only surmise where the students fail to answer the questions correctly but due to not having the question level, detailed data from ESCO, we cannot accurately assess where to help improve student success.

Furthermore, students are not required to take and pass the exams as part of their grade, but we encourage them to take the ESCO tests to better their employment opportunities. We are discussing development of an exam prep test within the department to obtain question-level data which would give us the ability to assess this outcome better.

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.

We continually monitor the ESCO test content and questions to ensure we are teaching to the most current information so that students are able to succeed on the tests. Unfortunately we do not have data at the question level of student's performance to determine where we can provide support. Moving forward we will be developing prep tests to capture what we are missing.

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?

I believe this course is a viable resource necessary to be successful in the field of commercial trades. The content taught is correctly related to the commercial trade skills. The course results and data reflects the knowledge gained from participation in the Heating Ventilation Air Conditioning and Refrigeration (HVAC/R) program.

Upon reviewing the data from 2016-2019, the student success rate of passing the test was much higher. In the year 2020, when we went from F2F to Virtual due to COVID-19 restrictions, we noticed that student success on the assessments was reduced. I think that being in a virtual environment made it difficult for students to properly and fully participate in the program.

In Fall 2021, we were met with the same low test scores from the virtual Fall 2020 semester.

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

This report and information will be shared at our department meeting and discussed.

4. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Assessment Tool	Develop ESCO prep exams related to topic content related to LCACER, LCRER and HLPHER	The current tool only yields pass or fail data on content areas. A preparatory exam will provide us with the detail to identify students' strengths and weaknesses.	2022
Course Assignments	Review test questions relating to MMC and IFGC for outcome number one.	MMC and IFGC codes are constantly updated every three years and to stay current we need to review the question level content.	2022
Course Assignments	Add an assignment of math practice problems similar to those found on the tests.	Students made simple math errors that could, perhaps, be avoided by reinforcement of any relevant math skills.	2022

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

No

III. Attached Files

[Data summary](#)

Faculty/Preparer:	Robert Carter	Date: 11/05/2021
Department Chair:	Brian Martindale	Date: 11/17/2021
Dean:	Jimmie Baber	Date: 11/22/2021
Assessment Committee Chair:	Shawn Deron	Date: 03/16/2022

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Heating, Ventilation, Air Conditioning and Refrigeration	207	HVA 207 10/05/2016-Commercial Industry Standards with Competency Exams
Division	Department	Faculty Preparer
Advanced Technologies and Public Service Careers	Heating, Ventilation and A/C	Michael Kontry
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Identify the Michigan Mechanical Code and International Fuel Gas Code when servicing and installing HVAC equipment.

- Assessment Plan
 - Assessment Tool: written departmental final exam
 - Assessment Date: Winter 2016
 - 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: 70% of students will score 70% or higher.
 - 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, 2015, 2014	

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

# of students enrolled	# of students assessed
34	34

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 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 selected

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

Multiple choice final exam was employed using 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

Students scored correctly 96% of the time on this outcome.

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

Students exhibited strong ability to reference both the Michigan Mechanical Code and International Fuel Gas Code passages with accuracy.

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.

Emphasis on explanation of the codes and how to locate them in the code manuals will continue as it has proved successful in this outcome.

Outcome 2: Identify commercial refrigeration, commercial air conditioning and residential low pressure hydronic heat systems.

- Assessment Plan

- Assessment Tool: The ESCO Institute's commercial air conditioning, commercial refrigeration and residential low pressure hydronic heat competency test
- Assessment Date: Winter 2016
- Course section(s)/other population: all
- Number students to be assessed: all
- How the assessment will be scored: ESCO electronic scoring
- Standard of success to be used for this assessment: 70% of students will score 70% or higher.
- Who will score and analyze the data: ESCO electronic scoring system

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, 2015, 2014	

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

# of students enrolled	# of students assessed
34	34

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

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 selected.

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

Third party ESCO "employment ready" tests were used in commercial A/C, commercial refrigeration, and Hydronic low pressure evaluations.

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>
Students scored 70.1% on ESCO commercial A/C test.
Students scored 75.9% on ESCO commercial refrigeration test.
Students scored 71.9% on ESCO Hydronic low pressure test.

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

Students as a whole exceeded standard of success but at the bottom of the scale. Those who did well in the related classes did better on the ESCO exams.
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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.

The standard of success was met but just barely. More review time for the ESCO tests will be conducted and related classes have recently added material found in the ESCO tests. However reviewing some of the questions on the tests, there is some ambiguity as to the correct answers according to the ESCO test writers. We have already taken steps to discuss with them the material in question.

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?

The part of the course that deals with codes seems to be effective in that students are learning the use of code books and how to find the correct answers to service and repair appliances in the HVAC field according to those safety codes.
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The ESCO test scores sometimes are not an accurate indication of what the students learn in the related classes since some test material includes larger and more complex systems than are taught in the class material. However these are the closest third party test available in these areas.

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

All instructors of the HVA 207 class will be verbally informed of these results in a department meeting.
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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?

No

III. Attached Files

[Summary of data outcomes 1 and 2](#)

Faculty/Preparer: Michael Kontry **Date:** 10/06/2016

Department Chair: Robert Carter **Date:** 10/06/2016

Dean: Brandon Tucker **Date:** 10/09/2016

Assessment Committee Chair: Michelle Garey **Date:** 11/02/2016

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
 Course Discipline Code and Number: **HVA 207**
 Course Title: **Commercial Industry Standards with Competency Exams**
 Division/Department Codes: **VCT/HVAC**

2. Semester assessment was conducted (check one):

- Fall 20__
- Winter 2009
- Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.

- Portfolio
- Standardized test
- Other external certification/licensure exam (specify):
- Survey
- Prompt
- Departmental exam
- Capstone experience (specify):
- Other (specify):

4. Have these tools been used before?

- Yes
- No

If yes, have the tools been altered since its last administration? If so, briefly describe changes made.
 N/A

5. Indicate the number of students assessed/total number of students enrolled in the course.

All students completing the final exams, 6 of 6 students

6. Describe how students were selected for the assessment.

All students taking the final tests

II. Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.

N/A

2. List each outcome that was assessed for this report exactly as it is stated on the course master syllabus.

1. **Identify the Michigan Mechanical Code, and the International Fuel Gas Code when servicing and installing HVAC equipment.**
2. **Identify commercial refrigeration, commercial air conditioning, and residential low pressure hydronic heat systems by passing the ESCO exams.**

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. *Please attach a summary of the data collected.*

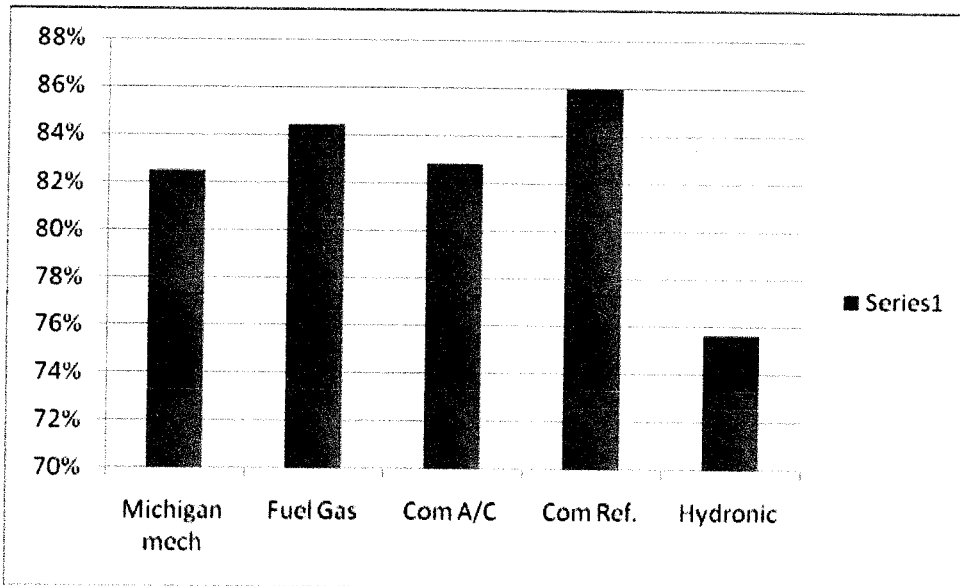
Students exceeded the standards of success in all above listed outcomes.

COURSE ASSESSMENT REPORT

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. *Please attach the rubric/scoring guide used for the assessment.*

70% of students should achieve a score of 70% or higher on the departmental final exam.
 70% of students should achieve a score of 70% or higher on the ESCO competency exam.

Student Exam Scores HVA 207 Winter 2008				
Outcome 1		Outcome 2		
Michigan Mechanical Code	International Fuel Gas Code	ESCO Commercial A/C	ESCO Commercial Refrigeration	ESCO low pressure Hydronic Heat
83%	84%	83%	86%	76%



5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

Strengths: Students showed a strong ability to reference the Michigan Mechanical Code, and the International Fuel Gas Code quickly and accurately.

Weaknesses: All students were well above the standard of success on all outcomes, but the students showed a slightly lower comprehension rate on the Hydronic heat test.

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

A more in depth review before the ESCO Hydronic Exam could be helpful, possibly supplemented by a handout study at home.

COURSE ASSESSMENT REPORT

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

a. Outcomes/Assessments on the Master Syllabus
Change/rationale:

b. Objectives/Evaluation on the Master Syllabus
Change/rationale:

c. Course pre-requisites on the Master Syllabus
Change/rationale:

d. 1st Day Handouts
Change/rationale:

e. Course assignments
Change/rationale:

f. Course materials (check all that apply)
 Textbook
 Handouts
 Other:

g. Instructional methods
Change/rationale:

h. Individual lessons & activities
Change/rationale: **Increase review time before students take the ESCO Exam on Hydronic Heating.**

3. What is the timeline for implementing these actions? **Winter 2010**

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.

The use of standardized tests and the departmentally developed final exams made assessing students easy and effective.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

The assessment tools worked effectively.

3. Which outcomes from the master syllabus have been addressed in this report?

All Selected _____

If "All", provide the report date for the next full review: **Winter 2012.**

If "Selected", provide the report date for remaining outcomes: _____

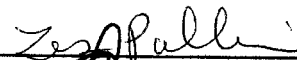
Submitted by:

Print: L. K. SWANSON
Faculty/Preparer

Signature: 


Date: 4/4/09

Print: Les Pullins
Department Chair

Signature: 

Date: 4/16/09

Print: Bruce Greene
Dean/Administrator

Signature: 

Date: 4/20/09