Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Heating, Ventilation, Air Conditioning and Refrigeration	105	HVA 105 04/09/2019-Residential and Light Commercial Heating Systems
Division	Department	Faculty Preparer
Advanced Technologies and Public Service Careers	Heating, Ventilation and A/C	Brian Martindale
Date of Last Filed Assessment Report		01/30/2017

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

   HVA 105 was last assessed by Robert Carter on 11/22/2016.

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

   The standard of success was met, as at least 70% of the students scored 70% or higher on the outcomes used to measure the students' success.

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

   The HVA 105 class is currently operating successfully. The action plan is to continue to provide a blend of lecture and hands-on experience to enable students to be successful in future classes and in the HVAC field in the future.

II. Assessment Results per Student Learning Outcome

Outcome 1: Diagnose service problems associated with residential heating systems.

- Assessment Plan
  - Assessment Tool: Computer simulatioin
  - Assessment Date: Winter 2016
  - Course section(s)/other population: all

- Number students to be assessed: all
- How the assessment will be scored: Check list
- Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
- Who will score and analyze the data: Departmental faculty

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

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

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

# of students enrolled	# of students assessed
50	46

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.

46 of 50 students were assessed. Four students either dropped or withdrew from the class.

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.

I chose four semesters of the most current material available.

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

The students performed a live furnace troubleshooting diagnosis in the lab room. Then their test results were compared to the 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
The students scored 82% on the final lab diagnosing furnace troubleshooting faults.

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

The students exceeded the outcome standards by having plenty of practice during labs diagnosing faults that are implemented into the furnaces.

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 provide educational opportunities with regards to the students' understanding of meter usage and sequence of operation.

Outcome 2: Identify industry standards for maintenance of residential heating equipment.

- Assessment Plan
    - Assessment Tool: Department 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 the students will score 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)
2018, 2017	2018	2018

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

# of students enrolled	# of students assessed
50	46

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.

46 of 50 students completed the HVA 105 class. Four students either dropped or 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.

Four semesters of HVA 105 classes were chosen from current material collected.

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

Certain questions were selected from a written final exam to be assessed. An answer key was used to establish an outcome.

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 students scored an average of 85% on this outcome.

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

The students showed strengths in different furnace components and types of 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.

Even though they were successful with the outcome, two areas that we may need to stress more is amp draw theory and gas pressure standards.

Outcome 3: Recognize Indoor Air Quality (IAQ) issues and standards.

- Assessment Plan
    - Assessment Tool: Department 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 the students will score 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)
2018, 2017	2018	2018

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

# of students enrolled	# of students assessed
50	46

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.

Four students either dropped or 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.

Four recent semesters were assessed.

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

Indoor Air Quality (IAQ) was selected from the written final exam to assess this outcome.

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 students scored an average of 96% on this outcome.

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

Based on the assessment outcomes, the students had a very high success rate in the area of IAQ.

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 topic of IAQ awareness has become a more important concern to the industry. We will continue to stress the importance of IAQ and provide information about new IAQ products that enter the HVAC market.

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.

Very few changes were implemented in the course. The students have been successful in the class in learning about heating theory and furnace usage.

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 students are executing above average in their knowledge of furnace operations, furnace components, and troubleshooting skills on furnaces.

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

All instructors teaching the HVA 105 course will be verbally informed of all actions for this course.

4. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Course Assignments	Provide more opportunities to use meters and recognize the sequence of operations.	Continuous Improvement	2020

Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Provide more information about amp draw theory and gas pressure standards.	Improve student understanding and performance	2020
Course Materials (e.g. textbooks, handouts, on-line ancillaries)	Stress IAQ awareness and provide information about new products	IAQ awareness has become more important in the industry	2020

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

No

III. Attached Files

HVA 105 Curriculum and Assessment worsheet

Faculty/Preparer:	Brian Martindale	**Date:**	05/08/2019
Department Chair:	Robert Carter	**Date:**	05/11/2019
Dean:	Brandon Tucker	**Date:**	05/19/2019
Assessment Committee Chair:	Shawn Deron	**Date:**	06/25/2019

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Heating, Ventilation, Air Conditioning and Refrigeration	105	HVA 105 10/12/2016-Residential and Light Commercial Heating Systems
Division	Department	Faculty Preparer
Advanced Technologies and Public Service Careers	Heating, Ventilation and A/C	Robert Carter
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Diagnose service problems associated with residential heating systems.

- Assessment Plan
  - Assessment Tool: Computer simulatioin
  - Assessment Date: Winter 2016
  - Course section(s)/other population: all
  - Number students to be assessed: all
  - How the assessment will be scored: Check list
  - Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
  - Who will score and analyze the data: Departmental faculty

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	2015, 2014, 2016	

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

# of students enrolled	# of students assessed
42	39

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.

3 students did not complete live furnace faults.

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

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

Live furnace faults diagnosed by students and compared to the master troubleshooting 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 89.4% on the final lab diagnosing troubleshooting faults.

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

Students displayed a good understanding of proper furnace diagnosing skills.

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.

Continue to stress the importance of understanding furnace operation as it pertains to troubleshooting furnace problems.

Outcome 2: Identify industry standards for maintenance of residential heating equipment.

- Assessment Plan
    - Assessment Tool: Department 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 the students will score 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)
2015	2016, 2015, 2014	

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

# of students enrolled	# of students assessed
42	39

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.

3 students did not take 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.

All students

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

Questions from the final exam 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
Students scored 89.7% 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 showed ability to use knowledge gained to maintain heating equipment operation to OEM 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.

Continue to reinforce the identification and operation of each part and their inter-dependence on each other's proper function.

Outcome 3: Recognize Indoor Air Quality (IAQ) issues and standards.

- Assessment Plan
    - Assessment Tool: Department 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 the students will score 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)
2015	2016, 2015, 2014	

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

# of students enrolled	# of students assessed
42	39

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.

3 students did not take 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.

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 questions from final exam related to the outcome 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 90.8% on this outcome.

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

Overall, students showed a good understanding of Indoor Air Quality (IAQ).

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 importance of IAQ is on the rise and we will continue to stress the importance in class.

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 understanding the students displayed on furnace operation, parts and the ability to diagnose problems on furnaces was above average.

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

All instructors of the HVA 105 course will be verbally informed.

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

HVA 105 data

Faculty/Preparer:	Robert Carter	**Date:** 11/22/2016
Department Chair:	Robert Carter	**Date:** 11/22/2016
Dean:	Brandon Tucker	**Date:** 11/24/2016
Assessment Committee Chair:	Ruth Walsh	**Date:** 01/29/2017

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
   Course Discipline Code and Number: HVA 105
   Course Title: Residential & Light Commercial Heating Systems
   Division/Department Codes: VCT

2. Semester assessment was conducted (check one):
   x Fall 2008 and 2009__
   ☐ Winter 20__
   ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   ☐ Portfolio
   ☐ Standardized test
   ☐ Other external certification/licensure exam (specify):
   ☐ Survey
   ☐ Prompt
   x Departmental exam
   ☐ Capstone experience (specify):
   ☐ Other (specify):

4. Have these tools been used before?
   x Yes
   ☐ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made.
   No

5. Indicate the number of students assessed/total number of students enrolled in the course.
   Two Separate Classes, Enrollment= 12,13

6. Describe how students were selected for the assessment.
   All students in each class assessed

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. Diagnose service problems associated with residential heating systems.
   2 Identify industry standards for maintenance of residential heating equipment.
   3 Recognize Indoor Air Quality (AIQ) issues and standards.

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.***
   See attached. Pages 1-2 detail questions, percentages and highlighted questions. Page 3 details question association to outcomes.

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.***
   Percentage of comprehension for outcomes 1-3

Outcome #1	Outcome # 2	Outcome #3
88.4%	96%	97%

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.
   Strengths: All of student outcomes were met.

   Weaknesses: Some questions did not meet the standard

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.

   No changes were necessary

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:

3. What is the timeline for implementing these actions?

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.
   Tool is a good measure of the outcomes.

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

3. Which outcomes from the master syllabus have been addressed in this report?
   All __x___ Selected _____
   If "All", provide the report date for the next full review: _Fall 2013_____

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

COURSE ASSESSMENT REPORT

Submitted by:

Print: DAN LAWRENCE (Faculty/Preparer) **Signature** Dan Lawrence **Date:** 4-19-2010

Print: LES PULLINS (Department Chair) **Signature** Les Pullins **Date:** 5/10/2010

Print: BRUCE GREENE (Dean/Administrator) **Signature** Bruce Greene **Date:** 5/13/2010

logged 5/13/10 sjl

Approved by the Assessment Committee 11//08

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:

   Course Discipline Code and Number: **HVA 105**
   Course Title: **Residential and Light Commercial Heating Systems**
   Division/Department Codes: **VCT-WAF**

2. Semester assessment was conducted (check one):
   - ☒ **Fall 2008**
   - ☐ Winter 20__
   - ☐ 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.

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

   All students in all sections completing the final exam, 21 of 21 students.

6. Describe how students were selected for the assessment.

   All students taking the final test

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.

   a. **Diagnose service problems associated with residential heating systems-assessment by computer simulation check sheet.**
   b. **Identify industry standards for maintenance of residential heating equipment – assessment by department final exam.**
   c. **Recognize Indoor Air Quality (IAQ) issues and standards- assessment by department final exam.**

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 met the standard of success in all of the above listed outcomes

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.***

Percentage of Comprehension for Outcomes 1 – 3

Outcome Summary	Outcome #1	Outcome #2	Outcome#3
	92.3%	91.2%	96.6%

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

   Strengths: **Students displayed a strong grasp on all outcomes.**

   Weaknesses: **None**

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.

   N/A

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:

3. What is the timeline for implementing these actions? **N/A**

COURSE ASSESSMENT REPORT

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 a standardized departmental final exam made assessing students easy and effective.

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

   Assessment tools worked effectively

3. Which outcomes from the master syllabus have been addressed in this report?
   All X Selected _____
   If "All", provide the report date for the next full review: **Fall 2011**.
   If "Selected", provide the report date for remaining outcomes: _____.

Submitted by: L. K. SWANSON

Print: L. K. Swanson (Faculty/Preparer)	**Signature** L. K. Swanson	**Date:** 4/14/09
Print: Les Pullins (Department Chair)	**Signature** Les Pullins	**Date:** 4/16/09
Print: Bruce Greene (Dean/Administrator)	**Signature**	**Date:** 4/20/09

logged 4/20/09 sjv

Approved by the Assessment Committee 11//08