

**Course Assessment Report  
Washtenaw Community College**

| Discipline   | Course Number                | Title   |
|--|------------------------------|---|
| Heating, Ventilation, Air Conditioning and Refrigeration | 107                          | HVA 107 05/16/2019- Residential and Light Commercial Air Conditioning Systems |
| Division   | Department                   | Faculty Preparer  |
| Advanced Technologies and Public Service Careers         | Heating, Ventilation and A/C | Michael Kontry  |
| 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<br><br>10/13/2016 |
|-----------------------|

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

|   |
|---|
| Students did not meet minimum standard of success on Outcome 1 (68.8%) - Identifying A/C principles and functions used to troubleshoot A/C systems.<br><br>Students did meet standard of success for Outcome 2 (96.9%) and Outcome 3 (81.1%). |
|---|

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

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| More time was dedicated to the refrigeration process and understanding of the factors that lead to a proper diagnosis of an air conditioning system. This change was implemented in Winter 2017. |
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**II. Assessment Results per Student Learning Outcome**

Outcome 1: Identify air conditioning principles and functions used to troubleshoot residential and commercial air conditioning systems.

- 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 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                  | 2019, 2018                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 66                     | 44                     |

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.

Records from 15 students attending Fall 2018 evening class were not submitted by the part time instructor. Seven students did not take the final exam, adding up to the 66 students that were listed as enrolled.

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.

Multiple choice questions from the final exam were scored 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: <u>No</u>  |
| Assessed students did poorly on this outcome with 50% achieving a score of 70% or higher related to principles involving troubleshooting air conditioning systems. Understanding of electrical related troubleshooting scored higher than troubleshooting related to the refrigeration system part of air conditioning. |

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

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| Students did fair on the electrical portion of this outcome being able to diagnose electrically related air conditioning faults. |
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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 refrigeration cycle in air conditioning component needs more time due to the complexity of the refrigeration system in that it is an invisible component of an air conditioning system. More time will be allotted to the explanation of the refrigeration cycle as it applies to air conditioning system. |
|--|

Outcome 2: Recognize safety rules and safe working practices while working around electricity and refrigerants.

- 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% fo 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                  | 2019, 2018                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 66                     | 44                     |

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.

Records from 15 students attending Fall 2018 evening class were not submitted by the part time instructor. Seven students did not take the final exam, adding up to the 66 students that were listed as enrolled.

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.

Multiple choice questions from the final exam were scored 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

Assessed students did very well on this outcome related to safety as it applies to air conditioning work with 88.6% achieving a score of 70% or higher. Safety is stressed in all areas of the course for the good of the students and then the customer once the students begin to work in the field.

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

Students appear to be very aware of safety as it applies to working around electricity and refrigeration systems as indicated by 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.

As safety is of the utmost importance to the students and, later the customer, we will continue to emphasize it as we have in the past.

Outcome 3: Interpret wiring diagrams for the purpose of troubleshooting air conditioning systems.

- 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% fo 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                  | 2019, 2018                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 66                     | 44                     |

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.

Records from 15 students attending Fall 2018 evening class were not submitted by the part time instructor. Seven students did not take the final exam, adding up to the 66 students that were listed as enrolled.

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.

Multiple choice questions from the final exam were scored 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: <u>No</u>   |
| Assessed students did poorly on this outcome with 54.5% achieving a score of 70% or higher interpreting wiring diagrams as they apply to troubleshooting air conditioning systems. |

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

|   |
|---|
| Students exhibited a fair knowledge of wiring diagrams and their importance to troubleshooting. |
|---|

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 not met on this outcome and needs to be improved, so continued emphasis will be placed on reading and interpreting wiring diagrams for a clearer understanding of electrical air conditioning circuits. |
|---|

Outcome 4: Apply principles of air conditioning to solve air conditioning problems on actual air conditioning units.

- Assessment Plan
    - Assessment Tool: Practical exam
    - Assessment Date: Winter 2016
    - Course section(s)/other population: all
    - Number students to be assessed: all
    - How the assessment will be scored: Check sheet
    - 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 | 2019, 2018 |  |
|------------|------------|--|

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 66                     | 44                     |

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.

Records from 15 students attending Fall 2018 class were not submitted by the part time instructor. Seven students did not take the practical lab final, adding up to the 66 students that were listed as enrolled.

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.

Refrigeration and electrical faults were introduced into live air conditioning units in the lab. Each fault is marked as a pass/no pass score (either correct or incorrect).

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

Assessed students did well on this outcome with 84% achieving a score of 70% or higher.

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

Students did very well on the lab practical exam.

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.

Since being able to troubleshoot air conditioning units is the main component of this course, we will continue to stress this knowledge in order to strengthen students' effectiveness in the field.

Outcome 4: Apply principles of air conditioning to solve air conditioning problems on actual air conditioning units.

- 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% fo 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                  | 2019, 2018                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 66                     | 44                     |

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.

Written final exam for this outcome has been replaced by a lab practical 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.

Final exam for this outcome was not used.



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

Written final exam for this outcome has been replaced by a practical exam.

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

No data was calculated.

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

Students did very well on the lab practical exam.

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.

Since being able to troubleshoot air conditioning units is the main component of this course, we will continue to stress this knowledge in order to strengthen students' effectiveness in the field.

### 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.

Outcomes 1, 2, and 3 were lower than the previous report due to using the cumulative sample scores as opposed to the specific students' scores for each outcome. Attached files show both cumulative class scores and the standard of success. The cumulative scores for this assessment were higher than the cumulative scores of the previous assessment. Outcome 4 scores were flat from the previous report and were based on individual student performance as it relates to the standard of success.

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?

Understanding of the refrigeration cycle and system parts is less than average. Electrical understanding of the air conditioning system seemed slightly above

average. More time needs to be spent on the internal refrigeration cycle as that is an invisible component to the students.

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

All instructors of the HVA 107 course will be verbally informed of this information in a department meeting.

4. Intended Change(s)

| Intended Change  | Description of the change   | Rationale   | Implementation Date |
|--|---|---|---------------------|
| Course Assignments   | More time will be allotted to the explanation of the refrigeration cycle as it applies to air conditioning systems. | Improve understanding of this important topic   | 2019                |
| Course Materials (e.g. textbooks, handouts, on-line ancillaries) | More emphasis will be placed on reading and interpreting wiring diagrams.   | Assure students have a clearer understanding of electrical air conditioning circuits. | 2019                |

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

To clear any confusion, in the past, standard of success was calculated on the cumulative scores of the sample as a whole rather than the individual scoring of the students. This is how standard of success in this department was calculated when first instructed on how to construct the report. This report is using the individual performance of the students on the specified questions to determine if the standard of success was met or not, hence both figures were supplied (cumulative and actual standard of success) so a comparison could be made on an even basis.

### III. Attached Files

**Faculty/Preparer:** Michael Kontry **Date:** 06/27/2019  
**Department Chair:** Robert Carter **Date:** 07/07/2019  
**Dean:** Brandon Tucker **Date:** 07/08/2019  
**Assessment Committee Chair:** Shawn Deron **Date:** 11/15/2019



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

| Discipline   | Course Number                | Title  |
|--|------------------------------|--|
| Heating, Ventilation, Air Conditioning and Refrigeration | 107                          | HVA 107 10/13/2016-Residential and Light Commercial Air Conditioning Systems |
| 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 air conditioning principles and functions used to troubleshoot residential and commercial air conditioning systems.

- 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 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) |
|-----------------------------|-------------------------------|------------------------------|
| 2014                        | 2015, 2016                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 33                     | 32                     |

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.

1 student in Winter 2016 did not 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.

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 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: No

Students scored 68.8% on this outcome.

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

Students exhibited a good knowledge of electrical principles related to 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.

More time needs to be spent with the theory of the refrigeration cycle to help students to diagnose internal air conditioning problems.

Outcome 2: Recognize safety rules and safe working practices while working around electricity and refrigerants.

- 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% fo 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) |
|-----------------------------|-------------------------------|------------------------------|
| 2014                        | 2016, 2015                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 33                     | 32                     |

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.

1 student did not 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.

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 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 96.9% 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 appear very aware of safety involved when working around electricity and refrigeration as indicated by 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.

Emphasis will continue on stressing and continually pointing out the safety hazards when working around electricity and refrigeration.

Outcome 3: Interpret wiring diagrams for the purpose of troubleshooting air conditioning systems.

- 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% fo 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) |
|-----------------------------|-------------------------------|------------------------------|
| 2014                        | 2016, 2015                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 33                     | 32                     |

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.

1 student did not 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.

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 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 81.1% 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 a good knowledge of the importance of proper wiring and making proper connections in an electrical circuit.

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.

Although the standard of success was met, more time could be spent on the wiring diagrams for a clearer understanding of the electrical circuits.

Outcome 4: Apply principles of air conditioning to solve air conditioning problems on actual air conditioning units.

- Assessment Plan
  - Assessment Tool: Practical exam
  - Assessment Date: Winter 2016
  - Course section(s)/other population: all
  - Number students to be assessed: all



- How the assessment will be scored: Check sheet
- 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) |
|-----------------------------|-------------------------------|------------------------------|
| 2014                        | 2016, 2015                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 33                     | 32                     |

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.

1 student did not take the final practical lab 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.

Live faults on air conditioning units were installed and graded using a correct diagnosis 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 83.3% 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 did well on the "hands-on" practical part of the course.

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.

Continued work in the lab will strengthen students' ability to identify and diagnose problems related to the air conditioning field.

Outcome 4: Apply principles of air conditioning to solve air conditioning problems on actual air conditioning units.

- 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% fo 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) |
|-----------------------------|-------------------------------|------------------------------|
| 2014                        | 2016, 2015                    |                              |

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

| # of students enrolled | # of students assessed |
|------------------------|------------------------|
| 33                     | 32                     |

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.

Written final exam for this outcome has been replaced by a lab practical 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.

Final exam for this outcome was not used.

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

Written final exam for this outcome has been replaced by a lab practical exam.

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

No data was calculated.

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

Students did well on the "hands-on" practical part of the course.

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.

Continued work in the lab will strengthen students' ability to identify and diagnose problems related to the air conditioning field.

## 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 understanding of air conditioning parts and their operation seems to be above average. More time on the theory of the refrigeration cycle and electricity related to air conditioning will help in increasing students' knowledge and confidence since these two principles are invisible and take more time to digest.

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

All instructors of the HVA 107 course will be verbally informed of this information in a department meeting.

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

[HVA 107 Outcome results](#)

**Faculty/Preparer:** Michael Kontry **Date:** 10/13/2016

**Department Chair:** Robert Carter **Date:** 10/17/2016

**Dean:** Brandon Tucker **Date:** 10/20/2016

**Assessment Committee Chair:** Michelle Garey **Date:** 11/14/2016

**COURSE ASSESSMENT REPORT**

**I. Background Information**

1. Course assessed:  
 Course Discipline Code and Number: HVA 107  
 Course Title: Residential & Light Commercial Air Conditioning Systems  
 Division/Department Codes: VCT
  
2. Semester assessment was conducted (check one):  
 Fall 2008 & 2009  
 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.

NO

5. Indicate the number of students assessed/total number of students enrolled in the course.  
**Four separate classes, enrollments = 10,13,14,15**
  
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. Identify knowledge of air conditioning, to troubleshoot residential and commercial air conditioning systems. x
  
  2. Recognize safety rules and safe work practices while working around electricity and refrigerants.
  
  3. Interpret wiring diagrams for the purpose of troubleshooting air condition<sup>ing</sup> systems. x
  
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. Page 1-3 detail questions, percentages and highlights questions to be changed. Page 4 details question association to 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.*

| Outcome #1 | Outcome #2 | Outcome #3 |
|------------|------------|------------|
| 83.3%      | 75%        | 100%       |

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

**Strengths: All of the 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.

**Changes will be made to specific questions in which the standard was not met.**

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.  1<sup>st</sup> Day Handouts  
Change/rationale:

e.  Course assignments  
Change/rationale:

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

g.  Instructional methods  
Change/rationale: based on specific questions, changes to instruction on specific topics have been made.

h.  Individual lessons & activities  
Change/rationale: changes will be made to some questions on the final (see attached).

3. What is the timeline for implementing these actions?

**Changes will be made by Spring 2010.**

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.

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.

Changes will be made to the questions that did not meet the standard of success.

- 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:      Winter 2013     .

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

Submitted by:

Print: DAN LAWRENCE Signature *Dan Lawrence* Date: 4-15-2010  
Faculty/Preparer

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

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

**Assessment  
of  
HVA 107  
Heating, Ventilation, and Air Conditioning IV  
Winter 2008**

**Assessment Conducted By: Paul W. Johnson  
May 2008**



**Assessment goals:** Determine student comprehension and retention of material covered in the HVA 107 course.

**Outcomes from Master Syllabi, Course Outcomes and Objectives:**

1. Apply knowledge of air conditioning to troubleshoot residential and commercial air conditioning systems.
  - Identify the four major components of an air conditioning system.
  - Recognize the function of each of the four major air conditioning components.
  - Identify the physical state of refrigerant as it flows through a refrigeration system.
2. Apply safety rules and safe work practices while working around electricity.
  - Recognize safe and effective use of an electrical meter.
  - Identify the safety precautions to follow while servicing air conditioning systems.
3. Interpret wiring diagrams for the purpose of troubleshooting air conditioning systems.
  - Interpret air conditioning and refrigeration power distribution through wiring diagrams.

**Standard of success:** 70% of students will meet all outcomes.

**Findings:** Students met the standard in all of the above listed outcomes

**Areas of possible improvement:** No assessed question had more than the standard but several questions for outcome 1 had 24% (5 out of 21 students) miss answered.  
Questions: 9, 18, & 37

Plan of action for areas of possible improvement:

**COURSE ASSESSMENT REPORT**

**I. Background Information**

1. Course assessed:
  - Course Discipline Code and Number: HVA 107
  - Course Title: Residential & Light Commercial Refrigeration ~~Service~~ *Systems*
  - Division/Department Codes: WAFD:HVAC-R
  
2. Semester assessment was conducted (check one):
  - Fall 20\_\_
  - 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 taking department exam were assessed.**
  
6. Describe how students were selected for the assessment.  
**All students completing the final exam for HVA107 were assessed.**

**II. Results**

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.  
**No previous assessment was conducted.**
  
2. State each outcome (verbatim) from the master syllabus for the course that was assessed.
  - **Apply knowledge of air conditioning, to troubleshoot residential and commercial air conditioning systems.**
  - **Apply safety rules and safe work practices while working around electricity.**
  - **Interpreting wiring diagrams for the purpose of troubleshooting air conditioning systems.**
  
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 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.*  
**Standard of success: 70% of students will meet all outcomes.**

**COURSE ASSESSMENT REPORT**

**Level of success for Outcomes 1 – 3**

| Objective: 1 | Objective: 2 | Objective: 3 |
|--------------|--------------|--------------|
| 88.4%        | 92.6%        | 100%         |

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

Strengths:

- Students had a strong ability to use wiring diagrams to troubleshoot A/C systems.

Weaknesses:

- Outcome 1 Questions: 9 18, & 37
- 26% of the students ( 5 of 21 assessed) had trouble applying knowledge of A/C systems to troubleshoot A/C systems on these questions.

**III. Changes influenced by assessment results**

- If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.
  - Re-emphasize the function of each refrigeration component and related symptoms to the performance of an A/C system.
  - Use trainers and lab equipment to develop stronger diagnostic skills.
  - Develop labs that require the use of diagnostic tools ( meters, gauges, and thermometers ) to determine systems function and efficiency.
- 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.
  - Outcomes/Assessments on the Master Syllabus  
Change/rationale:
  - Objectives/Evaluation on the Master Syllabus  
Change/rationale:
  - Course pre-requisites on the Master Syllabus  
Change/rationale:
  - 1<sup>st</sup> Day Handouts  
Change/rationale:
  - Course assignments  
Change/rationale:
    - Change and add to first day handouts so students understand better the expectations and outcomes for the course.
  - Course materials (check all that apply)
    - Textbook
    - Handouts
    - Other:
  - Instructional methods  
Change/rationale:
    - Develop more lab instruction and use lab assistants to help students develop troubleshooting skills.

COURSE ASSESSMENT REPORT

h.  Individual lessons & activities  
Change/rationale:

3. What is the timeline for implementing these actions? Fall 2008

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 assessment tool was effective

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

If "All", provide the report date for the next full review: Winter 2010.

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

Submitted by:

Name: PAUL W JOHNSON Paul W Johnson Date: 7/14/08  
Print/Signature

Department Chair: [Signature] Date: 7/16/08  
Print/Signature

Dean: [Signature] Date: 7/16/08  
Print/Signature

logged 7/16/08 sj