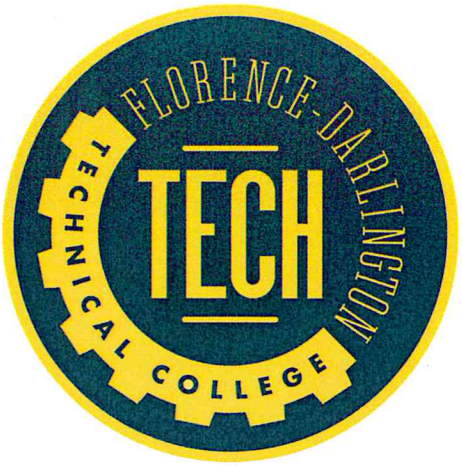

Heating, Ventilation and Air Conditioning Technology Student Learning Outcomes

February, 2017

FDTC Curriculum Map							
Program: HVAC –Heating, Ventilation, and Air Conditioning Technology Degree							
Course #	**Course Title**	**Credits**	**Hours**		**Program**	**General Education**	
			Lecture	**Lab**			
ECO 201	Economic Concepts	3	3	0		4	
ENG160	Technical Communications	3	3	0		2,3	
HSS 205	Technology and Society	3	3	0		5	
MAT 170	Algerbra, Geometry, and Trigonometry	3	3	0		1,7	
PSY 103	Human Relations	3	3	0		6	
ACR 101	Fundamentals of Refrigeration	5	3	6	3		
ACR 102	Tools and Service Techniques	3	2	3	4		
ACR 106	Basic Electricity for HVAC/R	4	3	3	1, 2		
ACR 107	Wiring Diagrams	2	2	0	2		
ACR 110	Heating Fundamentals	4	2	6	2, 4		
ACR 120	Basic Air Conditioning	4	3	3	1, 4, 6		
ACR 140	Automatic Controls	3	2	3	1, 4		
ACR 104	Print Reading for HVAC	1	0	3	5, 6		
ACR 111	Gas Heating Principles	3	2	3	1, 2		
ACR 131	Commercial Refrigeration	4	2	6	1, 3		
ACR 210	Heat Pumps	4	2	6	1, 2, 4		
ACR 206	Advanced Electricity for HVAC/R	2	1	3	2, 4		
ACR 220	Advanced Air Conditioning	4	2	6	1, 4		
ACR 221	Residential Load Calculations	2	1	3	1, 5		
ACR 231	Advanced Refrigeration	4	1	9	1, 2, 3		
ACR 240	Advanced Automatic Controls	3	1	6	1, 4		
ACR 250	Duct Fabrication	3	2	3	1, 6		
ACR 251	SCWE in HVAC	4	0	20	1, 2, 3, 4		
XXX	Elective: General*Students are strongly enc	3	3	0			
Total Credits		77					
Program Outcomes							
1. Apply knowledge of installing air conditioning system							
2. Demonstrate how to read electrical diagrams and diagnose electrical circuits							
3. Demonstrate how to read temperature/pressure charts and diagnose problems within the system							
4. Apply knowledge of the air conditioning system to repair problems							
5. Demonstrate a proper Load Calculation of a structure							

6. Fabricate, assemble, and install duct work using various sheet metal tools							
General Education Outcomes							
1. Quantitative Literacy							
2. Oral Communication							
3. Written Communication							
4. Reading Comprehension							
5. Information Literacy							
6. Critical Thinking							
7. Applied Technology							

Program: HVAC –Heating, Ventilation, and Air Conditioning Technology Degree

Course Student Learning Outcomes

ACR 101 - Fundamentals of Refrigeration	
1) Demonstrate how to convert temperature to pressure on pressure temperature charts	3
2) Differentiate between latent, sensible, and specific heat	3
3) Identify which refrigerant is contained inside a sealed system by using a pressure gage and a thermometer	3
4) Explain the difference between the transfer of heat by conduction, convection, and radiation	3
5) Identify the refrigeration process components and how they operate	1
6) Demonstrate how pressure and temperature are directly related concerning refrigerants	3
ACR 102 - Tools and Service Techniques	
1) Explain and demonstrate how to safely connect and operate a refrigerant recovery machine	1
2) Demonstrate how to create a vacuum in a refrigeration system	1
3) Explain and demonstrate how to measure proper operating pressures and temperatures of HVAC systems	3
4) Demonstrate the ability to measure temperature and pressure readings from different parts of an operating system	3
5) Demonstrate how to set up, adjust and operate an Oxy/Acetylene Torch	1
6) Demonstrate how safely charge a specified amount of refrigerant into a refrigeration system using a charging cylinder and digital scales	1
ACR 120 - Basic Air Conditioning	
1) Design and construct a basic air conditioning system refrigerant circuit and label the components	1
2) Demonstrate how to attach gauges to an air conditioning system	1
3) Explain and demonstrate the technique to use test equipment to measure temperatures and pressures on equipment	3
4) Demonstrate a technique to locate and repair refrigerant leaks using a variety of methods	1
5) Demonstrate the ability to read various temperature/pressure charts	1
6) Interpret various wiring diagrams and schematics	2
ACR 106 - Basic Electricity for HVAC/R	
1) Determine the proper operating voltage and current of five different HVAC components (using data plate)	2&4
2) Measure maximum allowable load amps of a fan motor and a compressor then measure actual current while operating	2
3) Show how to test and safely replace a blown fuse	2
4) Measure the motor winding resistance on a three-phase motor	2
5) Determine the resistance of strip heater with an ohmmeter	2
6) Using a multimeter measure resistance on a single phase motor	2

ACR 107 - Wiring Diagrams	
1) Identify schematic symbols used in drawings	2
2) Show how to locate and verify components on actual equipment	2 & 4
3) Construct a ladder type schematic from a pictorial diagram	2
4) Discuss and identify the sequence of operations from a schematic	2
5) Using a multimeter measure the voltage and current flow in a circuit from a diagram	2
6) Construct a pictorial diagram	2
ACR 110 - Heating Fundamentals	
1) Identify components and discuss the operation of an electric heating system	1 & 4
2) Demonstrate the ability to troubleshoot an electric heating system	2
3) Explain and demonstrate the ability to work safely avoiding safety hazards	1
4) Identify components and discuss the operation of a gas heating system	4
5) Identify components and discuss the operation of a gas heating system	4
6) Show how to measure gas pressure using a manometer	4
ACR 140 - Automatic Controls	
1) Identify and discuss the operation of various controls covered during this course	4
2) Apply troubleshooting skills to analyse controls for proper operation	4
3) Demonstrate the ability to choose proper replacement components	4
4) Show the proper technique to remove and replace faulty controls	4
5) Demonstrate how to work safely and avoid hazards	4
6) Explain the electrical, pressure, and temperature capacities of controls covered	4
ACR 104 - Print Reading	
1) Interpret architetural, plumbing, HVAC, and electrical plans	1
2) Analyze blueprints for sizing and designing HVAC equipment	1
3) Demonstrate safety procedures in the office and on the job site	1
4) Show how to use various kinds of scales and measuring devices	5
5) Identify and recognize standard symbols and abbreviations	5
6) Illustrate freehand sketching and drafting as needed in the office, shop, and on the job site	5
ACR 111 - Gas Heating Principles	
1) Describe and discuss each of the major components of a gas furnace.	4
2) List two fuels burned in gas furnaces and describe characteristics of each.	4
3) Discuss gas pressure measurement in inches of water column & perform pressure tests.	4
4) Describe the standing pilot, electric spark to pilot, direct spark and hot surface ignition.	4

5) Demonstrate how to work safely and avoid hazards	4
6) Describe the function of fan and limit switches and their typical settings.	4
ACR 131 - Commercial Refrigeration	
1) Demonstrate the ability to work safely avoiding safety hazards	4
2) Identify the components and discuss the operation of a medium temp refrigeration system	1
3) Identify the components and discuss the operation of a low temp refrigeration system	4
4) Explain the sequence of operation for defrosting a medium temperature system using planned or off cycle defrost	4
5) Demonstrate how to install a liquid line solenoid valve and low pressure switch for "pump down" control	4
6) Show how to install and adjust a defrost time clock	4
ACR 206 - Advanced Electricity for HVAC/R	
1) Explain Ohm's Law and demonstrate ability to solve electrical circuit math probles.	2
2) Describe how transformers and capacitors are constructed and substitute if necessary.	2
3) Determine proper wire size using charts, codes and manufactures data.	2
4) Determine sequence of operation from schematic diagrams.	2
5) Select electric motors for various applications and troubleshoot motor controls.	4
6) Demonstrate the ability to wire the components of a variety of HVAC/R equipment.	4
ACR 210 - Heat Pumps	
1 Describe how reverse cycle heating works.	4
2) Compare and contrast electric & gas heat to heating with a heat pump.	4
3) Explain how heat pump efficiency & coefficient of perfornace is rated.	4
4) Decsribe the control sequence of operation for various heat pumps.	4
5) Properly adjust refrigerant charge using manufactures information.	4
6) Perform preventative maintenance on various equipment in lab.	4
ACR 220 - Advanced Air Conditioning	
1) Explain how temperature, humidity and air movement affect human comfort.	4
2) Use a sling psychrometer to determine wet and dry bulb temperatures of air.	4
3) Plot air conditions using a psychrometric chart.	4
4) Record basic air pressure measurements using an inclined manometer & magnehelic gauge.	4
5) Explain what constitutes good airflow through a duct system.	4
6) Select proper equipment to control ventilation and humidity requirements of a structure.	4
ACR 221 - Residential Load Calculations	
1) Explain the factors that affect the rate of heat loss & gain for a house.	5
2) Calculate the square footage, area and volume of a structure using house plans.	5

3) Discuss how the orientation of the sun affects heat loss & gain.	5
4) Calculate heat loss & gain using various short forms.	5
5) Calculate heat loss and gain usuing ACCA Manual J.	5
6) Calculate whole house and individual room loads usuing Manual J.	5
ACR 231 - Advanced Refrigeration	
1) Define high, medium and low temperature refrigeration applications.	1,4
2) Determine the boiling temperature of refrigerant in evaporators.	3
3) Describe how the three types of refrigerant metering devices respond to load shanges.	4
4) Describe off cycle, planned, raqndom and temperature terminated defrost systems.	4
5) Demonstrate preventative maintenance on ice machines.	4
6) Diagnose inefficient evaporators, condensers and compressors.	4
ACR 240 - Advanced Automatic Controls	
1) Describe how sequencers operate in electric heating systems.	2,4
2) Wire typical electric furnace & heat strip arrangements using wiring diagrams.	2,4
3) Determine sequence of electrical & mechanical operation of equipment usuing diagrams.	2
4) Recognize & troubleshoot electronic control circuit boards.	2,4
5) Troubleshoot electrical components using various electrical test equipment.	2
6) Substitute electrical components usuing supply catalogs.	4
ACR 250 - Duct Fabrication	
1) Demonstrate safe work practices with sheet metal hand tools & equipment	6
2) Show how to accurately measure metal using a variey of measuring devices	6
3) Students should be able to demonstrate how to layout square and rectangular ductwork.	6
4) Illustrate how to layout & fabricate various transitions, elbows and offset fittings.	6
5) Students should be able demonstrate how to assemble sheet metal fittings using various fasteners.	6
6) Demonstrate how to use various sheet metal tools in the shop	6
ACR 251 - SCWE in HVAC	
1) Identify and replace various fan motors and controls.	4
2) Apply troubleshooting skills to diagnose and repair controls for proper operation	4
3) Evaluate the proper replacement components for a system	4
4) Identify, remove and replace faulty controls	4
5) Show how to work safely and avoid hazards	4
6) Explain the electrical, pressure, and temperature capacities of controls covered	4

3 Year Assessment Plan for HVAC

2016				2017				2018				2019				2020				
	Fall	Spring	Summer		Fall	Spring	Summer		Fall	Spring	Summer		Fall	Spring	Summer		Fall	Spring	Summer	
Course	PSLO			Course	PSLO			Course	PSLO			Course	PSLO			Course	PSLO			
ACR 101	5			ACR 101				ACR 101				ACR 101				ACR 101				
ACR 102	5,3,4			ACR 102				ACR 102				ACR 102				ACR 102				
ACR 106				ACR 106		1,2		ACR 106				ACR 106				ACR 106				
ACR 107				ACR 107				ACR 107		2		ACR 107				ACR 107				
ACR 110				ACR 110				ACR 110				ACR 110		2,4		ACR 110				
ACR 120				ACR 120	1,4,6			ACR 120				ACR 120				ACR 120				
ACR 140				ACR 140				ACR 140				ACR 140				ACR 140		1,4		
ACR 104				ACR 104			5,6	ACR 104				ACR 104				ACR 104				
ACR 111				ACR 111		1,2		ACR 111				ACR 111				ACR 111				
ACR 131				ACR 131				ACR 131			1,3	ACR 131				ACR 131				
ACR 210				ACR 210				ACR 210		1,2,4		ACR 210				ACR 210				
ACR 206				ACR 206	2,4			ACR 206				ACR 206				ACR 206	2,4			
ACR 220				ACR 220				ACR 220				ACR 220		1,5		ACR 220				
ACR 221				ACR 221				ACR 221				ACR 221				ACR 221			1,5	
ACR 231				ACR 231				ACR 231	1,4			ACR 231				ACR 231				
ACR 240				ACR 240				ACR 240				ACR 240	1,4			ACR 240				
ACR 250				ACR 250				ACR 250				ACR 250			1,6	ACR 250				
ACR 251				ACR 251				ACR 251				ACR 251				ACR 251			1,2,3,4	
	4	0	0		5	4	2		2	4	2		2	4	2		2	2	6	Evaluated per term

Count of Students	Student Identification				AAS.ACR Program Outcome 1			
	Name				Apply Knowledge of Installing Air Conditioning System			
					2016FA ACR 101-01 CSLO #5 Identify the refrigeration process components and how they operate		ACR 102-01 CSLO #5 Fall 2016 Demonstrate how to set up, adjust and operate an Oxy/Acetylene Torch	
	Last	First	Sex	ID NO	Summative Exam #4: 11 questions	Formative Component Schematic Quiz	Summative Lab Test demonstrate	Formative Lab Quiz how to Oxy/Ac
1	XXXX	XXXX		XXXX	80	100	100	100
2	XXXX	XXXX		XXXX	86	100	100	100
3	XXXX	XXXX		XXXX	86	100	100	80
4	XXXX	XXXX		XXXX	92	100	100	90
5	XXXX	XXXX		XXXX	86	100	100	100
6	XXXX	XXXX		XXXX	82	100	100	90
7	XXXX	XXXX		XXXX	86	100	100	100
8	XXXX	XXXX		XXXX	Stopped Attending			
9	XXXX	XXXX		XXXX	96	100	100	100
10	XXXX	XXXX		XXXX	100	100	100	90
11	XXXX	XXXX		XXXX	100	100	100	90
12	XXXX	XXXX		XXXX	100	100	100	80
13	XXXX	XXXX		XXXX	90	100	100	100
14	XXXX	XXXX		XXXX	100	100	100	90
15	XXXX	XXXX		XXXX	96	100	100	100
16	XXXX	XXXX		XXXX	92	100	100	90
17	XXXX	XXXX		XXXX	80	100	100	100
18	XXXX	XXXX		XXXX	90	100	100	100
19	XXXX	XXXX		XXXX	96	100	100	100
20	XXXX	XXXX		XXXX	92	100	100	80
21	XXXX	XXXX		XXXX	96	100	100	100
22	XXXX	XXXX		XXXX	100	100	100	100
23	XXXX	XXXX		XXXX	Not in course		100	80
24	XXXX	XXXX		XXXX	Not in course		100	80
25	XXXX	XXXX		XXXX	Not in course		100	80
	Course Benchmark %*				75	75	75	75
	Minimum Student Score*				70	70	70	70
	Actual Percentage Met				100	100	100	100
	Course Benchmark Achieved?				Exceed	Exceed	Exceed	Exceed

Count of Students	Student Identification				AAS.ACR Program Outcome #3 Demonstrate how to read temperature/pressure charts and diagnose problems within the system			
	Name				ACR 102-01 Fall 2016 CSLO #3Explain and demonstrate how to measure proper operating pressures and temperatures of HVAC systems		ACR 102-01 Fall 2016 CSLO #4 Demonstrate the ability to measure temperature and pressure readings from different parts of an operating system	
	Last	First	Sex	ID NO	Summative: Lab Test	Formative: Lab Quiz	Summative: Lab Test	Formative: Lab Quiz
1	XXXX	XXXX		XXXX	100	90	100	100
2	XXXX	XXXX		XXXX	100	80	100	100
3	XXXX	XXXX		XXXX	100	70	100	90
4	XXXX	XXXX		XXXX	100	80	100	90
5	XXXX	XXXX		XXXX	100	90	100	100
6	XXXX	XXXX		XXXX	100	100	100	100
7	XXXX	XXXX		XXXX	100	80	100	80
8	XXXX	XXXX		XXXX	100	70	100	80
9	XXXX	XXXX		XXXX	100	90	100	90
10	XXXX	XXXX		XXXX	Stopped Attending			
11	XXXX	XXXX		XXXX	100	100	100	100
12	XXXX	XXXX		XXXX	100	80	100	80
13	XXXX	XXXX		XXXX	100	90	100	90
14	XXXX	XXXX		XXXX	100	70	100	80
15	XXXX	XXXX		XXXX	100	90	100	100
16	XXXX	XXXX		XXXX	100	80	100	90
17	XXXX	XXXX		XXXX	100	100	100	100
18	XXXX	XXXX		XXXX	100	80	100	80
19	XXXX	XXXX		XXXX	100	90	100	100
20	XXXX	XXXX		XXXX	100	100	100	100
21	XXXX	XXXX		XXXX	100	100	100	100
22	XXXX	XXXX		XXXX	100	70	100	80
23	XXXX	XXXX		XXXX	100	70	100	100
24	XXXX	XXXX		XXXX	100	100	100	100
25	XXXX	XXXX		XXXX	100	80	100	80
				E.g. 75% of the students will....			E.g. 75% of the students will....	
	Course Benchmark %*				75	75	75	75
	Minimum Student Score*				70	70	70	70
	Actual Percentage Met				100	100	100	100
	Course Benchmark Achieved?				Exceed	Exceed	Exceed	Exceed

Florence-Darlington Technical College
(AAS ACR) Heating, Ventilation, and Air Conditioning Degree - Program
Assessment-Systematic Evaluation Plan

Course Category: ☒ **Traditional** ☐ **Hybrid/Blended** ☐ **Online** ☐ **Web Facilitated** ☐ **Dual Enrollment** ☐ **DL**

Program Student Learning Outcome: #1 Apply Knowledge of Installing Air Conditioning System

Course Number	Course Student Learning Outcome	Assessment Method	Benchmark	Actual Level of Achievement	Action Plan	Time Interval
ACR 101-01 Fall 2016	CSLO #5 Identify the refrigeration process components and how they operate.	**Formative:** Schematic Quiz: Students will draw and identify each component and connecting refrigerant lines on paper.	**Formative:** 75% of students will make a 70 or better on this Quiz.	**Exceeded.** All Students made a 100 on this quiz.	No action plan is needed. However the Benchmark will be increased to 80 for the next assessment cycle.	Week 3 to 6
		Summative: Exam #4 There are 11 questions on this exam. Students will trace out air conditioning system on paper and describe each component.	**Summative:** 75% of students will make a 70 or better on Exam #4.	**Exceeded**: All student scored 80 and above on this exam.	No action plan is required but we will work with students to help them identify the refrigeration lines that connect the components of the system.	Week 7 to 12
ACR 102-01 Fall 2016	CSLO #5 Demonstrate how to set up, adjust and operate an Oxy/Acetylene Torch.	**Formative:** Lab Quiz: Students will be graded on demonstrating how to setup, adjust, and operate an Oxy/Acetylene Torch.	**Formative:** 75% of students will make a 70 or better Lab Quiz.	**Exceeded.** All students exceeded the current benchmark by at least 10pts.	The action plan will be to work with students to help them get the proper flame desired for various application.	Week 3 to 8
		Summative: Lab Test: Students will be graded on demonstrating how to setup, adjust, and operate an Oxy/Acetylene Torch.	**Summative**: 75% of students will make a 70 or better the Lab Test.	**Exceeded.** All students passed the lab test scoring 100%.	The action plan will be to work with students to help them get the proper flame desired for various applications.	Week 8 to 13

Florence-Darlington Technical College
(AAS ACR) Heating, Ventilation, and Air Conditioning Degree - Program
Assessment-Systematic Evaluation Plan

Course Category: ☒ **Traditional** ☐ **Hybrid/Blended** ☐ **Online** ☐ **Web Facilitated** ☐ **Dual Enrollment** ☐ **DL**

Program Student Learning Outcome: (#3) Demonstrate how to read pressure/temperature charts and diagnose problems within the system

Course Number	Course Student Learning Outcome	Assessment Method	Benchmark	Actual Level of Achievement	Action Plan	Time Interval
ACR 102-01 Fall 2016	CSLO #3 Explain and demonstrate how to measure proper operating pressures and temperatures of HVAC systems	**Summative:** Lab Test: Students will be graded on demonstrating how to install gauges and determine operating pressures and temperatures of an A/C System.	**Summative:** 75% of students will make a 70 or better	**Exceed:** All students scored at 100% on the lab test	No action required at this time .	**Occurs from week 8-15**
		Formative: Lab Quiz: Students will be graded on demonstrating how to install gauges and determine operating pressures and temperatures of an A/C System.	**Formative:** 75% of students will make a 70 or better	**Exceed:** All students scored at or above the benchmark	Even though the benchmark was met the faculty will work with students to give them more exercises to get them familiar with various refrigerants and AC units being used.	**Occurs from week 1-8**
ACR 102-01 Fall 2016	**CSLO #4** Demonstrate the ability to measure temperature and pressure readings from different parts of an operating system	**Summative:** Lab Test: 10 questions: Students will demonstrate how to convert pressures to temperatures of various refrigerants:	**Summative:** 75% of students will make a 70 or better	**Exceed.** All Students scored at the 100% mark on this lab test.	No action needed for this summative assessment	**Occurs from week 8-15**
		Formative: Lab Quiz: 10 questions: Students will demonstrate how to convert pressures to temperatures of various refrigerants:	**Formative:** 75% of students will make a 70 or better	**Exceed.** Students scored 10pts. Above the benchmark	These scores on the lab quiz were 10pts. above the benchmark. The faculty will implement more exercises to allow	**Occurs from week 1-8**

					students more time to practice using pressure and temperature charts for various refrigerants	

Florence-Darlington Technical College
Assessment-Systematic Evaluation Plan Detailed Report

Course Name: **2016 FA ACR 101-01** **[Division] Technical**

Faculty: Matthew Lewis

Semester(s) Reported: 2016 Fall

Course Category: ☒ Traditional ☐ Hybrid/Blended ☐ Online ☐ Web Facilitated ☐ Dual Enrollment ☐ DL

Program Student Learning Outcome: #1 Apply knowledge of installing air conditioning system.

Course Student Learning Outcome: #5 Identify the refrigeration process components and how they operate.

Analysis of Results: The benchmark was exceeded for formative and summative assessments. All students at least 80 or above.

Strength in student performances: Students understand the basic components of the air conditioning system and can place components in the corresponding drawing. They are able to describe each component and their necessary function.

Weaknesses in student performances: Students have difficulty in determining which lines connect to each of the 4 main components in the air conditioning system.

Recommended Action(s): The Instructors will work with students to help them identify the refrigerant lines that connect to each of the 4 main components. The Instructor will provide more questions followed by discussion to help students determine the state of the refrigerant when connecting lines to refrigeration components.

When Action will be implemented: 2017 Fall

Data Comparison:

	2016 Spring- Startup	**20__**	**20__**	**20__**
Measurement Instrument	**Benchmark**	**Benchmark**	**Benchmark**	**Benchmark**
Formative: Schematic Quiz: Students will draw and identify each component and connecting refrigerant lines on paper	75% of students will make a 70 or better on the Schematic Quiz.			
Summative: Exam #4 There are 11 questions on this exam. Students will trace out air conditioning system on paper and describe each component	75% of students will make a 70 or better on Exam #4			

Impact of Changes Implemented As a Result of Previous Assessment Cycle:

Florence-Darlington Technical College
Assessment-Systematic Evaluation Plan Detailed Report

Course Name: 2016 FA ACR 102-01 **[Division] Technical**

Faculty: Matthew Lewis

Semester(s) Reported: 2016 Fall

Course Category: ☒ Traditional ☐ Hybrid/Blended ☐ Online ☐ Web Facilitated ☐ Dual Enrollment ☐ DL

Program Student Learning Outcome: #1 Apply knowledge of installing air conditioning system.

Course Student Learning Outcome: #5 Demonstrate how to set up, adjust and operate an Oxy/Acetylene Torch.

Analysis of Results: The benchmark was exceeded for both formative and summative assessments. In the formative and summative assessments exceeded the benchmark by 10 and 25 points respectively.

Strength in student performances: Students understand the basic steps in setting up the torch.

Weaknesses in student performances: Students have trouble adjusting for the desired flame at the torch handle.

Recommended Action(s): Instructors will give students more opportunities to practice with adjusting the flame for various welding applications

When Action will be implemented: Fall 2017

Data Comparison:

	2016 Spring- Startup	**20__**	**20__**	**20__**
Measurement Instrument	**Benchmark**	**Benchmark**	**Benchmark**	**Benchmark**
Formative: Lab Quiz: Students will be graded on demonstrating how to setup, adjust, and operate an Oxy/Acetylene Torch.	75% of students will make a 70 or better on the Lab Quiz			
Summative: Lab Test: Students will be graded on demonstrating how to setup, adjust, and operate an Oxy/Acetylene Torch.	75% of students will make a 70 or better on the Lab Test.			

Impact of Changes Implemented As a Result of Previous Assessment Cycle:

Florence-Darlington Technical College
Assessment-Systematic Evaluation Plan Detailed Report

Course Name: 2016 FA ACR 102-01 **[Division] Technical**

Faculty: Matthew Lewis

Semester(s) Reported: Fall 2016

Course Category: ☒ Traditional ☐ Hybrid/Blended ☐ Online ☐ Web Facilitated ☐ Dual Enrollment ☐ DL

Program Student Learning Outcome: #3 Demonstrate how to read temperature/pressure charts and diagnose problems within the system

Course Student Learning Outcome: #3 Explain and demonstrate how to measure proper operating pressures and temperatures of HVAC systems

Analysis of Results: All students scored 100% on the Lab Test

Strength in student performances: Students are able to install gauges to the system and determine what refrigerants the system uses and take pressure measurements throughout the system

Weaknesses in student performances: Students have a hard time knowing which hose to install in the different parts of the system

Recommended Action(s): Will work with students to help get them familiarized with the different color hoses on the gauges and where to install those hosing to taking pressure readings.

When Action will be implemented: Fall 2017

Data Comparison:

	2016 Spring-Startup	**20__**	**20__**	**20__**
Measurement Instrument	**Benchmark**	**Benchmark**	**Benchmark**	**Benchmark**
Summative: Lab Test: Students will be graded on demonstrating how to install gauges and determine operating pressures and temperatures of an A/C System	75% of students will make a 70 or better on the Lab Test.			
Formative: Lab Quiz: Students will be graded on demonstrating how to install gauges and determine operating pressures and temperatures of an A/C System	75% of students will make a 70 or better on the Lab Quiz			

Impact of Changes Implemented As a Result of Previous Assessment Cycle:

Florence-Darlington Technical College
Assessment-Systematic Evaluation Plan Detailed Report

Course Name: 2016 FA ACR 102-01 **[Division] Technical**

Faculty: Matthew Lewis

Semester(s) Reported: 2016 Fall

Course Category: ☒ Traditional ☐ Hybrid/Blended ☐ Online ☐ Web Facilitated ☐ Dual Enrollment ☐ DL

Program Student Learning Outcome: #3 Demonstrate how to read temperature/pressure charts and diagnose problems within the system

Course Student Learning Outcome: #4 Demonstrate the ability to measure temperature and pressure readings from different parts of an operating system

Analysis of Results: All students scored above 100% on the lab test. Student scored 5 points above the minimum required score on the lab quiz.

Strength in student performances: Students are able to find certain temperatures and convert to corresponding pressures and identify which refrigerant is in the system.

Weaknesses in student performances: When students read these charts they fail to recognize that some charts have the Pressure listed on the left hand side and the temperature listed on the right hand side and vice versa.

Recommended Action(s): Will work with students to help them first read the headings on the chart before looking at the numbers to line up the pressure and temperature.

When Action will be implemented: Fall 2017

Data Comparison:

	2016 Spring- Startup	**20__**	**20__**	**20__**
Measurement Instrument	**Benchmark**	**Benchmark**	**Benchmark**	**Benchmark**
Summative: Lab Test: 10 questions: Students will demonstrate how to convert pressures to temperatures of various refrigerants:	75% of students will make a 70 or better on the Lab test			
Formative: Lab Quiz: 10 questions: Students will demonstrate how to convert pressures to temperatures of various refrigerants:	75% of students will make a 70 or better on the Lab quiz			

Impact of Changes Implemented As a Result of Previous Assessment Cycle: