CENTRAL CAROLINA COMMUNITY COLLEGE

Applied Technologies

Program Planning Guide

Air Conditioning, Heating, and Refrigeration Technology, Diploma (D35100)

Program Length: 4 semesters
Program Sites: Center for Workforce Innovation/Howard James Industrial Training Center
Career Pathway Options: Associate in Applied Science Degree in Air Conditioning, Heating, and Refrigeration

Suggested Course Schedule		Class	Lab	Work	Credits	Notes:
1st Semester (fall)						
AHR 110	Intro to Refrigeration	2	6	0	5	
AHR 111	HVACR Electricity	2	2	0	3	
ACA 122	College Transfer Success	0	2	0	1	
English requirement, select one:						
ENG 110	Freshman Composition	3	0	0	3	
ENG 111	Writing and Inquiry	3	0	0	3	
	Total Semester Hours	7	4	0	12	
2nd Semester (spring)						
AHR 112	Heating Technology	2	4	0	4	
AHR 113	Comfort Cooling	2	4	0	4	
AHR 114	Heat Pump Technology	2	4	0	4	
	Total Semester Hours	6	12	0	12	
3rd Semester (summer)						
AHR 115	Refrigeration Systems	1	3	0	2	
AHR 160	Refrigerant Certification	1	0	0	1	
Math/Physics Elective, select one:						
MAT 110	Math Measurement & Literacy	2	2	0	2	
MAT 143	Quantitative Literacy	2	2	0	3	
PHY 121	Applied Physics I	3	2	0	4	
	Total Semester Hours	4/5	5	0	5/6/7	

Effective Term:2023Feb

4th Semester (fall)						
AHR 125	HVACR Electronics	2	2	0	3	
AHR 133	HVAC Servicing	2	6	0	4	
AHR 151	HVAC Duct Systems I	1	3	0	2	
	Total Semester Hours	5	11	0	9	
Total Semester Hours Required for Graduation: 38						

Course Descriptions

ACA 122 College Transfer Success
This course provides information and strategies necessary to develop clear academic and professional goals beyond the community college experience. Topics include the CAA, college policies and culture, career exploration, gathering information on senior institutions, strategic planning, critical thinking, and communications skills for a successful academic transition. Upon completion, students should be able to develop an academic plan to transition successfully to senior institutions. This course has been approved for transfer under the CAA/ICAA as a premajor and/or elective course requirement.

AHR 110 Intro to Refrigeration
This course introduces the basic refrigeration process used in mechanical refrigeration and air conditioning systems. Topics include terminology, safety, and identification and function of components; refrigeration cycle; and tools and instrumentation used in mechanical refrigeration systems. Upon completion, students should be able to identify refrigeration systems and components, explain the refrigeration process, and use the tools and instrumentation of the trade.

AHR 111 HVACR Electricity
This course introduces electricity as it applies to HVACR equipment. Emphasis is placed on power sources, interaction of electrical components, wiring of simple circuits, and the use of electrical test equipment. Upon completion, students should be able to demonstrate good wiring practices and the ability to read simple wiring diagrams.

AHR 112 Heating Technology
This course covers the fundamentals of heating including oil, gas, and electric heating systems. Topics include safety, tools and instrumentation, system operating characteristics, installation techniques, efficiency testing, electrical power, and control systems. Upon completion, students should be able to explain the basic oil, gas, and electrical heating systems and describe the major components of a heating system.

AHR 113 Comfort Cooling
This course covers the installation procedures, system operations, and maintenance of residential and light commercial comfort cooling systems. Topics include terminology, component operation, and testing and repair of equipment used to control and produce assured comfort levels. Upon completion, students should be able to use psychrometrics, manufacturer specifications, and test instruments to determine proper system operation.

AHR 114 Heat Pump Technology
Prerequisite: Take one AHR 110 or AHR 113
This course covers the principles of air source and water source heat pumps. Emphasis is placed on safety, modes of operation, defrost systems, refrigerant charging, and system performance. Upon completion, students should be able to understand and analyze system performance and perform routine service procedures.

AHR 115 Refrigeration System
This course introduces refrigeration systems and applications. Topics include defrost methods, safety and operational control, refrigerant piping, refrigerant recovery and charging, and leak testing. Upon completion, students should be able to assist in installing and testing refrigeration systems and perform simple repairs.

AHR 125 HVACR Electronics
Prerequisite: Take One: AHR 111, ELC 111, or ELC 112
This course introduces the common electronic control components in HVACR systems. Emphasis is placed on identifying electronic components and their functions in HVACR systems and motor-driven control circuits. Upon completion, students should be able to identify components, describe control circuitry and functions, and use test instruments to measure electronic circuit values and identify malfunctions.

AHR 133 HVAC Servicing
Corequisite: Take One: AHR-112 OR AHR-113
The course covers the maintenance and servicing of HVAC equipment. Topics include testing, adjusting, maintaining, and troubleshooting HVAC equipment and record keeping. Upon completion, students should be able to adjust, maintain, and service HVAC equipment.

AHR 151 HVAC Duct System I
This course introduces the techniques used to lay out and fabricate duct work commonly found in HVAC systems. Emphasis is placed on the skills required to fabricate duct work. Upon completion, students should be able to lay out and fabricate simple duct work.

AHR 160 Refrigerant Certification
This course covers the requirements for the EPA certification examinations. Topics include small appliances, high pressure systems, and low pressure systems. Upon completion, students should be able to demonstrate knowledge of refrigerants and be prepared for the EPA certification examinations.

ENG 110 Freshman Composition
Prerequisite: Take one set: Set 1: DRE 097; Set 2: ENG 002; Set 3: BSP 4002
This course is designed to develop informative and business writing skills. Emphasis is placed on logical organization of writing, including effective introductions and conclusions, precise use of grammar, and appropriate selection and use of sources. Upon completion, students should be able to produce clear, concise, well-organized short papers.

ENG 111 Writing and Inquiry
Prerequisite: Take one set: Set 1: DRE 097; Set 2: ENG 002; Set 3: BSP 4002
Corequisite: Take ENG 011
This course is designed to develop the ability to produce clear writing in a variety of genres and formats using a recursive process. Emphasis includes inquiry, analysis, effective use of rhetorical strategies, thesis development, audience awareness, and revision. Upon completion, students should be able to produce unified, coherent, well-developed essays using standard written English. This course has been approved for transfer under the CAA/ICAA as a general education course in English Composition.

MAT 110 Math Measurement & Literacy
Prerequisite: Take one set: Set 1: DMA 010 DMA 020, DMA 030; Set 2: DMA 025; Set 3: MAT 003; Set 4: BSP 4003
Corequisite: Take MAT 010
This course provides an activity-based approach that develops measurement skills and mathematical literacy using technology to solve problems for non-math intensive programs. Topics include unit conversions and estimation within a variety of measurement systems; ratio and proportion; basic geometric concepts; financial literacy; and statistics including measures of central tendency, dispersion, and charting of data. Upon completion, students should be able to demonstrate the use of mathematics and technology to solve practical problems, and to analyze and communicate results.

MAT 143 Quantitative Literacy
Prerequisite: Take one set: Set 1: DMA 010, DMA 020, DMA 030, and DRE 098; Set 2: DMA 010, DMA 020, DMA 030, and ENG 002; Set 3: DMA 010, DMA 020, DMA 030, and BSP 4002; Set 4: DMA 025 and DRE 092; Set 5: DMA 025 and ENG 002; Set 6: DMA 025 and BSP 4002; Set 7: MAT 003 and DRE 08; Set 8: MAT 003 and ENG 002; Set 9: MAT 003 and BSP 4002; Set 10: BSP 4003 and DRE 098; Set 11: BSP 4003 and ENG 002; Set 12: BSP 4003 and BSP 4002
Corequisite: Take MAT 043
This course is designed to engage students in complex and realistic situations involving the mathematical phenomena of quantity, change and relationship, and uncertainty through project- and activity-based assessment. Emphasis is placed on authentic contexts which will introduce the concepts of numeracy, proportional reasoning, dimensional analysis, rates of growth, personal finance, consumer statistics, practical probabilities, and mathematics for citizenship. Upon completion, students should be able to utilize quantitative information as consumers and to make personal, professional, and civic decisions by decoding, interpreting, using, and communicating quantitative information found in modern media and encountered in everyday life. This course has been approved for transfer under the CAA/ICAA as a general education course in Mathematics (Quantitative).

PHY 121 Applied Physics I
This algebra-based course introduces fundamental physical concepts as applied to industrial and service technology fields. Topics include systems of units, problem-solving methods, graphical analyses, vectors, motion, forces, Newton's laws of motion, work, energy, power, momentum, and properties of matter. Upon completion, students should be able to demonstrate an understanding of the principles studied as applied in industrial and service fields.