

AIR CONDITIONING, HEATING AND REFRIGERATION

*Effective Term – Summer 1997 [1997*02]*

AHR 110	Intro to Refrigeration	2	6	5
Prerequisites:	None			
Corequisites:	None			

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.

*Effective Term – Summer 1997 [1997*02]*

AHR 111	HVACR Electricity	2	2	3
Prerequisites:	None			
Corequisites:	None			

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.

*Effective Term – Summer 1997 [1997*02]*

AHR 112	Heating Technology	2	4	4
Prerequisites:	None			
Corequisites:	None			

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.

*Effective Term – Summer 1997 [1997*02]*

AHR 113	Comfort Cooling	2	4	4
Prerequisites:	None			
Corequisites:	None			

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 psychometrics, manufacturer specifications, and test instruments to determine proper system operation.

*Effective Term – Summer 1997 [1997*02]*

AHR 114 Heat Pump Technology

2 4 4

Prerequisites: AHR 110 or AHR 113

Corequisites: None

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.

*Effective Term – Summer 1997 [1997*02]*

AHR 115 Refrigeration Systems

1 3 2

Prerequisites: AHR 110

Corequisites: None

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.

*Effective Term – Summer 1997 [1997*02]*

AHR 120 HVACR Maintenance

1 3 2

Prerequisites: None

Corequisites: None

This course introduces the basic principles of industrial air conditioning and heating systems. Emphasis is placed on preventive maintenance procedures for heating and cooling equipment and related components. Upon completion, students should be able to perform routine preventive maintenance tasks, maintain records, and assist in routine equipment repairs.

*Effective Term – Summer 1997 [1997*02]*

AHR 125 HVAC Electronics

1 3 2

Prerequisites: None

Corequisites: AHR 111 or ELC 111

This course introduces the common electronic control components in HVAC systems. Emphasis is placed on identifying electronic components and their functions in HVAC 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.

*Effective Term – Summer 1997 [1997*02]*

AHR 130 HVAC Controls

2 2 3

Prerequisites: AHR 111 or ELC 111

Corequisites: None

This course covers the types of controls found in residential and commercial comfort systems. Topics include electrical and electronic controls, control schematics and diagrams, test instruments, and analysis and troubleshooting of electrical systems. Upon completion, students should be able to diagnose and repair common residential and commercial comfort system controls.

*Effective Term – Summer 1997 [1997*02]*

AHR 133	HVAC Servicing	2	6	4
Prerequisites:	None			
Corequisites:	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.

*Effective Term – Summer 1997 [1997*02]*

AHR 135	Transport Refrigeration	2	6	4
Prerequisites:	AHR 110			
Corequisites:	None			

This course introduces the equipment and components commonly found in commercial transport refrigeration systems. Topics include compressors, evaporators, metering devices, accessories, and related electrical components. Upon completion, students should be able to safely maintain, troubleshoot, and repair transport refrigeration components.

*Effective Term – Summer 1997 [1997*02]*

AHR 140	All-Weather Systems	1	3	2
Prerequisites:	AHR 112 or AHR 113			
Corequisites:	None			

This course covers the principles of combination heating and cooling systems including gas-electric, all-electric, and oil-electric systems. Topics include PTAC's and package and split-system units. Upon completion, students should be able to understand systems performance and perform routine maintenance procedures.

*Effective Term – Summer 1997 [1997*02]*

AHR 151	HVAC Duct Systems I	1	3	2
Prerequisites:	None			
Corequisites:	None			

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.

*Effective Term – Summer 1997 [1997*02]*

AHR 152	HVAC Duct Systems II	1	3	2
Prerequisites:	AHR 151			
Corequisites:	None			

This course introduces the techniques used to lay out and fabricate more advanced types of duct work found in HVAC systems. Emphasis is placed on the skills required to work with complex rectangular and round fittings and transitions. Upon completion, students should be able to lay out and fabricate complex rectangular and round fittings.

*Effective Term – Summer 1997 [1997*02]*

AHR 160	Refrigerant Certification	1	0	1
Prerequisites:	None			
Corequisites:	None			

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.

*Effective Term—Summer 2008 [2008*02] – CRC 3/27/08*

AHR 170	Heating Lab	0	3	1
Prerequisites:	None			
Corequisites:	AHR 112			

This course provides a laboratory experience in heating technology. Emphasis is placed on providing practical experience in the fundamentals of heating. Upon completion, students should be able to demonstrate an understanding of electric, oil, and gas fueled heating systems.

*Effective Term—Summer 2008 [2008*02] – CRC 3/27/08*

AHR 171	Comfort Cooling Lab	0	3	1
Prerequisites:	None			
Corequisites:	AHR 113			

This course provides a laboratory experience in comfort cooling. Emphasis is placed on providing practical experience in installation, operations, and maintenance of residential and light commercial comfort cooling systems. Upon completion, students should be able to demonstrate an understanding of comfort cooling systems.

*Effective Term—Summer 2008 [2008*02] – CRC 3/27/08*

AHR 172	Heat Pump Lab	0	3	1
Prerequisites:	None			
Corequisites:	AHR 114			

This course provides a laboratory experience in heat pump technology. Emphasis is placed on providing practical experience with air source and water source heat pumps. Upon completion, students should be able to demonstrate an understanding of heat pump year round comfort systems.

*Effective Term – Summer 1997 [1997*02]*

AHR 180	HVACR Customer Relations	1	0	1
Prerequisites:	None			
Corequisites:	None			

This course introduces common business and customer relation practices that may be encountered in HVACR. Topics include business practices, appearance of self and vehicle, ways of handling customer complaints, invoices, telephone communications, and warranties. Upon completion, students should be able to present themselves to customers in a professional manner, understand how the business operates, complete invoices, and handle complaints.

*Effective Term – Summer 1997 [1997*02]*

AHR 210	Residential Building Code	1	2	2
Prerequisites:	None			
Corequisites:	None			

This course covers the residential building codes that are applicable to the design and installation of HVAC systems. Topics include current residential codes as applied to HVAC design, service, and installation. Upon completion, students should be able to demonstrate the correct usage of residential building codes that apply to specific areas of the HVAC trade.

*Effective Term – Summer 1997 [1997*02]*

AHR 211	Residential System Design	2	2	3
Prerequisites:	None			
Corequisites:	None			

This course introduces the principles and concepts of conventional residential heating and cooling system design. Topics include heating and cooling load estimating, basic psychometrics, equipment selection, duct system selection, and system design. Upon completion, students should be able to design a basic residential heating and cooling system.

*Effective Term – Summer 1997 [1997*02]*

AHR 212	Advanced Comfort Systems	2	6	4
Prerequisites:	AHR 114			
Corequisites:	None			

This course covers water-cooled comfort systems, water-source/geothermal heat pumps, and high efficiency heat pump systems including variable speed drives and controls. Emphasis is placed on the application, installation, and servicing of water-source systems and the mechanical and electronic control components of advanced comfort systems. Upon completion, students should be able to test, analyze, and troubleshoot water-cooled comfort systems, water-source/geothermal heat pumps, and high efficiency heat pumps.

*Effective Term – Fall 2010 [2010*03] – CRC 09/22/09*

AHR 215	Commercial HVAC Controls	1	3	2
Prerequisites:	AHR 111 or ELC 111 or ELC 112			
Corequisites:	None			

This course introduces HVAC control systems used in commercial applications. Topics include electric/electronic control systems, pneumatic control systems, DDC temperature sensors, humidity sensors, pressure sensors, wiring, controllers, actuators, and controlled devices. Upon completion, students should be able to verify or correct the performance of common control systems with regard to sequence of operation and safety.

*Effective Term – Summer 1997 [1997*02]*

AHR 215	Commercial HVAC Controls	1	3	2
Prerequisites:	AHR 111 or ELC 111			
Corequisites:	None			

This course introduces HVAC control systems used in commercial applications. Topics include electric/electronic control systems, pneumatic control systems, DDC temperature sensors, humidity sensors, pressure sensors, wiring, controllers, actuators, and controlled devices. Upon completion, students should be able to verify or correct the performance of common control systems with regard to sequence of operation and safety.

*Effective Term – Fall 1999 [1999*03]*

AHR 220	Commercial Building Codes	2	0	2
Prerequisites:	None			
Corequisites:	None			

This course covers the appropriate sections of the *North Carolina State Building Code* that govern the installation of commercial comfort, refrigeration, and mechanical systems. Emphasis is placed on using and understanding applications sections of the *North Carolina State Building Code*. Upon completion, students should be able to use the *North Carolina State Building Code* to locate information regarding the installation of commercial systems.

*Effective Term – Summer 1997 [1997*02]*

AHR 220	Commercial Building Codes	1	2	2
Prerequisites:	None			
Corequisites:	None			

This course covers the appropriate sections of the *North Carolina State Building Code* that govern the installation of commercial comfort, refrigeration, and mechanical systems. Emphasis is placed on using and understanding applications sections of the *North Carolina State Building Code*. Upon completion, students should be able to use the *North Carolina State Building Code* to locate information regarding the installation of commercial systems.

*Effective Term – Summer 1997 [1997*02]*

AHR 225	Commercial System Design	2	3	3
Prerequisites:	None			
Corequisites:	None			

This course covers the principles of designing heating and cooling systems for commercial buildings. Emphasis is placed on commercial heat loss/gain calculations, applied psychometrics, air-flow calculations, air distribution system design, and equipment selection. Upon completion, students should be able to calculate heat loss/gain, design and size air and water distribution systems, and select equipment.

*Effective Term – Summer 1997 [1997*02]*

AHR 235	Refrigeration Design	2	2	3
Prerequisites:	AHR 110			
Corequisites:	None			

This course covers the principles of commercial refrigeration system operation and design. Topics include walk-in coolers, walk-in freezers, system components, load calculations, equipment selection, defrost systems, refrigerant line sizing, and electric controls. Upon completion, students should be able to design, adjust, and perform routine service procedures on a commercial refrigeration system.

*Effective Term – Summer 1997 [1997*02]*

AHR 240	Hydronic Heating	1	3	2
Prerequisites:	AHR 112			
Corequisites:	None			

This course covers the accepted procedures for proper design, installation, and balance of hydronic heating systems for residential or commercial buildings. Topics include heating equipment; pump, terminal unit, and accessory selection; piping system selection and design; and pipe sizing and troubleshooting. Upon completion, students should be able to assist with the proper design, installation, and balance of typical hydronic systems.

*Effective Term – Summer 1997 [1997*02]*

AHR 245	Chiller Systems	1	3	2
Prerequisites:	AHR 110			
Corequisites:	None			

This course introduces the fundamentals of liquid chilling equipment. Topics include characteristics of water, principles of water chilling, the chiller, the refrigerant, water and piping circuits, freeze prevention, purging, and equipment flexibility. Upon completion, students should be able to describe the components, controls, and overall operation of liquid chilling equipment and perform basic maintenance tasks.

*Effective Term – Summer 1997 [1997*02]*

AHR 247	Atypical Systems	1	3	2
Prerequisites:	AHR 110			
Corequisites:	None			

This course introduces refrigeration systems utilizing non-fluorocarbon based refrigerants. Topics include mechanical compression ammonia systems, ammonia absorption systems, and other absorption type systems. Upon completion, students should be able to demonstrate an understanding of the operation of certain non-fluorocarbon based refrigeration systems.

*Effective Term – Summer 1997 [1997*02]*

AHR 250	HVAC System Diagnostics	0	4	2
Prerequisites:	None			
Corequisites:	AHR 212			

This course is a comprehensive study of air conditioning, heating, and refrigeration system diagnostics and corrective measures. Topics include advanced system analysis, measurement of operating efficiency, and inspection and correction of all major system components. Upon completion, students should be able to restore a residential or commercial AHR system so that it operates at or near manufacturers' specifications..

*Effective Term – Summer 1997 [1997*02]*

AHR 255	Indoor Air Quality	1	2	2
Prerequisites:	None			
Corequisites:	None			

This course introduces the techniques of assessing and maintaining the quality of the indoor environment in residential and commercial structures. Topics include handling and investigating complaints, filter selection, humidity control, testing for sources of carbon monoxide, impact of mechanical ventilation, and building and duct pressures. Upon completion, students should be able to assist in investigating and solving common indoor air quality problems.

*Effective Term – Fall 2000 [2000*03]*

AHR 263 Energy Management

1 3 2

Prerequisites: AHR 125 or AHR 215

Corequisites: None

This course covers building automation computer programming as currently used in energy management. Topics include night setback, duty cycling, synchronization, schedule optimization, and anticipatory temperature control. Upon completion, students should be able to write programs utilizing the above topics and connect computer systems to HVAC systems.

*Effective Term – Summer 1997 [1997*02]*

AHR 263 Energy Management

1 3 2

Prerequisites: AHR 125

Corequisites: None

This course covers building automation computer programming as currently used in energy management. Topics include night setback, duty cycling, synchronization, schedule optimization, and anticipatory temperature control. Upon completion, students should be able to write programs utilizing the above topics and connect computer systems to HVAC systems.

See the SEL and SEM prefixes for generic Selected Topics and Seminar course descriptions.