AIR CONDITIONING

AIR-30
Residential System Installation **3.00 units**
Prerequisite: None
Description: Residential Air Conditioning installation, including residential split systems as well as Ductless mini-split zoned systems. Title 24 requirements including proper duct sizing and sealing. Class will include air balance and basic unit sizing. 36 hours lecture, 54 hours laboratory. (Letter grade only)

AIR-61A
Beginning Air Conditioning and Refrigeration 1 **3.00 units**
Prerequisite: None
Description: A basic study of the theory of thermodynamics and heat transfer as applied to mechanical vapor compression refrigeration cycle and system components. Classes include lectures with practical demonstrations and hands-on experience including laboratory projects demonstrate heat transfer theories and vapor compression mechanical system cycle components and accessories. A lab uniform is required for this course. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-61B
Advanced Air Conditioning and Refrigeration II **3.00 units**
Prerequisite: AIR-61A
Description: Basic types of compressors are introduced. This course covers operation of condensers within the refrigeration system. Basic evaporation process is studied. Metering devices are included with an emphasis on the speci?cs of modulating and ?xed ori?ce controls. Laboratory experience provides the student an opportunity to practice the methods and techniques presented in the classroom. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-64A
Beginning Air Conditioning and Refrigeration Electricity **3.00 units**
Prerequisite: None
Description: Basic theory of electricity and electronics, skills needed to install and service electrical circuits of air conditioning and refrigeration systems. Includes components and symbols, wiring diagrams, and wiring diagram exercises. A lab uniform is required for this course. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-64B
Advanced Air Conditioning and Refrigeration Electricity II **3.00 units**
Prerequisite: AIR-64A
Description: Introduction to procedures, techniques, and instruments utilized for troubleshooting the motors, circuitry and control elements for air conditioning and refrigeration equipment. Variations in control systems, including solid state, are described and analyzed. 36 hours lecture, 54 hours laboratory. (Letter grade only)

AIR-75
HVAC/R Systems Design **3.00 units**
Prerequisite: None.
Advisory: AIR-61A.
Description: Current industry practices for quality installation and design of residential air distribution systems as well as calculating heating and cooling loads to properly select air conditioning and heating systems. 45 lecture and 27 hours laboratory. (Letter grade only)

AIR-76
Facilities Maintenance/Chillers **3.00 units**
Prerequisite: None.
Advisory: AIR-61A.
Description: Current industry practices in maintaining chilled water, hot water, steam, cooling towers, pumps, and energy management for central station systems. A lab uniform is required for this course. 45 hours lecture and 27 hours laboratory. (Letter grade only)

AIR-77
Energy Conservation Methods for HVACR **3.00 units**
Prerequisite: None
Advisory: AIR-61A
Description: Current industry practices for auditing energy losses in residential and light commercial buildings. Methods of conserving energy and sustaining natural resources are presented. Blower door diagnostics are featured. A lab uniform is required for this course. 45 hours lecture and 27 hours laboratory. (Letter grade only)

AIR-78
Safe Refrigerant Handling and Management **3.00 units**
Prerequisite: None.
Description: Current industry practices for recovery, reclamation, recycling and retro fitting. Emphasis is on safe use and management of common refrigerants as well as effcient use of pressure and temperature measurement to determine system operating parameters. 45 hours lecture and 27 hours laboratory. (Letter grade only)

AIR-80
Gas Heating **3.00 units**
Prerequisite: None
Description: Basic principles of gas-fired furnaces. Introduction to gas heating, gas combustion, gas burners, gas ignition systems, safety and operating controls, installation practices, ventilation, venting, combustion air and gas troubleshooting. Emphasis is on service and maintenance of residential gas furnaces. 45 hours lecture and 27 hours laboratory. (Letter grade only)

AIR-83
All Weather Heating and Cooling System **3.00 units**
Prerequisite: None.
Advisory: AIR-61B.
Description: Presents current industry practices for year-round conditioned air including air to air heat pumps, geothermal heat pumps, water source heat pumps, electric heat, and fuel oil heating. 45 hours lecture and 27 hours laboratory. (Letter grade only)

AIR-84
Boiler and Hydronic Heating **3.00 units**
Prerequisite: None.
Advisory: EST-10
Description: Design, assembly, and operation of hot water boilers, hot water piping distribution (hydronic), and associated controls and control valves. Proper use of the related tools and safety included. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-90
Building Automation Fundamentals **3.00 units**
Prerequisite: AIR-61B
Description: Basics of commercial HVAC control theory as it applies to electric, pneumatic, and digital control systems. Principles of chiller plant operation, air distribution, variable air volume(VAV), constant air systems, and multizone systems are discussed. A lab uniform is required for this course. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-91
Advanced Building Control Networks **3.00 units**
Prerequisite: AIR-90
Description: Building Control Network implementations and protocol standards including web based applications, Building Automation and Control Networks (BACnet), local operating network (Lon-Talk), and proprietary Zero Net Energy (ZNE) monitoring systems will be introduced. BACnet is a communications protocol for building automation and control networks. It is an ASHRAE, ANSI, and ISO 16484-5 standard [1] protocol. Lon-Talk is a networking platform specically created to address the needs of control applications. Routers, installation, and troubleshooting will also be studied. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-92
Advanced Building Automation Networks And Programming **3.00 units**
Prerequisite: AIR-90
Description: Programming HVAC direct digital controllers using line (text) programming, icon based programming, and template programming. Stresses good programming practices including complete program documentation. 36 hours lecture and 54 hours laboratory. (Letter grade only)

AIR-200
Air Conditioning Work Experience **1.00 - 4.00 units**
CSU

Prerequisite: None.
Advisory: Students should have paid or voluntary employment.
Description: Work Experience is designed to coordinate the student's on-the-job training with workplace skills designed to assist the student in developing successful professional skills. Each student will establish measurable learning objectives appropriate for their job and discipline. Students may earn up to four (4) units each semester, for a maximum of 16 units of work experience total. 60 hours of volunteer work or 75 hours of paid work during the semester are required for each unit. No more than 20 hours per week, out of the 60 or 75 requirement, may be applied toward the work requirement. The course consists of an 18 hours of orientation/professional skills development and 60 hours of volunteer work experience per unit with a maximum of 240 for four units per semester OR 75 hours of paid work experience per unit, with a maximum of 300 for four units per semester. (Letter grade on Pass/No Pass option)