

# AIR CONDITIONING & REFRIGERATION

The field of air conditioning, heating, and refrigeration offers employment in the areas of service and repair, construction and installation, sales, manufacturing, and plant maintenance.

## Career Opportunities

Sales	Manufacturing
Service and Repair	Plant Maintenance
Construction and Installation	

## Faculty

Full Time	Part-Time
Robert Chatenever	Alan Ainsworth
	Dirk DeKreek
	Nick Ioannidis
	Jack Smith
	Jack Stewart

## ◆ Air Conditioning/Refrigeration

### Associate in Science Degree

### Certificate of Achievement

Required Courses:	Units
AC R010 AC & Refrigeration I	3
AC R010L AC & Refrigeration I Lab	2
AC R011L AC & Refrigeration II Lab	2
AC R020 Electrical Systems I	3
AC R020L Electrical Systems I Lab	2
AC R021L Electrical Systems II Lab	2
AC R030 Airside Systems	3
AC R030L Airside Systems Lab	2
AC R040 Heating Control Systems	3
AC R040L Heating Control Systems Lab	2

**Total Required Units 24**

## Air Conditioning & Refrigeration Courses

### AC R001—Air Conditioning & Refrigeration 15 units

*12 hours lecture, 9 hours lab weekly*

Comprehensive curriculum covering topics over the full range of the heating, air conditioning, and refrigeration industry. Field trips may be required. Students will be placed into individual courses within the Air Conditioning and Refrigeration Program.

### AC R010—Air Conditioning & Refrigeration I 3 units

*3 hours lecture weekly*

This course develops competency in the theoretical troubleshooting of mechanical problems in air conditioning and refrigeration systems through an understanding of the operating principles for refrigeration. It is recommended as a first semester course for persons who want to develop or improve job skills in the air conditioning, heating and refrigeration industry. Together with the lab course (AC R010L), this class targets the service technician who wishes to develop troubleshooting and repair skills. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

### AC R010L—Air Conditioning & Refrigeration I Lab

**2 units**

*1 hour lecture, 3 hours lab weekly*

This course develops competency in the hands-on troubleshooting of mechanical problems in air conditioning and refrigeration systems through an understanding of the operating principles for refrigeration. It is recommended as a first semester course for persons who want to develop or improve job skills in the air conditioning, heating and refrigeration industry. Together with the lecture course (AC R010), this class targets the service technician who wishes to develop refrigeration troubleshooting and repair skills. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

### AC R011L—Air Conditioning & Refrigeration II Lab

**2 units**

*1 hour lecture, 3 hours lab weekly*

This course develops additional competency in the hands-on troubleshooting of mechanical problems in air conditioning and refrigeration systems through an understanding of the operating principles for refrigeration. It is recommended as a second semester course for persons who want to develop or improve job skills in the air conditioning, heating and refrigeration industry. Together with the first semester lab course (AC R010L), this class targets the service technician who wishes to develop refrigeration troubleshooting and repair skills. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

### AC R020—Electrical Systems I

**3 units**

*3 hours lecture weekly*

This course develops competency in the theoretical troubleshooting of mechanical problems in air conditioning and refrigeration systems through an understanding of the operating principles for electrical wiring systems used in air conditioning and refrigeration installations. It is recommended for persons who want to develop or improve job skills in the air conditioning, heating and refrigeration industry. Together with the lab course (AC R020L), this course targets the service technician who wishes to develop skills in reading wiring diagrams, identifying electrical components, and electrical troubleshooting and repair skills. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

### AC R020L—Electrical Systems I Lab

**2 units**

*1 hour lecture, 3 hours lab weekly*

This course develops competency in the hands-on troubleshooting of mechanical problems in air conditioning and refrigeration systems through an understanding of the operating principles for electrical wiring systems used in air conditioning and refrigeration installations. It is recommended for persons who want to develop or improve job skills in the air conditioning, heating and refrigeration industry through practice on live equipment. Together with the lecture course (AC R020), this course targets the service technician who wishes to develop skills in reading wiring diagrams, identifying electrical components, and electrical troubleshooting and repair skills. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

**AC R021L—Electrical Systems II Lab**                      **2 units**  
*1 hour lecture, 3 hours lab weekly*

This course develops additional competency in the hands-on troubleshooting of mechanical problems in air conditioning and refrigeration systems through an understanding of the operating principles for electrical wiring systems used in air conditioning and refrigeration installations. It is recommended for persons who want to continue their development of electrical troubleshooting job skills in the air conditioning, heating and refrigeration industry through practice on live equipment. Together with the introductory electrical lab course (AC R020L), this course targets the service technician who wishes to develop a higher skill level in reading wiring diagrams, identifying electrical components, and electrical troubleshooting and repair skills. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

**AC R030—Airside Systems**                                      **3 units**  
*3 hours lecture weekly*

This course develops competency in the theoretical troubleshooting of air side problems in air conditioning systems through an understanding of the principles of air flow, the properties of air, theory of controls, reading of construction drawings, calculation of building loads. It is recommended for persons who want to develop or improve job skills in the air conditioning, heating and refrigeration industry. Together with the lab course (AC R030L), this course targets the service technician who wishes to develop skills in designing and troubleshooting building air conditioning systems and controls. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

**AC R030L—Airside Systems Lab**                              **2 units**  
*1 hour lecture, 3 hours lab weekly*

This course develops competency in the hands-on troubleshooting of air side problems in air conditioning systems through an understanding of the principles of air flow, the properties of air, theory of controls, reading of construction drawings, calculation of building loads. It is recommended for persons who want to develop or improve job skills in the air side segment of the air conditioning, heating and refrigeration industry through practice with live equipment and tools. Together with the lecture course (AC R030), this course targets the service technician who wishes to develop skills in designing and troubleshooting building air conditioning systems and controls. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

**AC R040—Heating and Control Systems**                      **3 units**  
*3 hours lecture weekly*

This course develops competency in the theoretical troubleshooting of mechanical and electrical problems in heating systems through an understanding of the operating principles heating and furnace electrical control circuits. It is recommended for persons who want to develop or improve job skills in the heating segment of the air conditioning, heating and refrigeration industry. Together with the lab course (AC R040L), this course targets the service technician who wishes to develop skills in designing and troubleshooting heating systems and controls. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

**AC R040L—Heating and Control Systems Lab**                      **2 units**  
*1 hour lecture, 3 hours lab weekly*

This course develops competency in the hands-on troubleshooting of mechanical and electrical problems in heating systems through an understanding of the operating principles heating and furnace electrical control circuits. It is recommended for persons who want to develop or improve job skills in the heating segment of the air conditioning, heating and refrigeration industry. Together with the lecture course (AC R040), this course targets the service technician who wishes to develop skills in designing and troubleshooting heating systems and controls. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer. Field trips may be required.

**AC R080—Industry Survey/Repair**                                      **1 unit**  
*Advisory: AC R010L, AC R030L, AC R040L or concurrent enrollment or equivalent.*  
*3 hours lab weekly*

Survey of local industries, opportunities and equipment. Repairs on equipment brought in by students will be done with guidance from instructor. Course may be taken two times.