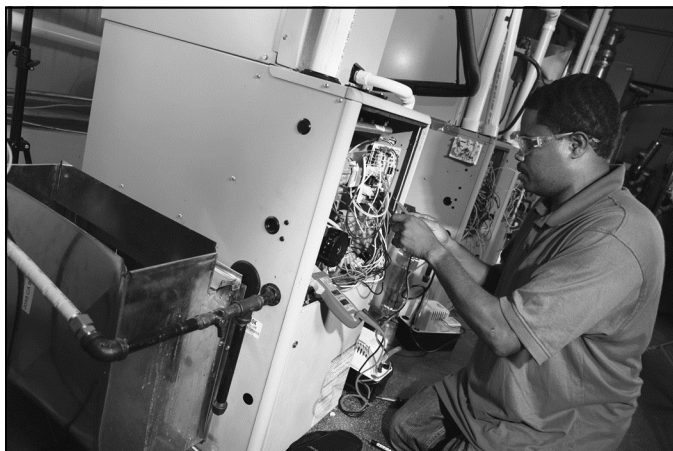




## Course Outline/Description— Air Conditioning, Refrigeration, and Heating



### DIPLOMA PROGRAM

24 weeks – 24 semester credit hours (DAY)  
52 weeks – 24 semester credit hours (EVENING)  
Total 720 hours

### OBJECTIVE

The Air Conditioning, Refrigeration, and Heating\* program teaches the skills required to diagnose, maintain, and repair residential air conditioning and commercial air conditioning, heating, and refrigeration equipment. Students learn refrigeration through work with freezers, cold rooms, and ice machines. Federal environmental reclamation and recycling standards are taught. In the air conditioning and heating portion of the course, students are taught current technology relating to central air conditioning and window units, heat pumps, gas and oil-fired furnaces, and related ductwork. Principles of alternative energy are taught through radiant heat.

### EMPLOYMENT OPPORTUNITIES

Graduates are employable in entry-level positions such as air conditioning technicians, refrigeration technicians, air conditioning and refrigeration mechanics or helpers, and general maintenance personnel. The Institute recommends that students take the E.P.A. exam at the completion of training to enhance employment opportunities.

|          | COURSE TITLE   | CREDIT HOURS |
|----------|--|--------------|
| ACRH 601 | Introduction to Safety in Air Conditioning, Refrigeration, and Heating       | 0.5          |
| ACRH 602 | Fundamentals of Mathematics for Air Conditioning, Refrigeration, and Heating | 0.5          |
| ACRH 603 | Basic Tools for Air Conditioning, Refrigeration, and Heating                 | 0.5          |
| ACRH 604 | Air Conditioning, Refrigeration, and Heating Measurements                    | 1.5          |
| ACRH 605 | Electrical Theory and Applications   | 4.5          |
| ACRH 606 | Heating Theory and Applications  | 2.5          |
| ACRH 607 | Basic Compression Refrigeration  | 2.5          |
| ACRH 608 | Tubing, Piping, and Soldering  | 2.0          |
| ACRH 609 | Condensing Units   | 1.5          |
| ACRH 610 | Air Conditioners   | 1.0          |
| ACRH 611 | Heat Pumps   | 1.0          |
| ACRH 612 | Domestic, Commercial, and Industrial Refrigeration                           | 2.0          |
| ACRH 613 | Recovery, Recycling, and Reclaiming  | 0.5          |
| ACRH 614 | Ductwork Application   | 1.0          |
| PD 616   | Professional Development   | 2.5          |

\* Students in this program are eligible to receive industry recognized certification from the National Occupational Competency Testing Institute (NOCTI) upon successful completion of certification exams.



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### ACRH 601 INTRODUCTION TO SAFETY IN AIR CONDITIONING, REFRIGERATION, AND HEATING

This course familiarizes students with air conditioning, refrigeration, and heating terms, and modern developments in the fields of air conditioning, mechanical refrigeration, and heating. Students learn to recognize unsafe situations, follow rules for shop and personal safety, select the correct fire extinguisher for each class of fire, and match the safety color code with elements of its use. Included are specific safety rules pertaining to the field. Students are also able to match ampere figures to their effects on the human body. Students receive an introduction to Green Technology and Energy Efficiency in the trades.

### ACRH 602 FUNDAMENTALS OF MATHEMATICS FOR AIR CONDITIONING, REFRIGERATION, AND HEATING

This course provides a review of basic mathematics including fractions, decimals, percentages, square roots, and liquid and linear measurements.

### ACRH 603 BASIC TOOLS FOR AIR CONDITIONING, REFRIGERATION, AND HEATING

Students learn identification, use, and care of basic and specialized hand tools used in the trade.

### ACRH 604 AIR CONDITIONING, REFRIGERATION, AND HEATING MEASUREMENTS

This course covers the identification, care, and use of different types of instruments required to record temperature, pressure, and heat in various units of measurement as used in the air conditioning, refrigeration, and heating trades. Refrigeration cooling loads, heat load and heat gain loads are also taught.

### ACRH 605 ELECTRICAL THEORY AND APPLICATIONS

This course presents fundamentals of electricity, Ohm's Law, and electrical circuits. Students learn to identify and use electrical test instruments and understand the distribution of electrical power. Thermostats, relays, capacitors, protection devices, and electric motors are studied, as well as the reading of wiring diagrams.

### ACRH 606 HEATING THEORY AND APPLICATIONS

This course presents fundamentals of gas, oil, and electric forced hot air systems. This includes the duct system, the heat exchanger, the electrical controls, and the control circuitry. Energy conservation methods as they relate to heating and air conditioning are discussed. Students also learn to troubleshoot gas heaters. Students are taught the installation of solar hydronic radiant heat in the floor. Students make all connections for solar hydronic radiant heat systems. The focus is to teach students the efficiency of such systems and their green applications.

### ACRH 607 BASIC COMPRESSION REFRIGERATION

This course covers identification of compressors, evaporators, condensers, connecting refrigerant lines, and system accessories; use of refrigerants; evacuation; pressurizing; testing for leaks; and charging. Students will also tear down and inspect compressors.

### ACRH 608 TUBING, PIPING, AND SOLDERING

In this course, students learn to select pipe, tubing, and fittings; flare, bend, and swag tubing; and perform soft soldering, silver brazing techniques.

### ACRH 609 CONDENSING UNITS

In this course, students learn to define terms associated with sealed system components (condensing units) and to discuss, list, identify, operate, and repair them.

### ACRH 610 AIR CONDITIONERS

This course covers the major components of air conditioners; matching wire size to carrying capacity; parts identification; trouble-shooting, and repair of air conditioning units including split systems.

### ACRH 611 HEAT PUMPS

The theory of heating and/or cooling by heat pumps is discussed, along with their advantages and disadvantages.

### ACRH 612 DOMESTIC, COMMERCIAL, AND INDUSTRIAL REFRIGERATION

The course covers domestic refrigerators, commercial walk-in boxes, ice-making machines, and ancillary controls associated with industrial refrigeration systems. Students also learn the basics of electrical controls, refrigeration defrost controls, mechanical servicing, shell and tube condensing units, oil pressure controls, hot gas defrost, electrical defrost, water pumps and troubleshooting techniques.

### ACRH 613 RECOVERY, RECYCLING, AND RECLAIMING

Students learn the effects of CFC refrigerants on the ozone layer of the atmosphere and the Environmental Protection Agency's rules governing the phasing out of CFCs and HCFCs. In all hands-on projects, students are instructed in the proper procedures required to recover CFCs. Department of Transportation regulations regarding the transport of refrigerant drums and cylinders are reviewed and discussed.

### ACRH 614 DUCTWORK APPLICATION

This course covers sizing and placement of ductwork, registers, and grills for proper air distribution.

### PD 616 PROFESSIONAL DEVELOPMENT

Students learn the skills employers require for positive work relationships and long-term employment. They include targeted workplace competencies: problem solving and other cognitive skills, oral communication skills, personal qualities, work ethic, and customer service, interpersonal and teamwork skills. Students also learn about the importance of professionalism on the jobsite and employer expectations. Employment Specialists teach students effective Internet, interviewing, and job search skills.