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AIR CONDITIONING, REFRIGERATION & FACILITIES TECHNOLOGY

*Associate in Applied Science Degree in Air Conditioning, Refrigeration
& Facilities Technology*

Certificate of Completion in Air Conditioning, Refrigeration & Facilities Technology

Certificate of Completion in Residential and Light Commercial Air Conditioning

MORE INFORMATION:

GATEWAYCC.EDU/INDUSTRIAL-TECHNOLOGY



**GATEWAY
COMMUNITY COLLEGE**

A MARICOPA COMMUNITY COLLEGE

108 N. 40th Street – Phoenix, AZ 85034



**MARICOPA
COMMUNITY COLLEGES**

Disclaimer: This document is for informational purposes only. The official programs description can be found here: <http://www.maricopa.edu/academic/ccta/>

Program: 3587, 5380, 5542 Effective 2018 - 2019

Welcome to the Air Conditioning, Refrigeration & Facilities Technology Program at GateWay Community College

If you have any questions about the enclosed program material, please feel free to contact any of the following program contacts:

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 Phone (602) 286-8647 Email: kelly@gatewaycc.edu

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James Kenney, ACRF, Faculty
 Phone (602) 286-8617 Email: James.Kenney@gatewaycc.edu

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Maricopa County Community College District (MCCCD) is an EEO/AA institution and an equal opportunity employer of protected veterans and individuals with disabilities. A lack of English language skills will not be a barrier to admission and participation in the career and technical education programs of the college.

The Maricopa Community Colleges do not discriminate on the basis of race, color, national origin, sex, disability or age in its programs or activities. For Title IX/504 concerns, call the following number to reach the appointed coordinator: (480) 731-8499. For additional information, as well as a listing of all coordinators within the Maricopa College system, <http://www.maricopa.edu/non-discrimination>.

1	Submit 'Student Information Form' https://eims.maricopa.edu/MAW/MAW.html	Enrollment Services IE 1214	(602) 286-8200
2	Verify in-state residency by filling out Prop 300 form. http://www.maricopa.edu/residency/ Click Student Declaration Form	Enrollment Services IE 1214	(602) 286-8200
3	Request Official Transcripts from all other educational agencies to be forwarded to Admissions & Records GateWay Community College Attn: Admissions and Records 108 North 40th Street Phoenix, AZ 85034	Enrollment Services IE 1214	(602) 286-8200
4	Fill out Request for Transcript Evaluation http://www.gatewaycc.edu/forms/transcript-evaluation-request	Enrollment Services IE 1214 – Joyce Cameron	(602) 286-8055
5	Take Course Placement Test (if applicable) Some courses and programs require test scores prior to enrollment. No fee required. BRING PICTURE ID. Call for times	Testing Center IE 1252	(602) 286-8160
6	Apply for Financial Aid and Scholarships, if interested http://www.gatewaycc.edu/Pay/FinancialAid/Apply.aspx http://www.fafsa.ed.gov/index.htm	Enrollment Services IE 1214	(602) 286-8300
7	Meet with an Industrial Technology Program Advisor Explore your program options, obtain registration advisement and setup a program of study plan.	Enrollment Services IE 1214	(602) 286-8174
8	Register for Courses Schedule Available at http://classes.sis.maricopa.edu/ Enroll online at https://my.maricopa.edu/	Enrollment Services IE 1214	(602) 286-8200
9	Pay Tuition and Fees Payment Plans and Payment Extensions Available. Ask for Details.	Enrollment Services IE 1214	(602) 286-8277
10	Obtain Student ID, Optional Enrollment Services — BRING PICTURE ID	Enrollment Services IE 1214	(602) 286-8141
11	Obtain Parking Decal, Required Required if parking a vehicle on campus	Enrollment Services IE 1214	(602) 286-8200
12	Purchase Books Bookstore or online at www.efollet.com	Main Building, Bookstore MA 1200	(602) 286-8400



Career Description

As an Air-Conditioning/Refrigeration & Facilities (ACRF) Technician, you will operate and maintain the mechanical and electrical systems in residential to large commercial, high technology and multi-building complexes. ACRF Technicians assist employees in maintaining an environmentally safe and accessible place of business. Technicians are called upon to provide short and long term planning schedules to maintain compliance, a safe work environment and cost beneficial production schedules and with knowledge of health, safety, environmental and ADA regulations, technicians provide education, training, and guidance to the employer. You will work closely with safety and health officers, management and administration. You must have considerable knowledge in the areas of heating, ventilating, air conditioning, refrigeration, electrical and mechanical systems, and be able to solve problems quickly and in emergency situations. Employment opportunities can be found in all industries where a company has more than 10 employees and comes under regulatory guidelines, such as electrical plants, hospitals, and grocery stores as well as residential systems.

How To Get Started

GateWay Community College offers a Certificate of Completion and Associate in Applied Science Degree in Air Conditioning/Refrigeration Facilities Technology (ACRF). Your class work along with hands-on training, using the latest in technology, are integrated in a seamless program that resembles an actual workplace environment. In this program, you will learn the required competencies by working individually or in a team to solve actual field problems. After completion you may choose to specialize in the areas of Air and Water Balance, Electrical Technology, and Building Com- missioning.

Accreditation

GateWay Community College is a Maricopa Community College, accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools (30 North LaSalle Street, Suite 2400, Chicago, IL. 60602-2504. Tele# (800)621-7440)

Career Opportunities

- Application Engineer/Technician
- Outside/Inside Sales Representative
- Facilities Engineer
- Production Technician
- Field Service/Installation Technician
- Project Manager
- Inspector
- Sales Manager
- Job Foreman/Supervisor
- Service Repair Technician
- Journeyman
- Supermarket Refrigeration



Employment Outlook

In Arizona, Air Conditioning, Refrigeration and Facility Technician positions are expected to increase by 2018. Air Conditioning/Refrigeration Facilities Technicians earn an average hourly rate of \$19.40 for an average annual salary of \$40,342.

Program Costs

Tuition and fees are set by the Maricopa Community College District Governing Board. Tuition is based on the 2018 -2019 tuition rate of \$85 per credit hour (for in-county students). Tuition and fees are subject to change. Additional fees may apply. Financial Aid and Child Care are available to those who qualify.

Certificate of Completion in Residential and Light Commercial Air Conditioning

Program Prerequisite: Completion of MAT090 or equivalent is recommended.

Course Pre-Fix	Course Name	Credits	Advisor Notes
Certificate of Completion in Residential HVAC Required Courses			
HVA101/HVA101LL	Refrigeration Applications & Components I/Lab	4	
HVA103/HVA103LL	Refrigeration Applications & Components II/Lab	4	
HVA104	EPA Section 608 Technician Preparation and Certification OR Proof of EPA Certification	0-0.5	
FAC105/FAC105LL	Electricity for Industry/Lab	4	
HVA112/HVA112LL	Heating & Air Conditioning/Lab	4	
HVA143	Load Calculation & Duct Design	3	
OSH106 AA OR OSH105AA OR	Industrial Safety Construction Safety, OR Proof of OSHA 30 Hour Card	0-3	
BPC110 or CIS105	Computer Usage & Applications	3	
Total Required Credits for Certificate of Completion in Residential HVAC		22-25.5	

Certificate of Completion in Air Conditioning, Refrigeration & Facilities Technology

Program Prerequisite: Completion of MAT090 or equivalent is recommended.

Course Pre-Fix	Course Name	Credits	Advisor Notes
Certificate of Completion in ACRF Required Courses			
Certificate of Completion in Residential and Light Commercial AC		22-25.5	
FAC115/FAC115LL	Motors, Controls & Wiring Diagrams/Lab	4	
FAC186	Electro-Mechanical Devices	3	
FAC210/FAC210LL	Facilities Air Conditioning Systems/Lab	4	
FAC220/FAC220LL	Controls & Instrumentation/Lab	4	
FAC231	Codes	3	
FAC235/FAC235LL	Air & Water Balance/Lab	4	
Total Required Credits for Certificate of Completion in ACRF		44-47.5	

To receive these certificates, students must earn a grade 'C' or better in all courses within the program. Note: (+) Indicates a prerequisite and/or co requisite is required

Associate in Applied Science (AAS) in Air Conditioning, Refrigeration & Facilities

Program Prerequisite: Completion of MAT082 or equivalent is recommended.

Course Pre-Fix	Course Name	Credits	Advisor Notes
Associate of Applied Science Required Core Courses			
HVA101/HVA101LL	Refrigeration Applications & Components I/Lab	4	
HVA103/HVA103LL	Refrigeration Applications & Components II/Lab	4	
HVA104	EPA Section 608 Technician Preparation and Certification OR Proof of EPA Certification	0-0.5	
FAC105/FAC105LL	Electricity for Industry/Lab	4	
HVA112/HVA112LL	Heating & Air Conditioning/Lab	4	
FAC115/FAC115LL	Motors, Controls & Wiring Diagrams/Lab	4	
HVA143	Load Calculation & Duct Design	3	
FAC186	Electro-Mechanical Devices	3	
FAC210/FAC210LL	Facilities Air Conditioning Systems/Lab	4	
FAC220/FAC220LL	Controls & Instrumentation/Lab	4	
FAC231	Codes	3	
FAC235/FAC235LL	Air & Water Balance/Lab	4	
OSH105AA OR OSH106AA	Construction Safety OR Industrial Safety		
BPC110 or CIS105	Microsoft Office	3	
Associate in Applied Science Required General Education Courses			
ENG101+ ENG 107+	First-Year Composition, OR First-Year Composition for ESL	3	
ENG102+ OR (ENG 108+, OR ENG111+)	First-Year Composition	3	
COM100 OR (COM110, COM225, COM230)	Introduction to Communications	3	
CRE101 OR (CRE111)	Critical Reading or Equivalent by Assessment	3	
MAT120+, MAT121+, MAT122+, OR MAT140+	Mathematical Concepts and Applications	3-5	
CHM130+/CHM130LL+ OR PHY101+ OR PHY111+	Fundamental Chemistry, Introduction to Physics, General Physics I	4	
Humanities/Fine Arts (course must be on the approved list of courses to meet the AAS degree in General Education Requirements)		3	
Social/Behavioral Sciences (course must be on the approved list of courses to meet the AAS degree in General Education Requirements)		3	
Total Required Credits for Associate in Applied Science		72-74	

To receive these certificates, students must earn a grade 'C' or better in all courses within the program. Note: (+) Indicates a prerequisite and/or co requisite is required

Program of Study/Suggested Course Sequence For ACRF Degree and Certificate Programs

FALL/SPRING START: Day/Night Classes

1st Semester				
Course	Credit	Tuition	Course Fees	Book
HVA101 and HVA101LL	4	\$340	\$75	Yes
FAC105 and FAC105LL	4	\$340	\$60	Yes
HVA143	3	\$255	-	Yes
General Studies/ Required Core Classes	<i>Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)</i>			
2nd Semester				
Course	Credit	Tuition	Course Fees	Book
HVA103 and HVA103LL	4	\$340	\$75	Yes
HVA112 and HVA112LL	4	\$340	\$75	Yes
OSH105AA OR	3	\$255	\$40	Yes
OSH106AA	3	\$255	\$40	Yes
General Studies/ Required Core Classes	<i>Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)</i>			
3rd Semester				
Course	Credit	Tuition	Course Fees	Book
FAC115 and FAC115LL	4	\$340	\$60	Yes
FAC210 and FAC210LL	4	\$340	\$25	Yes
FAC186	3	\$255	\$25	Yes
General Studies/ Required Core Classes	<i>Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)</i>			
4th Semester				
Course	Credit	Tuition	Course Fees	Book
FAC220 and FAC220LL	4	\$340	\$25	Yes
FAC235 and FAC235LL	4	\$340	\$25	Yes
FAC231	3	\$255	-	Yes
General Studies/ Required Core Classes	<i>Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)</i>			

Minimum Basic Tool List

Please note, you do not need to have all tools before starting classes. As you progress in the program, you will be required to obtain these tools. The instructors will also provide recommended brands and vendors.

Common Blade Screw Drivers: 6"x5/16"* , 4"x1/4"* , 2"x1/8" (pocket)
 Phillips Screw Drivers: #1* , #2*
 Adjustable (Crescent) Wrench: 6" , 12"
 Nut Drivers: ¼"* , 5/16"* , 11/32" , 3/8" , 7/16" , ½"
 6-in-1 Screwdriver (alternative to * items)
 Tapered (Needle-nose) Pliers
 Side Cutter Pliers (Dikes)
 Wire Stripper - Terminal Crimper
 Fuse Puller
 Refrigeration Service Valve Wrench
 Tubing Cutter
 Flaring Tool
 Clamp-on Ammeter (UL-Listed, Minimum Rating 600 V, Category III)
 Volt/Ohm Meter (UL-Listed, Minimum Rating 1000V Category II, 600 V, Category III)
 Work Gloves
 Safety Glasses

Optional General Tool List

Open-end Wrenches: ¼" - 13/16"
 Common Blade Screw Drivers: 6"x3/16" , 1-1/4"x1/4" (stubby)
 Utility Knife
 Linesman's Pliers
 Slip-joint Pliers (Channel-locks): 6" , 12"
 Awl
 Hex Key Set
 Tape Measure
 Hammer
 Box End Ratchet Wrenches: ¼" - 7/8"
 Socket Set: 3/8" or ½"
 Spirit Level
 Mill-tooth Flat File Flashlight
 (sealed)
 Punch Set
 Circuit Tester Jumper
 Wires
 Miscellaneous Items: Spare batteries, spare utility knife blades, duct tape, WD40

HVAC-R

Pipe Wrenches: 8" , 12" , 16-18"
 Wire Brush
 Manometer
 Pipe Dope/Teflon Tape
 Pilot Light Igniter
 Inspection Mirror
 Refrigeration Gauges Set

Facilities Systems Technology

Pipe Wrenches: 12" , 18"
 V-Belt Pulley Gage
 Specialty Drivers: Torx, Robertson, Tri-oval, etc.
 Insertion Thermometer

Air Conditioning, Refrigeration and Facilities Degree and Certificate Cost Estimates

Program	Tuition	Course Fees	Total
Associate of Applied Science in ACRF 3587	\$6,120	\$524	\$6,644
Certificate of Completion in Residential HVAC 5542	\$2,125	\$325	\$2,450
Certificate of Completion in ACRF 5380	\$3,995	\$485	\$4,480

Please note that these are only estimates and do not include books. These estimates may change based on increases to tuition, course fees and book costs. Estimates are based on the 2018-2019 tuition rates for in-county students. Additional fees may apply.

COLLEGE CONTACT INFORMATION

Admissions, Registration and Records	(602) 286-8200
Apprenticeship Programs	(602) 286-8681
Assessment/Testing	(602) 286-8160
Bookstore.....	(602) 286-8400
Cafeteria	(602) 286-8308
Career and Employment Services Center.....	(602) 286-8500
College Safety	(602) 286-8911
Cashier's Office.....	(602) 286-8200
Children's Learning Center	(602) 286-8130
College Information	(602) 286-8000
Computer Commons.....	(602) 286-8411
Counseling	(602) 286-8900
Disability Services	(602) 286-8191
Financial Aid	(855) 622-2332
Learning Center	(602) 286-8800
Library	(602) 286-8454
Phone Registration.....	(602) 286-8100
Student Activities/Clubs	(602) 286-8700
Veterans Services	(602) 286-8076

Partnership for Heating Ventilation Air-Conditioning Refrigeration Accreditation (PAHRA)



GateWay Community College's Air Conditioning, Refrigeration, and Facilities Technology training program has met the instruction, curriculum, student, faculty, and facility standards set forth by the Partnership for Air- Conditioning, Heating, Refrigeration Accreditation (PAHRA). PAHRA's programmatic accreditation certifies that the following training areas have been evaluated:

- Residential Heating and Air Conditioning
- Light Commercial Heating and Air Conditioning
- Commercial Refrigeration

The many individuals and organizations supporting PAH- RA, such as the Air-Conditioning and Refrigeration Institute (ARI), Air Conditioning Contractors of America, American Society of Heating, Refrigeration, Air Conditioning Engineers (ASHRAE), Council of Air-Conditioning and Refrigeration Educators (CARE),

Gas Appliance Manufacturers Association (GAMA), Heating, Air Conditioning & Refrigeration Distributors International (HARDI), and Plumbing, Heating, Cooling Contractors (PHCC) commend your training program for meeting and/or exceeding standards established and validated by the HVACR industry Associations.

Placement Test		
Math:	Reading:	English:

Semester:	Year:	
Course	Credit	Grade

Semester:	Year:	
Course	Credit	Grade

Semester:	Year:	
Course	Credit	Grade

Semester:	Year:	
Course	Credit	Grade

Semester:	Year:	
Course	Credit	Grade

Semester:	Year:	
Course	Credit	Grade