AIR CONDITIONING, REFRIGERATION & FACILITIES TECHNOLOGY
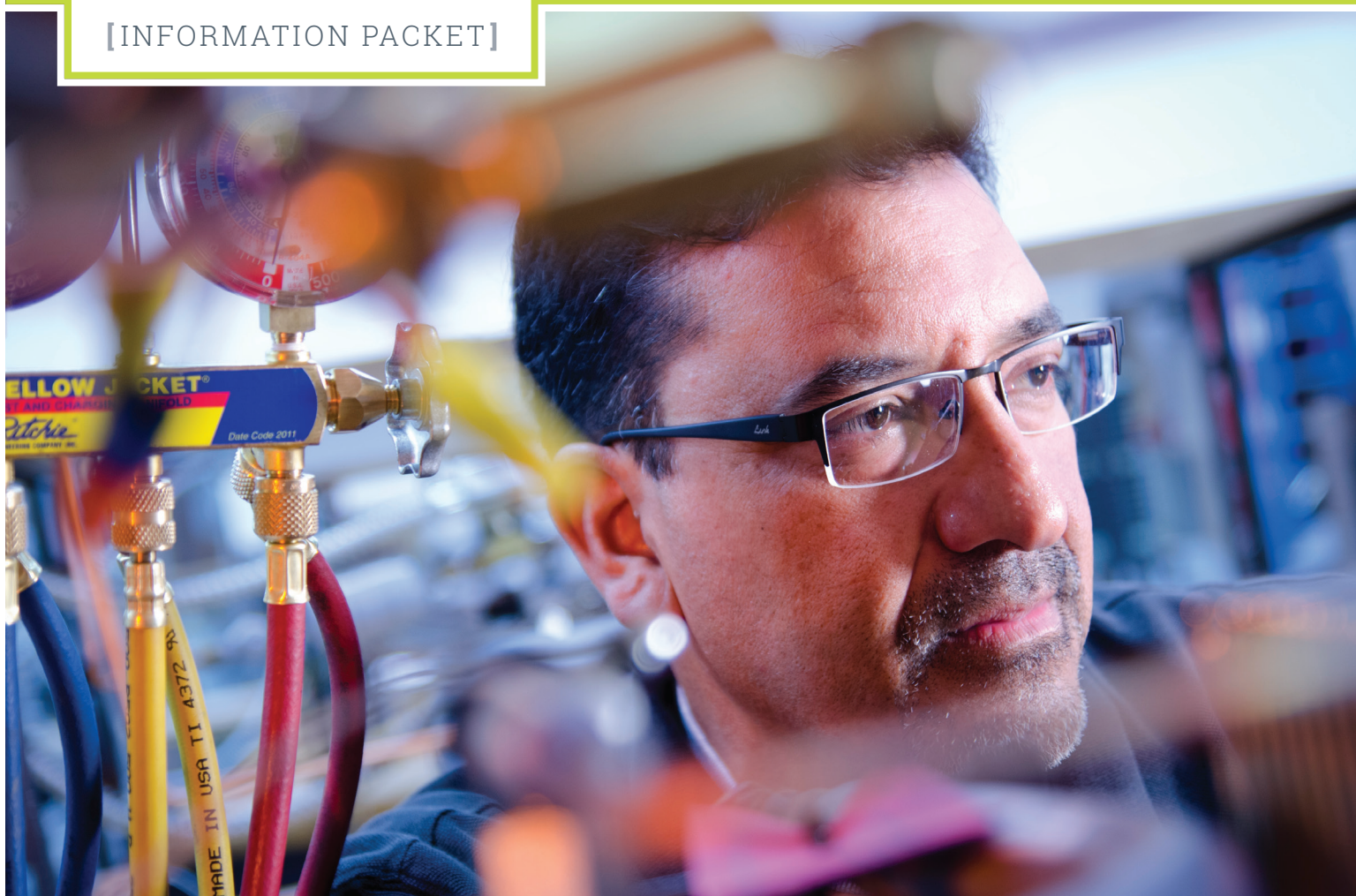
GATEWAYCC.EDU/**HVAC-REFRIGERATION-TECHNOLOGY**

[INFORMATION PACKET]

MARICOPA COMMUNITY COLLEGES | **GATEWAY COMMUNITY COLLEGE** A **MARICOPA** COMMUNITY COLLEGE

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:

Craig Urbanski, Industrial Technology Division Chair
Phone (602) 286-8616 Email: craig.urbanski@gatewaycc.edu

Bruce Martz, Program Director, HVAC/OSHA Faculty
Phone (602) 781-1330 Email: larry.martz@gatewaycc.edu

Jimmy Craft, Adjunct
Email: jimmy.craft@gatewaycc.edu

Dave Kenney, Adjunct
Email: david.kenney@gatewaycc.edu

Walt Priebe, Adjunct
Email: wpriebe@gatewaycc.edu

Raymond Rocha, Industrial Technology Advisor
Phone (602) 286-8174 Email: rocha@gatewaycc.edu

PROGRAM CONTACTS

REGISTRATION CHECKLIST

1	**Submit 'Student Information Form'** https://admissions.maricopa.edu/	Enrollment Services IE 1214	(602) 286-8200
2	**Verify in-state residency** https://my.maricopa.edu/services/admissions-recordsregistration/proofidentity-id-authentication	Enrollment Services IE 1214	(602) 286-8200
3	**Send Official Transcript and/or High School Transcripts to Enrollment Services** GateWay Community College Attn: Admissions and Records 108 North 40th Street Phoenix, AZ 85034	Enrollment Services IE 1214	(602) 286-8200
4	**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
5	**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	(855) 622-2332
6	**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
7	**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
8	**Pay Tuition and Fees** Payment Plans and Payment Extensions Available. Ask for details.	Enrollment Services IE 1214	(602) 286-8200
9	**Obtain Student ID, Optional** Enrollment Services — BRING PICTURE ID	Enrollment Services IE 1214	(602) 286-8141
10	**Obtain Parking Decal, Required** Required if parking a vehicle on campus.	Enrollment Services IE 1214	(602) 286-8200
11	**Purchase Books** Bookstore or online at https://www.bkstr.com/gatewayccstore/home	Main Building, Bookstore MA 1200	(602) 286-8400
12	**Attend a Program Orientation Session** A week before the start of the semester.	Room location varies each semester.	(602) 286-8613

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 employers 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. With knowledge of health, safety, environmental and ADA regulations, technicians provide education, training, and guidance to their 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. You will 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 Certificates of Completion and an 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 and design problems. After completion you may choose to specialize in the areas of Air and Water Balance, Electrical Technology, and Building Commissioning.

Career Opportunities

- Application Engineer/Technician
- Outside/Inside Sales Representative
- Facilities Engineer and Operator
- Production Technician
- Field Service/Installation Technician
- Project Manager
- Inspector
- Sales Manager
- Job Foreman/Supervisor
- Service Repair Technician
- Estimator
- Service Manager
- Commissioning Agents
- Test, Adjust, and Balance
- Journeyman
- Supermarket Refrigeration

Employment Outlook

Currently in Arizona, Air Conditioning, Refrigeration and Facility Technician positions are expected to increase. As an example:
- Entry Level Tech: $22-24/hour
- Journeyman Tech: $32-40/hour
- Applied Systems: $42-50/hour

Program Costs

Tuition and fees are set by the Maricopa Community College District Governing Board. Tuition is based on the 2023 -2024 tuition rate of $97 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.

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)

Certificate of Completion in Residential and Light Commercial Air Conditioning Major 5241

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			
OSH105	Construction Safety	3	
CON105	Construction Calculations	1.5	
CON107	Construction Drawings Intro	1	
HVA101	HVAC for Residential Systems I	4	
HVA102	HVAC for Residential Systems II	5	
HVA104	EPA608	.5	
CON/HVA131	Electrical Systems	3.5	
HVA120	HVAC Installation	4	
HVA130	HVAC Troubleshooting	4	
Total Required Credits for Certificate of Completion in Residential HVAC		**23.5-29.5**	

Certificate of Completion in Air Conditioning, Refrigeration & Facilities Technology - Major 5242

Program Prerequisite: Completion of MAT090 or equivalent is recommended.

Course Pre-Fix	Course Name	Credits	Advisor Notes
Certificate of Completion in ACRF Required Courses			
All Classes for Major 5241		**26.5**	
ELC/FAC115/FAC115+Lab	Motors, Controls & Wiring Diagrams	4	
FAC186	Electro-Mechanical Devices	3	
FAC210	Facilities Air Conditioning System	4	
FAC220	Controls & Instrumentation	4	
FAC231	Codes	3	

The information provided in this guide is subject to change. Updated 07/01/2023. Program: 3211, 5241, 5242   Effective 2023-2024

5

FAC235	Commercial Air & Water Test and Balance	4	
Total Required Credits for Certificate of Completion in ACRF		**44.5-51.5**	

*The information provided in this guide is subject to change. Updated 06/01/2022.   , 5241   Effective 2022-2023

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 – Major 3211

Program Prerequisite: Completion of MAT090 or equivalent is recommended.

Course Pre-Fix	Course Name	Credits	Advisor Notes
Associate of Applied Science Required Core Courses			
OSH105	Construction Safety	3	
CON105	Construction Calculations	1.5	
CON107	Construction Drawing Intro	1	
HVA101	HVAC for Residential Systems I	4	
HVA102	HVAC for Residential Systems II	5	
HVA104	EPA608	.5	
CON/HVA131	Electrical Systems	3.5	
HVA120	HVAC Installation	4	
HVA130	HVAC Troubleshooting	4	
ELC/FAC115+Lab	Motors, Controls & Wiring Diagrams	4	
FAC186	Electrical Mechanical Devices	3	
FAC210	Facilities Air Conditioning Systems	4	
FAC220	Controls and Instrumentation	4	
FAC231	Codes	3	
FAC235	Commercial Air & Water Test and Balance	4	
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	3-6	
CHM130+/CHM130LL+ OR PHY101+ OR	Fundamental Chemistry, Introduction to Physics, General	4	

PHY111+	Physics I		
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		**67.5-76.5**	

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

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	$388	$75	Yes
HVA102	5	$485	$75	Yes
CON105 and CON107	3	$291	-	Yes
HVA104*	.5	$48.50	$25	Provided
General Studies/ Required Core Classes	*Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available* **Course HVA104 is required for the following programs: 3587, 5380, 5542)*			

2nd Semester				
Course	**Credit**	**Tuition**	**Course Fees**	**Book**
HVA120	4	$388	$75	Yes
HVA130	4	$388	$65	Yes
OSH105AA	3	$291	$65	Provided
HVA131	3.5	$339.50	$65	Provided

Course				
General Studies/ Required Core Classes	*Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)*			

3rd Semester

Course	Credit	Tuition	Course Fees	Book
FAC115 and FAC115LL	4	$388	$65	Yes
FAC210	4	$388	-	Provided
FAC186	3	$291	$35	Yes
General Studies/ Required Core Classes	*Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)*			

4th Semester

Course	Credit	Tuition	Course Fees	Book
FAC220 and FAC220LL	4	$388	$25	Yes
FAC235	4	$388	$35	Provided
FAC231	3	$291	-	Provided
General Studies/ Required Core Classes	*Required general education core classes can be taken at any other MCCD Colleges at your convenience (summer, online and Saturday classes are available)*			

TOOL REQUIREMENTS

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 Refrigeration
Gauges Set
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
Leather Work Boot/Shoes

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

Facilities Systems Technology

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

Air Conditioning, Refrigeration and Facilities Degree and Certificate Cost Estimates

Program	Tuition	Course Fees	Total
Associate of Applied Science in ACRF Major 3211	$7,420.50	$670	$8,090.50
Certificate of Completion in Residential HVAC Major 5241	$2,861.50	$445	$3,306.50
Certificate of Completion in ACRF (Commercial HVAC) Major 5242	$4,995.50	$640	$5,635.50

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 2023-2024 tuition rates for in-county students. Additional fees may apply.

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

PROGRAM ACCREDITATION

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