

## Program Creation Process Sign-Off

**Program Title:** Associate in Science in Heating, Ventilation, Air Conditioning and Refrigeration

**Program Units:** 90 Units

**Division:** Apprenticeship

**Proposing Faculty name(s):** Robbie Kunkel

**Type of Program:** \_\_\_\_\_ Transfer or X Workforce

**Type of Award:**

\_\_\_\_\_ Non-transcriptable certificate

\_\_\_\_\_ Certificate of Achievement

X AA/AS Degree

### Documentation checklists:

#### Transfer documentation

\_\_\_\_\_ Catalog Description

\_\_\_\_\_ List of Courses

\_\_\_\_\_ Articulation & transfer data

\_\_\_\_\_ Identification of existing program(s) at CSU/UCs

\_\_\_\_\_ Completer Projections

\_\_\_\_\_ Identification of any additional resources needed to establish program (i.e. faculty, equipment, etc.)

#### Workforce documentation

X Catalog Description

X List of Courses

X Completer Projections

X Labor Market information

X Identification of any similar program(s) in the area (NONE)

X Identification of any additional resources needed to establish program (i.e. faculty, equipment, etc.) (NONE)

**Transfer/Workforce Work Group:**

☒ Recommended

☐ Not Recommended

**Comments:**

**Work Group Signature:** 

**Date:** 4-20-16

**Supervising Vice President:**

☒ Recommended

☐ Not Recommended

**Comments:**

**Vice President Signature:** 

**Date:** 4/29/16

**Planning & Resource Committee:**

☐ Recommended

☐ Not Recommended

**Comments:**

**PaRC Signature:**

**Date:**

**Division Curriculum Committee:**

☐ Recommended

☐ Not Recommended

**Comments:**

**Division CC Signature:**

**Date:**

Following the review by the listed committees, this form should be forwarded to the Office of Instruction.

10/22/14



**FOOTHILL COLLEGE**  
**Credit Program Narrative**  
**Associate in Science Degree in Heating, Ventilation, Air Conditioning, and Refrigeration**

**Item 1. Program Goals and Objectives**

The goals and objectives of the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration align with the primary mission of California community colleges, as established in Ed. Code § 66010.4, which mandate that community colleges provide vocational instruction to students and to advance California's economic growth and global competitiveness through education and training that contribute to workforce development. The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration aligns with Foothill College's Institutional Outcomes and directly supports the Computation and the Creative, Critical, and Analytical Thinking rubrics.

The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration at Foothill College serves to align apprenticeship programs with college and university academic tracks as directed by the federal and state government. Foothill College, functioning as the Local Education Agency for the Division of Apprenticeship Standards for the state of California, is collaborating with the Joint Apprenticeship Committee for Plumbing and Pipe Fitting of Sacramento/Yolo Counties, UA Local #447, to offer this degree.

Foothill College is responding to local demand for Pipe Trades workers in numerous industries who require workers in refrigeration, ventilation, heating, and air conditioning by establishing an Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration in partnership with the Joint Apprenticeship Committee (JAC) of the Plumbers and Steamfitters Local #447, located in Sacramento, California. Graduates will be employable as: Service Manager, Facilities Manager, Project Manager, Estimator, HVACR Instructor, HVACR Sustainable Technologies Technician, and Union Business Agent/Business Manager. Students will increase their marketability and employment opportunities.

The program learning outcome for the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration is:

- In compliance with applicable standards and codes, students will demonstrate ability to assess, install, maintain, repair, extend and remove refrigeration, heating, air conditioning, and ventilation systems, including the appropriate electrical/electronic control systems.

Students complete the associate degree through enrollment in the Heating, Ventilation, Air Conditioning, and Refrigeration apprenticeship program at the JAC Training Center, Local #447, of Sacramento and Yolo Counties and through enrollment in the General Education requirements at Foothill College. To apply to the JAC of Sacramento and Yolo Counties, potential students must be at least 18 years of age, be able to perform the work of the trade, present verification of high school completion, either through a high school diploma or GED, demonstrate the ability to read, write, and speak English, and pass a basic mathematics test with a minimum score of 65%. Students that pass the mathematics exam will be given a list of signatory contractors they may contact for sponsorship/employment into the apprenticeship program. The selection, employment and training of apprentices by the JAC of Sacramento and Yolo Counties is without discrimination according to race, color, national or ethnic origin, age, gender, religion, sexual orientation or marital status. Admission to apprenticeship classes is limited to apprentices registered with the California Division of Apprenticeships Standards. This limitation is authorized by the California Labor Code, Section § 3074.3.

Aside from Foothill College's ordinary enrollment fees, there are no additional costs to the student to complete the Associate in Science degree in Ventilation, Air Conditioning, and Refrigeration.

**Item 2. Catalog Description**

The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration program is conducted in partnership with the Joint Apprenticeship Committee Training Center of the UA Local #447 apprenticeship program of Sacramento and Yolo Counties. The apprenticeship program is five years in duration, requiring a minimum of 9,000 hours of on-the-job training and 1,080 hours of classroom instruction. After 5 years of classroom and paid work experience, students are recognized as journeypersons within the



Pipe Trades industry and work to ensure indoor air quality by installing, servicing, and repairing refrigeration equipment and complex air conditioning, heating, and refrigeration units used in various industries in the public and private sectors. Graduates of the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration program will be employable as: Service Manager, Facilities Manager, Project Manager, Estimator, HVACR Instructor, HVACR Sustainable Technologies Technician, and/or a Union Business Agent/ Business Manager in almost any industrial setting, including biomedical laboratories and research facilities, logistics facilities, manufacturing and office complexes, educational institutions, entertainment facilities, and water and waste treatment facilities. Labor Market Analysis indicates increased employment opportunities in the Pipe Trades through 2020. Students earning the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration will increase their marketability and employment opportunities. Admission to apprenticeship classes is limited to apprentices registered with the California Division of Apprenticeships Standards, according to the California Labor Code, Section § 3074.3.

The apprenticeship program, which includes coursework, lab work and on-the-job training, involves learning about the assessment, installation, maintenance, and repair of different types and sizes of pipe systems, using welding and other techniques, control systems, refrigeration and air conditioning systems, effective and safe tool use, material applications, electrical competency, related mathematics & science and storage. The apprenticeship courses required for the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration also meet the requirements for the Certificate of Achievement in Heating, Ventilation, Air Conditioning, and Refrigeration Service Mechanic.

Students are admitted into the apprenticeship program based on obtaining a passing (65%) score on a mathematics exam, which measures the student's ability in math and mechanical reasoning. Students who pass the mathematics entrance exam will be given a list of signatory contractors they may contact for sponsorship into the apprenticeship program.

### Item 3. Program Requirements

Requirements	Course #	Name	Units	CSU-GE	IGETC	Sequence
Core Courses (42.5 Quarter Units)	APPR 150A	Job Safety, OSHA, Mathematics, Heritage & Rigging I	4.5			Yr 1, Fall
	APPR 151	Oxy-Acc, Arc, & Plastic Welding, Soldering/Brazing Certification	4.5			Yr 1, Winter
	APPR 160A	EPA, Customer Service, Refrigeration & Electrical	4.5			Yr 2, Fall
	APPR 161	Air Conditioning, Pneumatic Controls, Instrumentation & Process Controls	4.5			Yr 2, Winter
	APPR 162A	Electrical Troubleshooting, Refrigeration Controls	4.5			Yr 3, Fall
	APPR 162B	Computer Literacy & Pneumatic Controls	4.5			Yr 3, Winter
	APPR 162C	Electronic Controls, DDC Controls	4.5			Yr 4, Fall
	APPR 163	Refrigeration & Hydronics Piping, UA STAR	4.5			Yr 4, Winter
	APPR 167	Start, Test, & Balance	4.5			Yr 5, Fall
	APPR 168	Supermarket Refrigeration	4.5			Yr 5, Winter



<b>Required Major Total</b>	<b>45 units</b>
Completion of Foothill GE pattern	35 units
Transferable electives (as needed to reach 60 units)	10 units
<b>TOTAL UNITS</b>	<b>90 units</b>

**Proposed Sequence: (to include general education courses)**

Year 1, Fall = 10 units  
 Year 1, Winter = 10 units  
 Year 2, Fall = 10 units  
 Year 2, Winter = 10 units  
 Year 3, Fall = 10 units  
 Year 3, Winter = 10 units  
 Year 4, Fall = 10 units  
 Year 4, Winter = 10 units  
 Year 5, Fall = 5.0 units  
 Year 5, Winter = 5.0 units  
**TOTAL UNITS: 90 units**

**Item 4. Master Planning**

The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration aligns with the planned goals of the College and the District because the program serves the regional area in support of workforce development and economic growth. The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration is a new degree, specifically offered in partnership between Foothill College, as Local Education Agency, and the UA Local #447, and monitored by the Division of Apprenticeship Standards. This degree does not duplicate an already-existing program within the Foothill-De Anza district or the surrounding colleges. The courses and programs offered by the Joint Apprenticeship Committee Training Center of the Plumbers and Steamfitters UA Local #447 are unique in scope, specific to local needs, and differ substantially from other Joint Apprenticeship Training Centers serviced by Foothill College in its role as Local Education Agency for the Division of Apprenticeship Standards.

Competition to the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration program at Foothill College primarily occurs from an out-of-state college that offers on-line degrees. Apprentices and recently-graduated journeymen of the UA Local #447 are taking on-line courses at Washtenaw Community College at considerably higher tuition, \$202/credit hour, and incurring other expenses in order to earn an Associate in Applied Science degree in HVACR Sustainable Technologies or Industrial Journeyman. Offering an Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration at Foothill College would well serve the college's primary stakeholders: the students, community partners, and the community at-large.

Local references in support of the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration include all Advisory Committee representatives from the UA Local #447 Joint Apprenticeship Committee Training Center of Sacramento and Yolo counties who strongly support the partnership between the training center and Foothill College due to their understanding of local economic workforce needs and their ongoing contact with apprenticeship students, which provides grounded understanding of their students' short-term and long-term educational goals.

**Item 5. Enrollment and Completer Projections**

Course #	Course Title	Year 1		Year 2	
		Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
APPR 150A	Job Safety, OSHA, Mathematics, Heritage & Rigging I	1	14	1	20
APPR 151	Oxy-Acc, Arc, & Plastic Welding, Soldering/Brazing Certification	1	13	1	20
APPR 160A	EPA, Customer Service, Refrigeration & Electrical	1	14	1	21

APPR 161	Air Conditioning, Pneumatic Controls, Instrumentation & Process Controls	1	14	1	18
APPR 162A	Electrical Troubleshooting, Refrigeration Controls	1	14	1	19
APPR 162B	Computer Literacy & Pneumatic Controls	1	13	1	20
APPR 162C	Electronic Controls, DDC Controls	1	14	1	19
APPR 163	Refrigeration & Hydronics Piping, UA STAR	1	14	1	20
APPR 167	Start, Test, and Balance	1	14	1	20
APPR 168	Supermarket Refrigeration	1	14	1	19
APPT 180	HVACR Star Review and Exit Exam	1	15	1	20

**Item 6. Place of Program in Curriculum/Similar Programs**

The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration does not adversely affect existing programs at Foothill College in terms of competition for students or courses, nor does it take material resources away from other existing programs at the College. The Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration is designed to create pathways for students from Pre-Apprenticeship and Apprenticeship through an associate's degree and potential transfer to a four-year institution. Thus, the students can easily move from the Certificate of Achievement in Ventilation, Air Conditioning, and Refrigeration Mechanic Service to the Associate in Science degree in Heating, Ventilation, Air Conditioning, and Refrigeration. This streamlined approach facilitates the students' ability to readily complete their educational goals and to earn family-supporting wages.

**Item 7. Similar Programs at Other Colleges in Service Area**

There are no similar college programs in existence in the college service area of Foothill College; the partnership with the UA Local #447 Joint Apprenticeship Committee Training Center of Sacramento and Yolo Counties is unique in the college service area.



**Appendix A:**  
**Labor Market Analysis**  
**for Ventilation, Air Conditioning, and Refrigeration Employment**  
**for Sacramento and Yolo Counties**  
**from 2012 – 2022**

Employment Development Department		2012-2022 Occupational Employment Projections												
Labor Market Information Division		Sacramento–Roseville–Arden-Arcade Metropolitan Statistical Area												
Published: December 2014		(El Dorado, Placer, Sacramento, and Yolo Counties Counties)												
SOC Code*	Occupational Title	Estimated Employment 2012**	Projected Employment 2022	Numeric Change 2012-2022 [1]	Percent Change 2012-2022	Annual Average Percent Change	Average Annual Job Openings			2014 First Quarter Wages [5]		Education and Training Levels [7]		
							New Jobs [2]	Replacement Needs [3]	Total Jobs [4]	Median Hourly	Median Annual	Entry Level Education	Work Experience	On-the-Job Training
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	1,500	1,800	300	20.0%	2.0%	30	32	62	\$22.93	\$47,694	7	None	LT OJT
49-3041	Farm Equipment Mechanics and Service Technicians	180	220	40	22.2%	2.2%	4	5	9	\$24.32	\$50,574	7	None	LT OJT
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	710	910	200	28.2%	2.8%	20	20	40	\$25.61	\$53,261	7	None	LT OJT
49-3051	Motorboat Mechanics and Service Technicians	120	150	30	25.0%	2.5%	3	2	5	\$15.83	\$32,916	7	None	LT OJT
49-3093	Tire Repairers and Changers	960	1,160	200	20.8%	2.1%	20	34	54	\$13.24	\$27,542	7	None	ST OJT
49-9000	Other Installation, Maintenance, and Repair Occupations	12,750	15,570	2,820	22.1%	2.2%	282	283	565	N/A	N/A			
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	110	130	20	18.2%	1.8%	2	4	6	\$33.77	\$70,238	7	None	MT OJT
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	1,470	2,130	670	45.6%	4.6%	67	37	104	\$23.30	\$48,467	5	None	LT OJT
49-9031	Home Appliance Repairers	220	270	50	22.7%	2.3%	5	7	12	\$19.48	\$40,518	7	None	MT OJT
49-9041	Industrial Machinery Mechanics	930	1,210	280	30.1%	3.0%	28	27	55	\$28.14	\$58,523	7	None	LT OJT

**Appendix B:**

**Minutes of Advisory Committee Meeting**

**Conferring Approval for Certificate and Degree Program**

**Partnership with Foothill College**





**JOINT APPRENTICESHIP COMMITTEE**  
 FOR THE  
**PLUMBING AND PIPE FITTING INDUSTRY**  
 SACRAMENTO - YOLO DISTRICT  
 8750 Younger Creek Drive  
 Sacramento, California 95828  
 Phone: 916.383.1102 Fax: 916.383.3830



### MINUTES

*January 11, 2016*

*Bob Taylor, called the meeting to order at 5:00 p.m.*

*Employer members present were Larry Cook, Mike Countryman, Jon Pierce and Rod Barbour.*

*Employee members present were Victor Gutierrez, Matt Rotz and Todd Schiavo.*

*Also present were Randy Boatman, William Haley, Bill Whitney, and Claire Donnenwirth*

*The minutes of the previous meeting were submitted and approved.*

### **ACTION ITEMS:**

- *The following apprentice, **Vincent Hamilton**, appeared before the JAC for receiving multiple unfavorable letters. A motion was made, seconded and carried to terminate Mr. Hamilton's apprenticeship.*
- *The following apprentice, **Paul Scarlata-Clark**, requested in writing to withdraw from the program. A motion was made, seconded and carried to grant Mr. Scarlata-Clark's request. His apprenticeship will be terminated February 29, 2016.*

### **NEW BUSINESS:**

- *The committee was made aware of the JAC expenses for March 1, 2016 through April 28, 2016.*
- *The committee approved Foothill's plan to adopt Associates degrees for completing apprentices.*
- *A motion was made, seconded, and carried to approve the Affirmative Action list for the period from February 26, 2016 through April 29, 2016.*

- *The Committee was advised that the next Committee Meeting will be at the JAC Training Center on Friday, February 26, 2016, if needed.*

*Copies of these minutes will be available for Committee Members at the next Committee meeting.*

*Chairman, Bob Taylor, adjourned the meeting at 5:45 p.m.*

A handwritten signature in blue ink, appearing to read "R. Boatman".

*Randy Boatman  
Coordinator, J.A.C.*

RAB:map



## JOINT APPRENTICESHIP COMMITTEE

(As of January 2016)

### MANAGEMENT

**Larry Cook** Feb-90  
Airco Mechanical  
Phone: 916/381-4523  
Email: [larryc@aircomech.com](mailto:larryc@aircomech.com)

**Rick Chowdry** Oct-12  
Intech Mechanical  
Phone: 916.797.4900  
Email: [rick@intech-mech.com](mailto:rick@intech-mech.com)

**Rod Barbour** Jun-08  
Lawson Mechanical Contractors  
Office: 916.381.5000  
Email: [r.barbour@lawsonmechanical.com](mailto:r.barbour@lawsonmechanical.com)

**Jon Pierce** Jul-97  
ACCO  
Phone: 916.520.2100  
Email: [jpierce@accoes.com](mailto:jpierce@accoes.com)

**John O'Connor** Sep-97  
Luppen & Hawley  
Phone: 916/456-7831  
Email: [johno@luppenandhawleyinc.com](mailto:johno@luppenandhawleyinc.com)

### LABOR

**William Haley** Oct-80  
L.U. #447  
Phone: 916/457-6595  
Email: [bill.haley@ualocal447.org](mailto:bill.haley@ualocal447.org)

**Bob Taylor** Feb-09  
L.U. #447  
Phone: 916.834.7473  
Email: [bob.taylor@ualocal447.org](mailto:bob.taylor@ualocal447.org)

**Matt Rotz** Aug-00  
Phone: 916/383-2128  
Email: [mattrotz@comcast.net](mailto:mattrotz@comcast.net)

**Victor Gutierrez** Jun-04  
Phone: 916/212-1673  
Email: [vicg31@gmail.com](mailto:vicg31@gmail.com)

**Todd Schiavo** Apr-12  
ACCO  
Phone: 916.844.5168  
Email: [tschiavo@accoes.com](mailto:tschiavo@accoes.com)

**Harry Rotz** Feb-76  
L.U. #447  
Phone: 916.217.9990  
Email:

**Mike Countryman** Apr-12  
Carrier  
Phone: 916.717.4655  
Email: [mike.countryman@carrier.utc.com](mailto:mike.countryman@carrier.utc.com)

### COORDINATOR

**Randy Boatman** Mar-07  
Phone: 916/383-1102  
Email: [rboatman@447jac.org](mailto:rboatman@447jac.org)

CONSULTANTS

**Claire Donnenwirth**

A.P.M.C.

**Phone:** 916.475.1226

**Email:** [claired@sacvalleyassoc.net](mailto:claired@sacvalleyassoc.net)

**Scott Strawbridge**

Executive Vice President- MCA

**Phone:** 800/640-5152

**Email** [swstraw@aol.com](mailto:swstraw@aol.com)

NAME OF SCHOOL & REPRESENTATIVE

**Foothill College**

**Rob Johnstone**, Director

Economic Development

12345 El Monte Road

Los Altos Hills, CA 94022-4599

650/949-7240

DIVISION OF APPRENTICESHIP STANDARDS (DAS) CONSULTANT

**Eric Elberg**

**Phone:** 916/263-2877

**Email:**



**Appendix C:**

**Declaration of Student Interest**

**by JAC UA Local #447**

**Training Center Board of Directors**



**JOINT APPRENTICESHIP COMMITTEE**  
FOR THE  
**PLUMBING AND PIPE FITTING INDUSTRY**  
SACRAMENTO - YOLO DISTRICT  
8750 Younger Creek Drive  
Sacramento, California 95828  
Phone: 916.383.1102 Fax: 916.383.3830



August 10, 2015

Chancellor's Office  
California Community Colleges  
1102 Q Street  
Sacramento, CA 95811-6539

Dear Chancellor's Office,

Please be advised that an apprentice that earns an Associate of Science degree in the Pipe Trades Industry and can perform at a journey person level and achieves a high standing within Local 447, will have a greater opportunity to stay with his/her current employers and will be in demand to work at any of the over seventy employers signatory to UA Local 447. Thus a survey is not necessary.

When the apprenticeship students can earn a certificate and degree at Foothill we believe the response will be very high and that all students will pursue the Certificate of Achievement and many others will pursue the Associate's degree in their area of expertise. Earning a certificate of achievement and an associate's degree is highly regarded at the PTTC and leads to increased earnings and career advancement for journeyman.

Based on the long-standing interest of the journeyman students to pursue earning college certificates and degrees, our Joint Apprenticeship Committee (i.e. Board of Directors) unanimously voted to recommend/endorse Foothill College's offering these certificates and degrees.

Sincerely,

Randy Boatman  
Coordinator, Local 447 JATC

Robert Taylor  
JATC Committee Chairman