

Program Creation Process Check List

Program Title: Certificate of Achievement in Refrigeration & Air Conditioning Mechanical Service

Division: BSS

Proposing Faculty name(s): Mark Likeness – Foothill P/T Faculty

Type of Program: _____ Transfer or Workforce

Type of Award:

_____ Non-transcriptable certificate

Certificate of Achievement

_____ 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

Catalog Description

List of Courses

Completer Projections

Labor Market information

Identification of any similar program(s) in the area

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

Transfer/Workforce Work Group Comments/Recommendations:

Recommend Approval.

Work Group Signature: _____



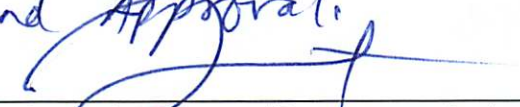
Date: _____

12/11/13

Operations Planning Committee Comments/Recommendations:

VP
This certificate strengthens the existing program.
Recommend Approval.

VP
OPC Signature: _____



Date: _____

12/13/13

Planning & Resource Committee Comments/Recommendations:

PaRC Signature: _____

Date: _____

Division Curriculum Committee Comments/Recommendations:

Division CC Signature: _____



Date: _____

11/26/13

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

11/14/13

FOOTHILL COLLEGE
Credit Program Narrative
Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service

Item 1. Program Goals and Objectives

Foothill College is responding to local demand for Pipe Trades workers in Refrigeration, Heating, and Air Conditioning by establishing a Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service in partnership with the Loyd E. Williams Pipe Trades Training Center (PTTC), located in San Jose, CA. Graduates are recognized as journeypersons within the Pipe Trades industry. Graduates of the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service program will be employable as a: Journeyman Commercial Plumber/Industrial Plumber, Foreman, and General Foreman. Students earning a certificate in Refrigeration and Air Conditioning Mechanical Service will increase their marketability and employment opportunities.

The Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service at Foothill College serves to align apprenticeship programs with college and university academic tracks as directed by the federal and state government. Foothill College and the Loyd E. Williams Pipe Trades Training Center (PTTC) are collaborating in an LEA program, along with the Division of Apprenticeship Standards (DAS) for the state of California.

The program learning outcomes for the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service are:

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

Students complete the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service through enrollment in the Refrigeration and Air Conditioning Mechanical Service apprenticeship program at the PTTC. To apply to the PTTC apprenticeship program, 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 or High School Proficiency certificate, and demonstrate the ability to read, write, and speak English. The selection, employment and training of apprentices by the PTTC is without discrimination according to race, color, national or ethnic origin, age, gender, religion, sexual orientation or marital status. Students are admitted into the PTTC apprenticeship program based on obtaining a passing (75%) score on the "Pipe Trades Entrance Exam," an exam which measures the student's ability in math and mechanical reasoning. Students who pass the entrance exam are selected from an applicant waiting list, the order of which is established by the date the entrance exam was taken and the test score. Admission to apprenticeship classes is limited to apprentices registered with the California Department 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 Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service.

In accordance with the State Chancellor's office, the goals and objectives of the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service 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 Certificate of Achievement program in Refrigeration and Air Conditioning Mechanical Service aligns with Foothill College's Institutional Outcomes and directly supports the Computation and the Creative, Critical, and Analytical Thinking rubrics.

Item 2. Catalog Description

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 of pipe systems, effective and safe tool use, material applications, electrical competency, related mathematics & science and storage. The courses required for the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service also meet many of the requirements for the Associate in Science degree in Air Conditioning and Refrigeration Technology.

The Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service program is conducted in partnership with the Pipe Trades Training Center apprenticeship program. The apprenticeship program is five years in duration, requiring a minimum of 9,000 hours of on-the-job training. After 5 years of classroom and paid work experience, students are recognized as journeypersons within the Pipe Trades industry and work to insure indoor air quality by servicing and repairing all types of refrigeration equipment in all sizes of buildings, complex air conditioning, heating, and refrigeration units used in hospitals, skyscrapers, manufacturing facilities, and research development laboratories. Graduates of the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service program will be employable as: a Commercial/Industrial Journeyman, Refrigeration and HVAC Mechanic, Foreman, General Foreman, and Service Manager in almost any industry. Labor Market Analysis indicates increased employment opportunities in the Pipe Trades through 2020. Students earning a certificate in Refrigeration and Air Conditioning Mechanical Service will increase their marketability and employment opportunities. Admission to apprenticeship classes is limited to apprentices registered with the California Department of Apprenticeships Standards, according to the California Labor Code, Section § 3074.3.

Item 3. Program Requirements

Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service

| Requirements | Dept. Name / Course # | Name | Units | CSU-GE | IGET C | Sequence |
|-----------------------------------|-----------------------|---|-------|--------|-------------------------|-------------------------|
| Core Courses (45.5 Quarter Units) | APPT 151 | Advanced Chillers and Refrigeration | 4.5 | NA | NA | Year 1, Fall & Winter |
| | APPT 152 | Basic Electricity and Refrigeration | 4.5 | NA | NA | Year 1, Spring & Summer |
| | APPT 153 | Mechanical Systems | 4.5 | NA | NA | Year 2, Fall & Winter |
| | APPT 154 | Electrical Controls Fundamentals | 4.5 | NA | NA | Year 2, Spring & Summer |
| | APPT 155 | Advanced Electric Controls | 4.5 | NA | NA | Year 3, Fall & Winter |
| | APPT 156 | HVAC Pneumatic & Electric Controls | 4.5 | NA | NA | Year 3, Spring & Summer |
| | APPT 157 | Industrial Refrigeration & Air-Conditioning Service | 4.5 | NA | NA | Year 4, Fall & Winter |
| | APPT 158 | Advanced Refrigeration & Chillers | 4.5 | NA | NA | Year 4, Spring & Summer |
| | APPT 159 | Start, Test, & Balance: HVAC Systems | 4.5 | NA | NA | Year 5, Fall & Winter |
| | APPT 129 | Special Topics | 2.5 | NA | NA | Year 5, Spring & Summer |
| APPT 130 | Review and Turnout | 2.5 | NA | NA | Year 5, Spring & Summer | |

TOTAL UNITS

45.5 units

Proposed Sequence:

Year 1, Fall/Winter = 4.5 units

Year 1, Spring/Summer = 4.5 units

Year 2, Fall/Winter = 4.5 units

- Year 2, Spring/Summer = 4.5 units
- Year 3, Fall/Winter = 4.5 units
- Year 3, Spring/Summer = 4.5 units
- Year 4, Fall/Winter = 4.5 units
- Year 4, Spring/Summer = 4.5 units
- Year 5, Fall/Winter = 4.5 units
- Year 5, Spring/Summer = 5.0 units

TOTAL UNITS: 45.5 units

Labor Market Analysis: The occupational outlook for the Pipe Trades industry shows strong demand and growth over the next ten years in Santa Clara and San Benito counties. The projected employment of Air Conditioning and Refrigeration journeymen is expected to grow by 29.8% in the period from 2010 to 2020. The California State Employment Development Department expects the number of professionals employed in the Pipe Trades to increase from 1,190 to 2,480. The Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service is an important contribution in efforts to educate California’s workforce and meet local demands for educated professionals in the Pipe Trades. More generally, the National Skills Coalition reported in November, 2007, that jobs in the middle of the labor market, “those that require more than high school, but less than a four-year degree” are in demand, and will remain “robust relative to its supply.” See Appendix A for Santa Clara County Labor Market Information.

Advisory Committee Meeting Minutes and Member list: See Appendix B

Item 4. Master Planning

The Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service 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 Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service is a new degree and does not duplicate an already-existing program within the Foothill-De Anza district or the surrounding colleges.

The only competition to the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service program at Foothill College occurs from two out-of-state colleges that offer on-line degrees. PTTC apprentices and recently-graduated journeymen are taking on-line courses at Washtenaw Community College and at National Labor College at considerably higher tuition, \$194/credit hour and \$297/credit hour respectively, and other expenses in order to earn a Certificate of Achievement in Apprenticeship Completion or Construction Management. Offering a Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service 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 Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service include all Advisory Committee representatives from the PTTC (Appendix B) who strongly support the partnership between the PTTC 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 |
| APPT 151 | Advanced Refrigeration and Chillers | 2 | 24 | 2 | 21 |
| APPT 152 | Basic Electricity and Refrigeration | 2 | 23 | 2 | 22 |
| APPT 153 | Mechanical Systems | 1 | 13 | 2 | 21 |
| APPT 154 | Electrical Controls Fundamentals | 1 | 15 | 2 | 22 |
| APPT 155 | Advanced Electric Controls | 1 | 6 | 1 | 14 |
| APPT 156 | HVAC Pneumatic and Electric Controls | 1 | 6 | 1 | 14 |

| | | | | | |
|----------|---|---|----|---|----|
| APPT 157 | Industrial Refrigeration and Air-Conditioning Service | 2 | 19 | 1 | 6 |
| APPT 158 | Advanced Refrigeration and Chillers | 2 | 19 | 1 | 7 |
| APPT 159 | Start, Test, & Balance: HVAC Systems | 2 | 24 | 2 | 19 |
| APPT 129 | Special Topics | 3 | 25 | 2 | 20 |
| APPT 130 | Review and Turnout | 2 | 25 | 2 | 21 |

Item 6. Place of Program in Curriculum/Similar Programs

The Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service 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 Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service is designed to create pathways for students from Pre-Apprenticeship and Apprenticeship through an Associate in Science degree and potential transfer to a four-year institution. Thus, the students can easily move from the Certificate of Achievement in Refrigeration and Air Conditioning Mechanical Service to the Associate in Science degree in Air Conditioning and Refrigeration Technology. 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 programs in existence in the college service area of Foothill College; the partnership with the Loyd E. Williams Pipe Trades Training Center is unique in the college service area.

Appendix A:
Labor Market Analysis
for Heating, Air Conditioning and Refrigeration Employment
for San Benito and Santa Clara Counties
from 2010 – 2020

| Employment Development Department | | 2010-2020 Occupational Employment Projections | | | | | | | | | | | |
|-----------------------------------|---|---|--------|---------------|---------|----------------|-----------------------|----------------|--------------------|---------------|------------------------|-----------------|---------------------|
| Labor Market Information Division | | San Jose-Sunnyvale-Santa Clara | | | | | | | | | | | |
| January 7, 2013 | | (San Benito and Santa Clara Counties) | | | | | | | | | | | |
| SOC Code* | Occupational Title | Annual Average | | Employment | | Average Annual | | | 2012 First Quarter | | Education and Training | | |
| | | 2010 | 2020 | Numerical [1] | Percent | New Jobs [2] | Replacement Needs [3] | Total Jobs [4] | Median Hourly | Median Annual | Entry Level Education | Work Experience | On-the-Job Training |
| 49-1000 | Supervisors of Installation, Maintenance, and Repair Workers | 1,980 | 2,330 | 350 | 17.7 | 35 | 52 | 87 | N/A | N/A | | | |
| 49-1011 | First-Line Supervisors of Mechanics, Installers, and Repairers | 1,980 | 2,330 | 350 | 17.7 | 35 | 52 | 87 | \$35.92 | \$74,710 | 7 | 1-5 years | None |
| 49-2000 | Electrical and Electronic Equipment Mechanics, Installers, and Repairers | 5,640 | 6,520 | 880 | 15.6 | 91 | 121 | 212 | N/A | N/A | | | |
| 49-2011 | Computer, Automated Teller, and Office Machine Repairers | 1,860 | 2,040 | 180 | 9.7 | 19 | 46 | 65 | \$18.81 | \$39,126 | 5 | None | None |
| 49-2022 | Telecommunications Equipment Installers and Repairers, Except Line Installers | 1,930 | 2,380 | 450 | 23.3 | 45 | 31 | 76 | \$31.43 | \$65,357 | 5 | None | MT OJT |
| 49-2094 | Electrical and Electronics Repairers, Commercial and Industrial Equipment | 630 | 700 | 70 | 11.1 | 8 | 15 | 23 | \$30.56 | \$63,566 | 5 | None | LT OJT |
| 49-2098 | Security and Fire Alarm Systems Installers | 440 | 620 | 180 | 40.9 | 18 | 11 | 29 | \$24.77 | \$51,530 | 7 | None | MT OJT |
| 49-3000 | Vehicle and Mobile Equipment Mechanics, Installers, and Repairers | 6,050 | 7,380 | 1,330 | 22.0 | 133 | 154 | 287 | N/A | N/A | | | |
| 49-3011 | Aircraft Mechanics and Service Technicians | 300 | 360 | 60 | 20.0 | 6 | 9 | 15 | \$27.72 | \$57,665 | 5 | None | None |
| 49-3021 | Automotive Body and Related Repairers | 570 | 710 | 140 | 24.6 | 14 | 14 | 28 | \$22.59 | \$46,985 | 7 | None | MT OJT |
| 49-3023 | Automotive Service Technicians and Mechanics | 3,460 | 4,280 | 820 | 23.7 | 82 | 89 | 171 | \$23.22 | \$48,310 | 7 | None | LT OJT |
| 49-3031 | Bus and Truck Mechanics and Diesel Engine Specialists | 720 | 840 | 120 | 16.7 | 12 | 16 | 28 | \$24.83 | \$51,646 | 7 | None | LT OJT |
| 49-3042 | Mobile Heavy Equipment Mechanics, Except Engines | 340 | 400 | 60 | 17.7 | 6 | 9 | 15 | \$30.03 | \$62,461 | 7 | None | LT OJT |
| 49-3093 | Tire Repairers and Changers | 430 | 540 | 110 | 25.6 | 11 | 11 | 22 | \$14.29 | \$29,714 | 7 | None | MT OJT |
| 49-9000 | Other Installation, Maintenance, and Repair Occupations | 12,220 | 14,700 | 2,480 | 20.3 | 248 | 249 | 497 | N/A | N/A | | | |
| 49-9012 | Control and Valve Installers and Repairers, Except Mechanical Door | 120 | 130 | 10 | 8.3 | 1 | 2 | 3 | \$28.86 | \$60,029 | 7 | None | MT OJT |
| 49-9021 | Heating, Air Conditioning, and Refrigeration Mechanics and Installers | 1,520 | 2,150 | 630 | 41.5 | 63 | 27 | 90 | \$26.96 | \$56,093 | 5 | None | LT OJT |
| 49-9041 | Industrial Machinery Mechanics | 750 | 970 | 220 | 29.3 | 23 | 14 | 37 | \$30.87 | \$64,202 | 7 | None | LT OJT |
| 49-9043 | Maintenance Workers, Machinery | 180 | 190 | 10 | 5.6 | 1 | 3 | 4 | \$23.71 | \$49,309 | 7 | None | MT OJT |
| 49-9052 | Telecommunications Line Installers and Repairers | 750 | 830 | 80 | 10.7 | 8 | 14 | 22 | \$31.52 | \$65,561 | 7 | None | LT OJT |
| 49-9062 | Medical Equipment Repairers | 250 | 360 | 110 | 44.0 | 10 | 7 | 17 | \$26.07 | \$54,228 | 4 | None | MT OJT |
| 49-9071 | Maintenance and Repair Workers, General | 5,990 | 6,890 | 900 | 15.0 | 90 | 110 | 200 | \$22.07 | \$45,903 | 7 | None | MT OJT |
| 49-9094 | Locksmiths and Safe Repairers | 130 | 170 | 40 | 30.8 | 4 | 2 | 6 | \$31.83 | \$66,214 | 7 | None | LT OJT |
| 49-9098 | Helpers—Installation, Maintenance, and Repair Workers | 660 | 770 | 110 | 16.7 | 12 | 30 | 42 | \$15.35 | \$31,938 | 7 | None | MT OJT |
| 49-9799* | Installation, Maintenance, and Repair Workers, All Other | 1,250 | 1,480 | 230 | 18.4 | 23 | 23 | 46 | \$26.80 | \$55,750 | 7 | None | MT OJT |