

# Program Creation Process Check List

**Program Title:** Associate in Science Degree in Plumbing Technology

**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:~~

*<sup>VP</sup> This degree strengthens the existing program.  
Recommend Approval*

~~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**  
**Associate in Science Degree in Plumbing Technology**

**Item 1. Program Goals and Objectives**

Foothill College is responding to local demand for Pipe Trades workers in Plumbing by establishing an Associate in Science degree in Plumbing Technology 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 Associate in Science degree in Plumbing Technology will be employable as: as a Journeyman Commercial Plumber/Industrial Plumber, Foreman, General Foreman, Superintendent, Project Manager, Estimator, Detailer, Building Trades Inspector, Building Trades Instructor, and Union Business Agent/Business Manager. Students earning an Associate in Science degree in Plumbing Technology will increase their marketability and employment opportunities.

The Associate in Science degree in Plumbing Technology 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 with the Division of Apprenticeship Standards (DAS) for the state of California.

The program learning outcomes for the Associate in Science degree in Plumbing Technology are:

- In compliance with applicable standards and codes, students will demonstrate ability to install and remove plumbing systems such as drain waste and ventilation systems, systems for various industrial fluids, public or private water systems and gas piping systems.
- In compliance with applicable standards and codes, students will demonstrate ability to maintain, extend, and/or alter plumbing systems including drain waste and ventilation systems, systems for various industrial fluids, public or private water systems and gas piping systems.

Students complete the Associate in Science degree in Plumbing Technology through enrollment in the Plumbing 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 Associate in Science degree in Plumbing Technology.

In accordance with the State Chancellor's office, the goals and objectives of the Associate in Science degree in Plumbing Technology 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 Plumbing Technology 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, related mathematics & science and storage. The student will learn how to read blueprints, apply layout and install, as well as estimate and repair both supply and waste water systems. The Associate in Science degree in Plumbing Technology builds on the Certificate of Achievement in Plumbing by adding requirements for general education courses and electives offered at Foothill College.

The Associate in Science degree in Plumbing Technology 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, working to protect the health and safety of the community by piping pure water to commercial and industrial buildings for drinking, cooking, washing, cleaning, manufacturing or personal use, and removing waste water after it has served its purpose. A graduate will be prepared to work as a Journeyman Commercial Plumber/Industrial Plumber, Foreman, General Foreman, Superintendent, Project Manager, Estimator, Detailer, Building Trades Inspector, Building Trades Instructor, and Union Business Agent/ Business Manager in a variety of industries including the energy, biopharmaceutical, healthcare, aerospace, construction, housing, water treatment, and food and beverage processing industries. Labor Market Analysis indicates increased employment opportunities in the Pipe Trades through 2020. Students earning an Associate in Science degree in Plumbing Technology 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**

**Associate in Science Degree in Plumbing Technology**

Requirements	Dept. Name & Course #	Name	Units	CSU-GE	IGET C	Sequence
Core Courses (47.5 Quarter Units)	APPT 131	Basic Plumbing Skills	4.5	NA	NA	Year 1, Fall & Winter
	APPT 132	Applied & Related Theory	4.5	NA	NA	Year 1, Spring & Summer
	APPT 133	Beginning Drawing & Design	4.5	NA	NA	Year 2, Fall & Winter
	APPT 134A	Rigging & Layout	2.5	NA	NA	Year 2, Spring & Summer
	APPT 134B	Industrial Safety	2.5	NA	NA	Year 2, Spring & Summer
	APPT 135A	Plumbing Fixtures	2.5	NA	NA	Year 3, Fall & Winter
	APPT 135B	Plumbing Codes	2.5	NA	NA	Year 3, Fall & Winter
	APPT 136	Advanced Trade Math for Plumbers	4.5	NA	NA	Year 3, Spring & Summer
	APPT 137A	Water Systems	2.5	NA	NA	Year 4, Fall & Winter
	APPT 137B	Applied Welding	2.5	NA	NA	Year 4, Fall & Winter
	APPT 138	Advanced Drawing & Blueprint Reading	4.5	NA	NA	Year 4, Spring & Summer
	APPT 139A	Industrial Installation	2.5	NA	NA	Year 5, Fall & Winter
	APPT 139B	Medical Gas Installation	2.5	NA	NA	Year 5, Fall & Winter
	APPT 129	Special Topics	2.5	NA	NA	Year 5, Spring & Summer
	APPT 130	Review & Turnout	2.5	NA	NA	Year 5, Spring & Summer

<b>Required Major Total</b>	<b>47.5 units</b>
Completion of Foothill GE pattern	35 units
Transferable electives (as needed to reach 60 units)	7.5 units
<b>TOTAL UNITS</b>	<b>90 units</b>

**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 = 5.0 units  
Year 3, Fall & Winter = 5.0 units  
Year 3, Spring & Summer = 4.5 units  
Year 4, Fall & Winter = 5.0 units  
Year 4, Spring & Summer = 4.5 units  
Year 5, Fall & Winter = 5.0 units  
Year 5, Spring & Summer = 5.0 units  
Year 6, Fall = 6 units  
Year 6, Winter = 6 units  
Year 6, Spring = 6 units  
Year 6, Summer = 6 units  
Year 7, Fall = 6 units  
Year 7, Winter = 6 units  
Year 7, Spring = 6 units  
Year 7, Summer = 3 units  
**TOTAL UNITS: 90 units**

**Associate Degree Requirements:**

- English proficiency: ENGL 1A, 1AH, 1S & 1T, ESLL 26 or equivalent.
- Mathematics proficiency: MATH 57, 105, 108 or equivalent.

A minimum of 90 units is required to include:

- All Foothill General Education requirements (35 Units)
- Core courses (47.5 Units)
- Transferable Electives (7.5 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 Plumbers, Pipefitters, and Steamfitters 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 Associate in Science degree in Plumbing Technology 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 Associate in Science degree in Plumbing Technology 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 Plumbing Technology 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 Associate of Science degree in Plumbing Technology 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 an Associate in Applied Science degree in Industrial Journeyman. Offering a Associate in Science degree in Plumbing Technology 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 Plumbing Technology 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 131	Basic Plumbing Skills	3	36	2	30
APPT 132	Applied & Related Theory	1	6	3	33
APPT 133	Beginning Drawing & Design	1	6	2	24
APPT 134A	Rigging & Layout	1	13	1	12
APPT 134B	Industrial Safety	1	13	1	12
APPT 135A	Plumbing Fixtures	2	20	1	6
APPT 135B	Plumbing Codes	2	26	1	6
APPT 136	Advanced Trade Math for Plumbers	1	6	1	13
APPT 137A	Water Systems	2	22	1	8
APPT 137B	Applied Welding	2	21	1	8
APPT 138	Advanced Drawing and Blueprint Reading	2	25	2	18
APPT 139A	Industrial Installation	2	25	1	18
APPT 139B	Medical Gas Installation	1	20	1	12
APPT 129	Special Projects	3	25	2	21
APPT 130	Review and Turnout	2	25	2	18

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

The Associate in Science degree in Plumbing Technology 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 Plumbing Technology 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 Plumbing to the Associate in Science degree in Plumbing 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**

Foothill College's partnership with the Loyd E. Williams Pipe Trade Training Center is unique in the college service area. This degree poses no competition with other public institutions of higher education in the college service area.

**Appendix A:**  
**Labor Market Analysis**  
**for Plumbing and Steamfitting 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	
47-0000	<b>Construction and Extraction Occupations</b>	34,740	43,590	8,850	25.5	886	738	1,624	\$27.06	\$56,278				
47-1000	Supervisors of Construction and Extraction Workers	2,630	3,400	770	29.3	77	61	138	N/A	N/A				
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	2,630	3,400	770	29.3	77	61	138	\$39.32	\$81,797	7	>5 years	None	
47-2000	Construction Trades Workers	29,180	36,560	7,380	25.3	738	597	1,335	N/A	N/A				
47-2021	Brickmasons and Blockmasons	200	290	90	45.0	10	4	14	\$28.63	\$59,540	7	None	APP	
47-2031	Carpenters	5,230	6,370	1,140	21.8	114	111	225	\$28.07	\$58,390	7	None	APP	
47-2041	Carpet Installers	950	1,070	120	12.6	12	20	32	\$23.80	\$49,514	8	None	ST OJT	
47-2042	Floor Layers, Except Carpet, Wood, and Hard Tiles	200	210	10	5.0	2	4	6	\$31.02	\$64,532	7	None	MT OJT	
47-2044	Tile and Marble Setters	640	810	170	26.6	16	14	30	\$21.34	\$44,390	8	None	LT OJT	
47-2051	Cement Masons and Concrete Finishers	810	1,130	320	39.5	32	13	45	\$24.70	\$51,368	8	None	MT OJT	
47-2061	Construction Laborers	5,720	7,170	1,450	25.4	145	46	191	\$20.32	\$42,266	8	None	ST OJT	
47-2071	Paving, Surfacing, and Tamping Equipment Operators	310	410	100	32.3	10	6	16	\$18.58	\$38,649	7	None	MT OJT	
47-2073	Operating Engineers and Other Construction Equipment Operators	790	1,020	230	29.1	22	18	40	\$33.64	\$69,968	7	None	MT OJT	
47-2081	Drywall and Ceiling Tile Installers	1,340	1,720	380	28.4	39	37	76	\$28.38	\$59,022	8	None	MT OJT	
47-2082	Tapers	540	730	190	35.2	19	15	34	\$27.71	\$57,630	8	None	MT OJT	
47-2111	Electricians	4,040	5,200	1,160	28.7	116	109	225	\$33.93	\$70,590	7	None	APP	
47-2141	Painters, Construction and Maintenance	2,960	3,610	650	22.0	64	65	129	\$18.71	\$38,905	8	None	MT OJT	
47-2151	Pipelayers	370	420	50	13.5	5	11	16	\$26.33	\$54,779	7	None	ST OJT	
47-2152	Plumbers, Pipefitters, and Steamfitters	1,910	2,480	570	29.8	56	55	111	\$34.72	\$72,210	7	None	APP	
47-2181	Roofers	1,190	1,450	260	21.9	26	24	50	\$26.80	\$55,724	8	None	MT OJT	
47-2211	Sheet Metal Workers	840	1,030	190	22.6	20	14	34	\$33.22	\$69,102	7	None	APP	
47-2221	Structural Iron and Steel Workers	230	300	70	30.4	7	5	12	\$60.98	\$126,832	7	None	APP	
47-3000	Helpers, Construction Trades	1,340	1,830	490	36.6	50	35	85	N/A	N/A				
47-3011	Helpers—Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	180	300	120	66.7	12	5	17	\$18.16	\$37,766	8	None	ST OJT	
47-3012	Helpers—Carpenters	150	250	100	66.7	9	4	13	\$14.74	\$30,668	8	None	ST OJT	
47-3014	Helpers—Painters, Paperhangers, Plasterers, and Stucco Masons	220	280	60	27.3	5	6	11	\$13.04	\$27,124	8	None	ST OJT	
47-3019	Helpers, Construction Trades, All Other	140	200	60	42.9	6	4	10	\$13.78	\$28,660	8	None	ST OJT	
47-4000	Other Construction and Related Workers	1,500	1,710	210	14.0	21	43	64	N/A	N/A				
47-4011	Construction and Building Inspectors	630	710	80	12.7	8	18	26	\$41.87	\$87,088	7	>5 years	MT OJT	
47-4051	Highway Maintenance Workers	280	300	20	7.1	2	7	9	\$24.47	\$50,889	7	None	MT OJT	
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners	180	200	20	11.1	2	5	7	\$22.85	\$47,530	8	None	MT OJT	
47-4799*	Construction and Related Workers, All Other	250	300	50	20.0	5	8	13	\$19.32	\$40,195	7	None	MT OJT	
47-5000	Extraction Workers	100	90	-10	-10.0	0	2	2	N/A	N/A				

49-0000	Installation, Maintenance, and Repair Occupations	25,880	30,930	5,050	19.5	507	576	1,083	\$24.83	\$51,651			
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