

Steamfitting

**STEAMFITTING – STMFT**

Open, Dean  
 Workforce Development and Engineering Technologies  
 Administration Building, Room 121

**Possible career opportunities**

In collaboration with Plumbers and Steamfitters Union Local 159 email: [info@plumbers159.org](mailto:info@plumbers159.org) and Plumbers-Steamfitters-Refrigeration Union Local 342 [www.ua342.org](http://www.ua342.org), DVC offers two five-year apprenticeship programs: steamfitting and plumbing. Apprenticeship is training that is designed to prepare an individual for a career in the skilled crafts and trades. Apprentices develop technical skills, experience the sharing of assignments and see how technical tasks relate specifically with theoretical knowledge and interpretation. Apprentices earn a wage while learning. Enrollment in this program is restricted. You must be registered as an apprentice with the State of California to participate in the program and accepted into the apprenticeship program by our Union partners.

Plumbers-Steamfitters-Refrigeration Union Local 342,  
 Joint Apprenticeship and Journeymen Training Office

935 Detroit Avenue  
 Concord, CA 94518-2501  
 925-686-0730

Plumbers and Steamfitters Local 159  
 1308 Roman Way  
 Martinez, CA 94553  
 800-443-0220 or  
 925-229-0883  
 email: [info@plumbers159.org](mailto:info@plumbers159.org)

**Program-level student learning outcomes**

Program learning outcomes are subject to change. The most current list of program learning outcomes for each program is published on the DVC website at [www.dvc.edu/slo](http://www.dvc.edu/slo).

**Associate in science degree  
 Steamfitting**

Students completing the program will be able to...

- A. discuss safety harness practices during rigging.
- B. apply mathematical formulas for calculating travel on a spool.
- C. demonstrate knowledge of using a band saw.
- D. use proper method in fabricating a copper spool.
- E. explain the responsibilities of a journey person with regards to training an apprentice on the job.
- F. demonstrate use of tubing benders.

This program is offered in collaboration with Plumbers and Steamfitters Union Local 159 and Plumbers-Steamfitters-Refrigeration (HVACR) Union Local 342. Apprenticeship is training that is designed to prepare an individual for a career in the skilled crafts and trades. Apprentices develop technical skills, experience the sharing of assignments and see how technical tasks relate specifically with theoretical knowledge and interpretation. Apprentices earn a wage while learning. Enrollment in this program is restricted. You must be registered as an apprentice with the State of California to participate in the program and accepted into the apprenticeship program by our union partners.

This program prepares students to become steamfitters and includes an introduction to the installation, maintenance, and repair of different types of pipe systems; tool use; material applications and storage; and safety. Upon completion of the program, students will be able to install pipe systems that move liquids or gases under high pressure and use many different materials and construction techniques, depending on the type of project. They will be able to follow building plans or blueprints and instructions from supervisors to lay out the job and work efficiently with the materials and tools of the trade.

To earn an associate in science degree with a major in steamfitting, students must complete 20 out of 31 core courses to meet their individual educational and career goals. In addition they must complete General Education Option 1 (DVC General Education). Students must complete each course used to meet a major requirement with a "C" grade or higher and maintain an overall GPA of 2.5 or higher in the coursework required for the major. The associate in science degree with a major in steamfitting is not a transfer program.

DVC steamfitting students who intend to transfer must consult with a program advisor or counselor to ensure that the requirements for transfer to baccalaureate institutions of their choice are met.

<i>complete at least 30 units from:</i>	<i>units</i>
STMFT-110 OSHA-CPR.....	1.5-2.5
STMFT-111 Trade Mathematics.....	1.5-2.5
STMFT-112 Use and Care of Tools.....	1.5-2.5
STMFT-113 Welding Safety/Plate Welding.....	1.5-2.5
STMFT-114 Oxygen/Acetylene Cutting.....	1.5-2.5
STMFT-115 Pipe Shop I.....	1.5-2.5
STMFT-116 Pipe Shop II.....	1.5-2.5
STMFT-117 Related Science in the Piping Trades.....	1.5-2.5
STMFT-118 Beginning Drawing and Plan Reading for the Piping Trades.....	1.5-2.5
STMFT-119 Advanced Drawing in the Piping Trade.....	1.5-2.5
STMFT-120 Instrumentation 1.....	1.5-2.5
STMFT-121 Instrumentation 2.....	1.5-2.5
STMFT-122 Steam Systems.....	1.5-2.5
STMFT-123 Electricity for Steamfitting.....	1.5-2.5
STMFT-124 Industrial Rigging.....	1.5-2.5
STMFT-125 Beginning AutoCAD.....	1.5-2.5
STMFT-126 Advanced AutoCAD.....	1.5-2.5
STMFT-127 Pumps.....	1.5-2.5
STMFT-128 Tube Bending.....	1.5-2.5
STMFT-131 Pipe Welding 1.....	1.5-2.5
STMFT-132 Welding 5.....	1.5-3.5
STMFT-133 Welding 6.....	1.5-3.5
STMFT-134 Welding 7.....	1.5-3.5
STMFT-135 Welding 8.....	1.5-3.5
STMFT-136 Welding 9.....	1.5-3.5
STMFT-137 Welding 10.....	1.5-3.5
STMFT-138 Orbital Welding.....	1.5-3.5
STMFT-140 Construction Management in Steamfitting.....	1.5-2.5
<b>total minimum required units</b>	<b>30-50</b>

Steamfitting

**Certificate of achievement  
Steamfitting**

Students completing the program will be able to...

- A. demonstrate proper isometric drawing technique.
- B. apply mathematical formula for calculating load weight on pipe.
- C. use the proper method to cut a steel plate, using an OXY/ACT torch.
- D. explain proper brazing technique for copper.
- E. demonstrate proper knot tying.
- F. demonstrate proper preparation for a beveled coupon.

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This program prepares students to become steamfitters and includes an introduction to the installation, maintenance, and repair of different types of pipe systems; tool use; material applications and storage; and safety. Upon completion of the program, students will be able to install pipe systems that move liquids or gases under high pressure and use many different materials and construction techniques, depending on the type of project. They will be able to follow building plans or blueprints and instructions from supervisors to lay out the job and work efficiently with the materials and tools of the trade.

To earn a certificate of achievement, students must complete 14 out of 19 core courses. Students must complete each course used to meet a major requirement with a "C" grade or higher and maintain an overall GPA of 2.5 or higher in the coursework required for the certificate. The courses required for the certificate of achievement also meet some of the requirements of the major for the associate of science degree.

<i>complete at least of 21 units from:</i>	<i>units</i>
STMFT-110 OSHA-CPR.....	1.5-2.5
STMFT-111 Trade Mathematics.....	1.5-2.5
STMFT-112 Use and Care of Tools.....	1.5-2.5
STMFT-113 Welding Safety/Plate Welding.....	1.5-2.5
STMFT-114 Oxygen/Acetylene Cutting.....	1.5-2.5
STMFT-115 Pipe Shop I.....	1.5-2.5
STMFT-116 Pipe Shop II.....	1.5-2.5
STMFT-117 Related Science in the Piping Trades.....	1.5-2.5
STMFT-118 Beginning Drawing and Plan Reading for the Piping Trades.....	1.5-2.5
STMFT-119 Advanced Drawing in the Piping Trade.....	1.5-2.5
STMFT-120 Instrumentation 1.....	1.5-2.5
STMFT-121 Instrumentation 2.....	1.5-2.5
STMFT-122 Steam Systems.....	1.5-2.5
STMFT-123 Electricity for Steamfitting.....	1.5-2.5
STMFT-124 Industrial Rigging.....	1.5-2.5
STMFT-125 Beginning AutoCAD.....	1.5-2.5
STMFT-126 Advanced AutoCAD.....	1.5-2.5
STMFT-127 Pumps.....	1.5-2.5
STMFT-128 Tube Bending.....	1.5-2.5
<b>total minimum required units</b>	<b>21-35</b>

**Certificate of accomplishment  
Steamfitting**

Students completing the program will be able to...

- A. explain the responsibilities of a journey person with regards to training an apprentice on the job.
- B. apply mathematical formula for calculating load weight on pipe.
- C. demonstrate proper knot tying.
- D. use the proper method to cut a steel plate, using an OXY/ACT torch.

This program is offered in collaboration with Plumbers and Steamfitters Union Local 159 and Plumbers-Steamfitters-Refrigeration (HVACR) Union Local 342. Apprenticeship is training that is designed to prepare an individual for a career in the skilled crafts and trades. Apprentices develop technical skills, experience the sharing of assignments and see how technical tasks relate specifically with theoretical knowledge and interpretation. Apprentices earn a wage while learning. Enrollment in this program is restricted. You must be registered as an apprentice with the State of California to participate in the program and accepted into the apprenticeship program by our union partners.

Program content includes an introduction to the installation, maintenance, and repair of different types of pipe systems; tool use; material applications and storage; and safety. Upon completion of the program, students will be able to install pipe systems that move liquids or gases under high pressure and use many different materials and construction techniques, depending on the type of project. They will be able to follow building plans or blueprints and instructions from supervisors to lay out the job and work efficiently with the materials and tools of the trade.

To earn a certificate of accomplishment students must complete five out of seven core courses. Students must complete each course used to meet a major requirement with a "C" grade or higher and maintain an overall GPA of 2.5 or higher in the coursework required for the certificate. The courses required for the certificate of accomplishment also meet some of the requirements of the certificate of achievement and major for the associate of science degree.

<i>complete at least 10 units from:</i>	<i>units</i>
STMFT-110 OSHA-CPR.....	1.5-2.5
STMFT-111 Trade Mathematics.....	1.5-2.5
STMFT-112 Use and Care of Tools.....	1.5-2.5
STMFT-113 Welding Safety/Plate Welding.....	1.5-2.5
STMFT-114 Oxygen/Acetylene Cutting.....	1.5-2.5
STMFT-115 Pipe Shop I.....	1.5-2.5
STMFT-116 Pipe Shop II.....	1.5-2.5
<b>total minimum required units</b>	<b>10.5 – 17.5</b>

## Steamfitting

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### STMFT-110 OSHA-CPR

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section. This class is the same as PLUMB-110.

This course covers the regulations governed by OSHA 30 that provide and recognize safe work practices. The student will receive certification in Cardio-Pulmonary Resuscitation and First Aid.

### STMFT-111 Trade Mathematics

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section. This class is the same as PLUMB-111.

This course covers the approaches to mathematical problem solving used in pipe fitting and metric conversion.

### STMFT-112 Use and Care of Tools

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course presents an introduction to the identification of tools encountered in the industrial environment and the proper use of trade-related tools.

### STMFT-113 Welding Safety/Plate Welding

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course presents an introduction to welding safety and theory. Student will also be introduced to plate arc welding.

### STMFT-114 Oxygen/Acetylene Cutting

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course presents an introduction to oxygen and acetylene cutting and safety. The processes on how to cut for various plate thicknesses and layouts will also be discussed and practiced.

### STMFT-115 Pipe Shop I

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction, to enhance the apprentice's on-the-job training. The use of various pipe and fitting materials and their application; including using pipes and pipe fitting materials to build piping projects based on isometric drawings.

### STMFT-116 Pipe Shop II

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will be introduced to basic isometric drawing and steam systems with copper connections to be made with solder and brazing procedures.

### STMFT-117 Related Science in the Piping Trades

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section. This class is the same as PLUMB-117.

This course covers the scientific and mechanical principles that are basic to the work of the piping industry.

### STMFT-118 Beginning Drawing and Plan Reading for the Piping Trades

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section. This class is the same as PLUMB-118.

This course covers the interpretation of drawings and sketches associated with piping installation.

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### STMFT-119 Advanced Drawing in the Piping Trades

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section. This class is the same as PLUMB-119.

In this course students will Interpret, coordinate and make drawings and sketches associated with piping installation.

### STMFT-120 Instrumentation 1

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will be introduced to the instrumentation includes basic descriptions of processes, loop diagrams and documentation in the instrumentation field.

### STMFT-121 Instrumentation 2

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will be introduced to the second part Instrumentation that will give the students the knowledge of pneumatic controls, liquid level instruments, analyzers and fiber optic signals.

### STMFT-122 Steam Systems

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will be introduced to the properties of saturated steam, traps, boilers and heating systems.

### STMFT-123 Electricity for Steamfitting

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will be introduced to the specialized knowledge and techniques required to make electrical systems operate and function properly for the steamfitter working in the instrumentation field.

### STMFT-124 Industrial Rigging

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will be introduced to identify safe work habits to use with industrial rigging. Load limits, crane ratings, equipment storage and handling are all covered.

### STMFT-125 Beginning AutoCAD

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

Introductory course covering the computer application AutoCAD as it relates to the creation of technical drawings. Course covers two dimensional computer aided drafting of objects in orthographic projection. Hands-on training utilizing a comprehensive overview of the software package and its applications in pipe drafting is stressed. Students are recommended to have a basic knowledge of technical drawing.

### STMFT-126 Advanced AutoCAD

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

Course is designed for students with previous knowledge and experience in using AutoCAD. Course covers surface/wireframe and solid modeling features of AutoCAD for 3-dimensional modeling and photo realistic rendering, customization and optimal application of AutoCAD and utility options for presentation purposes and project management.

## Steamfitting

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### STMFT-127 Pumps

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will complete projects related to the different types, installation, operation and maintenance of industrial pumps.

### STMFT-128 Tube Bending

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will complete projects related to tube bending and installations. Several tubing connection assignments will assist the student in recognizing different tubing connectors.

### STMFT-129 Union Heritage

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This program is designed to review the heritage and traditions of the United Association of Steamfitters and Welders. Students will learn about past and current events with presentations and classroom interactions.

### STMFT-131 Pipe Welding 1

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will learn techniques and methods for beginning welding processes for the steamfitting apprentice. Safe procedures and practices for use of cutting torch and introduction of groove pipe welding.

### STMFT-132 Welding 5

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is an introduction to the techniques and methods for welding processes for the steamfitting apprentice. Students will learn how to identify various welding rods, electrodes, and their applications.

### STMFT-133 Welding 6

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is an introduction to the techniques and methods for welding processes for the steamfitting apprentice. Techniques studied will include string beads on an open grooved pipe weld and proper torch positioning for advanced torch cutting.

### STMFT-134 Welding 7

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is an introduction to the techniques and methods for welding processes for the steamfitting apprentice. The topics will include proper handling of grinders, weld coupons, identification of hazards, and an introduction to square groove welding processes.

### STMFT-135 Welding 8

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is an introduction to the techniques and methods for welding processes for the steamfitting apprentice. Techniques studied will include single vee groove welding in various positions.

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### **STMFT-136 Welding 9**

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course introduces the techniques and methods for welding processes for steamfitting apprentices. Topics include identification of trapped slag using an x-ray image as well as completing a root bead in a welding coupon in 6G position.

### **STMFT-137 Welding 10**

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is an introduction to the techniques and methods for welding processes for the steamfitting apprentice. The topics will include identification of materials, butt-weld root and filler beads, and tools needed for stainless steel welding processes.

### **STMFT-138 Orbital Welding**

1.5-3.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will learn techniques and methods for the Automatic Orbital Welding machine.

### **STMFT-140 Construction Management in Steamfitting**

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

This course is designed to give related technical instruction to enhance the apprentice's on-the-job training. Student will complete projects related to an introduction to the administrative procedures, plans and specifications, scheduling and other forms of communication in the construction field.

### **STMFT-141 Hydrostatic Testing**

1.5-2.5 units LR

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local Union responsible for this section.

This course presents the proper procedures to successfully complete a hydrostatic test on a piping system. Demonstrations of test packages, hydrostatic pump test procedures, pressure and safely securing the testing area will be included.

### **STMFT-150 Topics in Steamfitting**

.3-4 units SC

- Variable hours
- Note: This program is sponsored by the International Brotherhood of Steamfitters and Plumbers and is for apprenticeship only. Course enrollment is limited to those who have been accepted by the local union responsible for the section.

A supplemental course in steamfitting to provide a study of current concepts and problems in steamfitting and related subdivisions. Specific topics will be announced in the schedule of classes.

### **STMFT-299 Student Instructional Assistant**

.5-3 units SC

- Variable hours
- Note: Applications must be approved through the Instruction Office. Students must be supervised by a DVC instructor.

Students work as instructional assistants, lab assistants and research assistants in this department. The instructional assistants function as group discussion leaders, meet and assist students with problems and projects, or help instructors by setting up laboratory or demonstration apparatus. Students may not assist in course sections in which they are currently enrolled.