

Program Information: Facilities Maintenance Technology



"This is definitely an area where women can excel. It takes brain power, it takes organization, and it takes patience."

Approx. Starting Salary:	\$14-15 per hour for an entry-level student who has taken 2-3 classes in the certificate program.
Average Salary:	\$27 per hour with A.S. degree and three years experience. \$33-\$37 per hour with A.S. degree and six years experience.
Average Wage at Placement:	\$15 per hour for graduates without work experience. \$19-\$24 per hour for graduates who have had work experience while they were in school.
Placement Rate:	The demand in this field is quite high, and even students with just two to three classes in the program can find employment in an entry-level position.
Labor Market:	The labor market for Facilities Maintenance Technology professionals fluctuates depending on the commercial real estate industry and in the economy in general. Given the overall high building rates in California, any slowdowns are expected to be temporary. Special opportunities for women may be available due to the building boom in condominiums and resulting maintenance requirements.

Career Information

Career Path: Depending on their experience level, graduates often begin in entry-level positions, where they are exposed to a broad range of tasks and responsibilities. As they learn and apply new skills after three to five years, they may move into lead positions. In larger settings, management opportunities may also be available. Some students who enter the facilities maintenance field later move into work as biomedical technicians in hospitals, where a higher percentage of women are currently employed. Some students who already hold down a facilities maintenance position may also enter the program to learn more about the field and enhance their skills on the job.

Nature of the Work: Entry-level facilities maintenance crew members may do a little of everything. Initial tasks might include changing filters, checking oil levels, looking for pumps that have shut down, checking for broken equipment, greasing motors and bearings, changing the fluorescent bulbs, working with toilet flushometers (a device for flushing toilets that uses less water), painting, carpentry, and plumbing. Crew member with more highly developed skills may advance into more complex projects including leadership and project management roles.

On a larger building crew, workers tend to specialize in areas such as electronics (handling fire alarms and communications), electrical (handling power distribution systems), or with heating, ventilation, air conditioning, and refrigeration (HVACR). Workers may also handle chemicals used for cleaning and other maintenance tasks.

Work Environment: Any industry that has a building, even if it is a vacant location, may require facilities maintenance staff. The positions available are quite varied in nature. Some people may work at a computer operating remote building management control devices, which regulate energy requirements and building environments. Others might punch tubes out of the condenser, which is a very dirty job. Since all of the building systems require maintenance, hands-on work could include electricity, plumbing, communications systems, fire alarms, heating, air conditioning and ventilation equipment, and landscaping.

Work locations may include outdoor rooftop areas, outdoor maintenance and landscaping areas, upper and lower mechanical rooms (fans, boilers, hot water heaters and pumps), and indoor locations where carpentry, plumbing, light electrical, and other tasks are performed.

In-house crew members remain at a single location, while technicians who work for installation and repair companies may be dispatched to several building locations during the course of their day.

Specific Jobs Available to Graduates: Graduates of both the certificate and A.S. degree have many career alternatives:

The following list indicates fields which may be open to graduates of SD Mesa's GIS program:

In-house facilities maintenance staff in commercial building (On a larger crew, specialization in a particular craft such as electrical, communications, HVACR, or plumbing is likely)

Residential facilities maintenance, including condominiums

Installer or repair person for a service company

Salesperson for building systems and equipment

Administrator taking service calls and arranging repairs in commercial real estate or residential facilities

Initial job opportunities with the A.S. degree and a certificate are comparable, although a degree may add to the potential for promotions. Those with degrees and a few years experience also will be asked to serve as leads, oversee jobs, and define the scope of work for projects. The degree also makes graduates more competitive for eventual management jobs and for the teaching profession.

Industries Employing Graduates of this Program:

Several industries employ graduates of the Facilities Maintenance Technology program:

Any company with large buildings that require maintenance, including both commercial and residential buildings

Service industries which install or repair equipment in buildings

Industries which sell HVACR, plumbing, communications, electrical, and other equipment used in large buildings

Construction industry

Real estate companies which manage large properties

San Jose City College (SJCC) has developed strong relationships with industry partners via its advisory board, former students who are now employed at companies, and local unions. Graduates of the HVACR and Facilities Maintenance Technology programs at SJCC have obtained employment with Equity Office, Cold Craft, Inc., the Morgan Hill Unified School District, Wyse, Telewave Inc, BO Enterprises, East Side Union High School, Xilinx Semi Conductor, the Veteran's Hospital of Palo Alto, Golden Gate Mechanical, AAA Furnace & Air Conditioning, Alton Air & Heating Inc., Pacific Cooling and Heating, Cushman and Wakefield, EBay, Jones Lang LaSalle, and the cities of San Jose, Los Gatos, and Hayward.

Course Information

Course Description:

Degrees or certificates offered:

Certificate of Achievement Level 3 in Facilities Maintenance Technology (36 units)

A.S. degree in Facilities Maintenance Technology (61 units)

This course prepares graduates to install, operate, monitor, maintain and troubleshoot mechanical and electrical equipment in large commercial facilities ranging from operating rooms, hotels, commercial and residential buildings to clean rooms.

Content covered in basic instruction (40 units):

Electrical Principles for Air Conditioning/Refrigeration
Refrigeration Principles
Air Conditioning Work Experience
Air Conditioning Control Systems
Introduction to Facilities Operation
Electrical/Electronic Systems
Boiler Procedures

Introduction and Intermediate Programmable Logic Controllers
Introduction to Industrial Electronics and Controls
Low and High Pressure Boilers
Math for Technicians
Construction Blue Print Reading, Estimating, Codes & Specifications
Introduction to Computer Information Systems

Visit the Facilities Maintenance Technology website and view the course catalog for more information.

Prerequisites:

This program has no prerequisites.

Hours Offered:

The Facilities Maintenance Technology program offers an accelerated day program, with three classes offered three days a week from 8:30 a.m. to early afternoon. Evening classes are always available. There are also occasional afternoon classes in the major.

For those students pursuing a degree, many general education courses are offered online and on weekends. Class offerings vary by semester.

Length of Program:

The certificate program requires 36 units.

Most students complete the program in two years, but it can be finished sooner with the accelerated program.

The A.S. degree program requires 61 units.

Most students complete the program in two years, but it can be finished sooner with the accelerated program.

"The facilities maintenance industry is growing by leaps and bounds - trying to keep skilled personnel ready, available and trained in its diverse facility applications. This program provides women the opportunity to enter into a field that has massive growth potential - not limited to just maintenance of facilities but future inclusion into automated building systems, safety and industrial hygiene and then into management after your years of experience and education prove invaluable. Women will find a variety of daily responsibilities, from simple to complex, which will catalyze them on their professional career path."

- Steve Mansfield, Instructor

Program Contact Information

Instructor Information:

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Financial Aid Contact

Dennis Matsumoto, Financial Aid Specialist
Student Center SC103
2100 Moorpark Avenue
San Jose, Ca 95128
(408) 288-3741
sjccfa@sjcc.edu

Tutoring Contact:

Priscilla Muñoz, Supervisor
Learning Resource Center
Room L-105
2100 Moorpark Avenue
San Jose, CA 95128
(408) 298-2181 X 3312
<http://sjcc.edu/Library/LRC1.shtml>

Tutoring Center Hours:

Mon-Thurs:8:30 a.m. - 9:00 p.m.
Friday:8:30 a.m. - 1:00 p.m.

Academic Counselor Contact:

Marc Sola
Counseling Center
Student Center, SC-200
408.298.2181 X 3634
marc.sola@sjcc.edu
<http://sjcc.edu/StudentServices/Counseling/default.asp>

Job Placement Contact:

Pat Greene, Job Placement Specialist
Job Placement Center
Room SC-216
2100 Moorpark Avenue
San Jose, CA 95128
(408) 288-3783
patricia.greene@sjcc.edu
<http://www.sjcc.edu/StudentServices/Jobplacement/>

CalWomenTech Library Contact:

Marjorie Rico
Sr. Division Administrative Assistant
Division of Applied Science
Room 308-A
2100 Moorpark Avenue
San Jose, CA 95128
(408) 288-3781

CalWomenTech Library Hours:

Mon - Fri:8:00 a.m. - 5:00 p.m.

Career FAQs

Occupational outlook. **Are employers hiring for jobs in this area?**

Employers are hiring in this area, and students who obtain entry-level employment while they are in school develop solid skills by the time they graduate, which makes them more competitive for job openings. In addition, many new positions are opening due to the growth in condominium construction throughout the state. Graduates of the SJCC program have found work at Equity Office, Cold Craft, Inc., the Morgan Hill Unified School District, Wyse, Telewave Inc., BO Enterprises, East Side Union High School, the City of Los Gatos, the City of Hayward, Xilinx Semi Conductor, the Veteran's Hospital of Palo Alto, Golden Gate Mechanical, AAA Furnace & Air Conditioning, Alton Air & Heating Inc., Pacific Cooling and Heating, Cushman and Wakefield, EBay, Jones Lang LaSalle, and the City of San Jose.

Technology background. **Can I pursue a career in this field without a background in technology?**

Yes you can! You will learn the technology you need during your program. It does help to have basic computer skills so you are comfortable using a computer to complete your assignments.

Accessibility for women. **Isn't Facilities Maintenance Technology a tough field for women to break into?**

Women who enter facilities maintenance technology with a good attitude and a willingness to learn should have no problem breaking into this field. It's true that more men than women work in this field today, but that is changing. San Jose City College has made a special effort to recruit and retain women to meet the growing demands in facilities maintenance technology. Explore this website for success stories of role models, e-mentoring, and opportunities to network with women in technology fields.

Some women enter the field after they've worked at related jobs, such as handling service calls for a commercial real estate company. The program gives them the skills they need to hire and supervise the appropriate skilled contractor for the job.

Receptivity to hiring women. **Will employers hire women into male-dominated technology areas?**

Absolutely! This is a wide open field for women, and many employers are happy to hire women as Facilities Maintenance technicians. Female graduates of the SJCC program have found work at Equity Office (which owns and operates class A office buildings in multiple markets) and Cold Craft, Inc. (a climate control company in the Bay Area). Other graduates have obtained work with local school districts, city governments, hospitals, real estate companies, mechanical and Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) companies, and other corporations with large buildings which require maintenance. We have many employers involved in the CalWomenTech Project. Visit E-Jobs for companies specifically looking to hire women.

Jobs available. **What kinds of jobs can I get with a certificate and with an A.S. degree?**

Graduates of both the certificate and A.S. degree qualify for jobs as:

- Commercial facilities maintenance technician
- Residential facilities maintenance technician
- Installer or repair person for a service company
- Salesperson for building systems and equipment
- Administrator taking service calls and arranging repairs in commercial real estate or residential facilities.

Job opportunities with an A.S. degree and a certificate are comparable, although a degree opens the door for jobs with leadership responsibilities and promotions.

Salaries. What kind of salary can I expect?

Students with just two or three courses in the Facilities Maintenance Technology program can expect to earn \$14 to \$15 per hour at entry-level jobs in the field. Graduates without work experience can also expect an hourly rate of \$15. New graduates of the certificate or A.S. degree with related experience can expect to earn \$19 to \$24 per hour. The average salaries for facilities maintenance technicians range from \$27 to \$37 per hour with up to six years of experience.

More information. Where can I learn more about technology careers and what they're like for women?

You'll find a great deal of information on this website about women in technology careers. For starters, you can find a female mentor at e-mentoring, join our e-mail list for women students at San Jose City College, network with other women at a Women in HVACR meeting, and read success stories about other women in this and related fields.

You could also check out websites for the labor unions involved in facilities maintenance: plumbers, pipefitters and sheetmetal workers (who tend to work more on construction projects), and stationary engineers (who tend to work inhouse) Visit the state of California's Division of Apprenticeship Standards to explore possible apprenticeship programs and visit websites for unions in your local area.

Academic FAQs

Math skills. **How much math do I really need?**

There are no math prerequisites for the Facilities Maintenance program. However, it does help to have basic math skills, including algebra. If you're concerned about refreshing your math skills, SJCC has an array of refresher math courses to get you up to speed. You can find out exactly where you stand in math by taking an assessment test from the Testing Center at SJCC, which will help you and your counselor decide if you need to enroll in a math class.

You may also borrow software from the CalWomenTech Learning Library that helps you develop spatial reasoning, problem solving and math skills.

Technology skills. **How can I prepare for the program if I don't have a background in technology?**

You don't need a background in technology to enter this program. However, developing computer skills before you enter the program will help make your first days in class go smoothly.

Also, studies show that improving spatial reasoning skills can help women increase their academic achievement. You may want to visit the CalWomenTech Learning Library to check out resources such as software that can help you learn these and other important skills.

Course required. **How can I find out what courses I need to take for the Facilities Maintenance Technology program?**

Visit the Facilities Maintenance Technology program at the San Jose City College website for general information about the courses you'll need for both the certificate and A.S. degree program. You can also call the Facilities Maintenance Technology Department at (408) 298-2181 x3671 and ask for the major sheet from the college catalog.

Length of program. **How long will it take to complete this technology program?**

The Facilities Maintenance Technology certificate program takes most students about two years. Most students complete the A.S. degree in about four years, especially if they are working while they are attending classes. Many students find that holding down a facilities management job while in the program gives them a great way to apply the lessons they're learning in class.

High school preparation. **Can I prepare myself for a technology program at SJCC while I'm still in high school?**

There are no specific prerequisites for the Facilities Management Technology program. However, it is important to have solid reading, math (through algebra) and computer skills when you enter the program, since you'll need basic proficiency in these skills to complete your studies and work in the field. Chemistry and physics at the high school level are also helpful.

Weight-lifting requirements. **How can I prepare myself physically to meet the weight-lifting requirements for a job as a Facilities Maintenance Technician?**

Typical jobs in facilities maintenance require that individual workers lift up to 35 pounds; anything over that limit would require a second person to help with the lift. Students thinking about a career in this area should stay active and maintain their physical fitness. Female students in particular may want to focus on increasing their upper body strength via a gym or the school's Physical Education courses to increase their ease and safety in lifting.

Women's Success Stories



CHRIS JONES

Age 48, Caucasian
Senior Controls Programmer, CEO
Founder, Digital Control Solutions, Inc.

"This is definitely an area where women can excel. It takes brain power, it takes organization, and it takes patience."

Career Quick Look

Salary:	\$70K-\$90K per year	Education:
Years in Field:	25 years	A.S. degree, Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) from San Jose City College (SJCC)
City/State:	Aromas, California	

Getting Started: When she was a little girl, Chris Jones' older brothers often asked her to assist with their car projects. This may have sparked her interest in mechanical devices. In high school she was the only female to sign up for auto shop. She found she enjoyed working in a hands-on environment which involved troubleshooting and solving mechanical problems. When she graduated from high school in 1977, she entered San Jose City College and enrolled in the solar technology department. Her courses included heating, air conditioning, and electrical, and since solar technology did not provide many employment opportunities at that time, she began to move toward HVACR.

She went to work part-time for a company that sold air conditioning supplies while she was in school, and later became their sole outside sales representative. During this period her interests were ultimately drawn back to technical challenges. She went back into the field as a mechanic. From 1982 to 1984, she worked for a controls company, G.J. Yamas, in South San Francisco. She graduated from San Jose City College in 1983 with an A.S. degree in Air Conditioning and Refrigeration. She also got her journeyman card in 1984 after a 4 year apprenticeship program, and was the first woman to achieve this status in the air conditioning service division.

On July 1, 1984, Chris was given a baby shower by the service department at G.J. Yamas, and was driven home by her then boss/mentor to begin her life as a homemaker and mother of 2 daughters. Although she didn't work in the field for a while, she stayed informed about the industry through her husband's mechanical contracting company. She also learned to use a computer during this time. Once her children became more independent, Chris studied for and obtained certification as an energy analyst, helping companies and home owners to meet the requirements spelled out by Title 24, the energy building code for the state of California. She started a small business doing energy analysis while her children were in school, and later worked for another company part time. In 1998, she returned to the controls industry, where she was employed until she started her own digital controls/energy management business, Digital Control Solutions, in Gilroy in 2003. She now functions as the CEO and Senior Programmer and continues to build her company.

Education: Chris Jones began attending San Jose City College right after high school. Although her initial focus was solar technology, she soon moved into HVACR, working part-time while she took courses. "Our lab at SJCC prepared us to troubleshoot problems hands-on, to actually have our hands touching meters and pieces of equipment we'd see in the field, so it wasn't a big shock. When I got out there I felt comfortable with what I was looking at," says Chris.

Her primary instructor at the time, Jerry Hurwitz, helped students find summer jobs to get hands-on experience and find out if they really liked and wanted to pursue this field. "Jerry went well above what any instructor would do to help people make sure they were on the right track. The program prepared you for real life." Because of the flexible hours,

Chris was able to work while she took classes. She met her husband through her summer job as a helper at a mechanical contracting company.

Chris has also continually taught herself how to work with specific software programs that control energy use and environments. She still relies heavily on her HVACR education at San Jose City College to understand and troubleshoot the mechanical equipment which this software controls and monitors.

Greatest Professional Achievement: In addition to having started her own business, Chris is very proud of a project her company completed in December 2007. In collaboration with another company, they provided the digital controls for the first Leadership in Environmental and Energy Design (LEED) certified Platinum school building in the nation, Chartwell School in Seaside. "I was real proud of this project; we got to work collaboratively with a company in Illinois. It was huge." The trade journal Indoor Comfort News ran a story about the project in January. Twenty-five years earlier, Chris had her picture on the cover of the same publication when she was working as an apprentice.

Barriers: Chris recalls a specific incident from her early days in the field when her male colleagues didn't take her seriously because of her age and gender. "It was out at the Lockheed Space Telescope Building. I had three men in suits and contractors all looking at me because I was telling them the fans were going backwards. Here's this little 20-year old telling them the fans were going backwards. It was quite a fight to get them to listen to me. Ultimately they did." "It's a wonderful trade, but it's still a male-dominated trade, and if you come in with an attitude you'll get attitude back. If you're not a team player, you're not going to make it," she cautions.

Working with Men: Chris has always been comfortable working in a male-dominated field. Perhaps it began with older brothers who often asked her to "hold this flashlight, or pump the brake" as they worked on projects. Currently, she has just one female employee at her two-person company. She continues to work with many male contractors and installers. To this day Chris still keeps in touch with several of the men she worked with 25 years ago.

Advice for Women: Chris suggests for female students to enter this field if they find it interesting. "Do it for yourself. Don't do it to please somebody else. Do it because you want to be there and because you enjoy it," she says. Chris also encourages women entering the field to seek out answers to their questions. "Be yourself. Everyone is there to learn. If you don't know the answer, chances are someone else probably doesn't know it either, and they're just too scared to ask. So don't hold back. Make sure you demand the education you need."

"This is definitely an area where women can excel. It takes brain power, it takes organization, and it takes patience. A lot of my male counterparts can't sit still long enough to look at anything. They've got to be off doing something. They get frustrated by sitting in front of a computer and observing that the program is performing as expected. It can be tedious."

Typical Workday/Environment: In her role as CEO and Senior Programmer at her two-person company, Chris designs and delivers digital controls to manage mechanical systems such as heating and air conditioning in homes and commercial buildings. Her company provides these services for smaller contractors and electricians who don't have control divisions in-house because they're too small to make it cost effective. Chris's company does the design work and wiring diagrams, programming, and layout and builds the panels. Then, they hand it off to the contractor to install. Once installed, they make sure it works - since much of what they do is Internet-based, Chris and her employee are often able to do this from their office without visiting the site by gaining access to the controls via a password to a computer at the site.

Her company is located in a converted shop. An average day might include meeting with potential clients, receiving blueprints, doing a "Take Off" and putting a bid together, or submitting drawings. She may also work on developing wiring schematics, programming, and testing for existing clients. She orders parts, builds electrical panels, and may visit sites or work remotely to roll out systems. She responds to client's' and installers' questions and troubleshoots problems on existing systems. She also pays bills, orders parts, and takes care of other administrative and management functions.

The dress code is casual: Chris and her colleague wear yoga pants and sweat shirts when they're not meeting with clients. When they deliver a training program to a client, they wear jeans and polo shirts with their company name and logo.

Career Ladder: An entry-level controls technician doing programming could earn \$35K to \$40K a year, and with advancement might earn up to \$60 to \$70K. Senior programmers with years of experience can earn between \$70

and \$90K plus a year. Supervising other employees can add to salary levels, as can union membership. There are many facets of the controls field other than programming: some people enter the controls field as installers, or work for a company like Intel or a school district where they monitor the energy management systems. Some people who work in controls have mainly computer experience and don't understand how HVAC systems work. Chris believes that it is better to understand the mechanical systems that you are controlling before becoming a controls technician or software programmer.

Professional Associations: None at present.

Hobbies: When time permits, Chris enjoys going to the mountains, where they have a small getaway, camping, fishing and hiking.

Women's Success Stories



GAIL MATHIS

Age 60, Caucasian
 Maintenance Supervisor
 Employed by San Jose/Evergreen Community College District

"Basically, you just have to make sure you show the men that you'll do what they'll do, and that you don't think you should have special treatment. Show them that you're not afraid to get dirty. Everything has always been fine."

Career Quick Look

Salary:	\$65K - \$90K per year	Education:
Years in Field:	24 years	San Jose City College, Certificate of Completion, Air Conditioning. Graduate of Air Conditioning Apprenticeship program at Hewlett-Packard
City/State:	Saratoga, California	

Getting Started: When Gail Mathis finished high school, she worked in a variety of manufacturing jobs, including stints at Velcon Filters, Coca Cola Bottling, and the now-defunct Container Corporation. In 1979, she was hired as an assembly worker on the line at Hewlett-Packard and soon moved into spray painting parts. Out of concern for paying for the education of her young son, Gail decided to seek work with better income potential and she knew that a career in the trades would bring her the financial rewards she sought.

She had always been mechanically inclined, so when she learned that Hewlett-Packard had an apprenticeship program for air conditioning mechanics, she signed up. Her boyfriend at the time was an electrician, and he provided her with encouragement and support. While still working at Hewlett-Packard, she completed the four-year program by taking classes in the evening at San Jose City College and a local vocational school. The state-approved program required 9000 hours of work documented in different trades, and through it Gail also achieved journeyman status and completed a certificate program.

As a part of the program, Gail moved into a Heating, Ventilation, and Air Conditioning (HVAC) apprentice role at Hewlett-Packard and continued with the company for ten years. Since Hewlett-Packard was not promoting HVAC mechanics into management positions at the time, she moved on to a job as a lead HVAC mechanic at Sun Microsystems, where she worked for five years until they outsourced their maintenance department. For a couple of years, she managed the outsourced program for Sun, supervising multiple tradespeople working to fulfill the specifications of the maintenance contract.

After leaving Sun Microsystems, Gail took on a position as Director of Operations for Vallco Fashion Park, supervising all operations for the shopping center for two years. Over the next 12 years, she also held down building maintenance management positions at Read Right Corporation, Adobe Systems (through Cushman and Wakefield), Seagate Technologies, and for Nortel (through Johnson Controls), serving in both in-house roles and with outsourced contractors. She moved to her current position as a Maintenance Supervisor at San Jose City College District in February 2008 because she came to understand that she preferred the in-house role to working for contractors. In her current position, she oversees the HVAC, electricians, painters, locksmiths, and general maintenance workers on both the Evergreen and SJCC campuses.

Education: Gail attended San Jose City College for most of the HVAC courses required for both the Hewlett-Packard air conditioning apprenticeship program and the Certificate of Completion in Air Conditioning, which she completed in

the mid 1980's. While working at Hewlett-Packard, she attended school two or three nights a week to complete the required list of classes for the state-approved program. "All my classes were great. There was only one class I didn't like, a hydronics class. I got through it, but that was the toughest class I had."

"All my teachers were very helpful," says Gail. When she didn't understand something in a lecture, such as the acronyms an instructor used, "He brought in a little definitions book, and that really helped." The classes provided a great deal of hands-on training as well, which she could immediately apply in her work setting.

Greatest Professional Achievement: Gail believes that completing the air conditioning apprenticeship program and the certificate as an air conditioning mechanic were her greatest achievements. She completed the program at a time when the field was almost entirely male. "All my classes were all men. But I've always been kind of a tomboy and hung around my dad and men, so it was fairly comfortable to me and I really didn't have any issues with that," she says. "Basically, you just have to make sure you show the men that you'll do what they'll do, and that you don't think you should have special treatment. Show them that you're not afraid to get dirty. Everything has always been fine."

Barriers: Gail has mostly had very positive experiences with her co-workers, but did have one difficult experience with a young co-worker at Sun Microsystems. He assumed she didn't know anything, challenged her competence, and even sabotaged the equipment at times. Over time, the problems abated. "After they got to know me, and they saw that I'd carry the ten-foot ladder and do whatever they were doing, it got better." She learned later that because she was the only person in her department with journeyman status she had been hired at a higher salary than anyone else and that jealousy may have been a factor in her co-worker's behavior toward her.

Working with Men: With the exception of a few women at Vallco and Adobe, Gail has worked almost exclusively with men throughout her career. She has found them to be quite welcoming, and she has not had problems with either working with men and or in getting the training she needs when she starts a new job.

Advice for Women: Gail's advice to women in this field is: "You have to do what they'll do. I did everything that they did. It was more of a team thing. You have to show them you're not afraid to get dirty. But if you walk around being 'Little Miss Feminine,' and don't want to break your fingernails, you're going to be in trouble." She also recommends that women pay more attention to finding work they really love rather than climbing a career ladder. She has found that joining a professional association has helped her to network and learn more about opportunities in the field.

"This is definitely an area where women can excel. It takes brain power, it takes organization, and it takes patience. A lot of my male counterparts can't sit still long enough to look at anything. They've got to be off doing something. They get frustrated by sitting in front of a computer and observing that the program is performing as expected. It can be tedious."

Typical Workday/Environment: As the Maintenance Supervisor for two college campuses, Gail's workday is quite varied, and may include office work, meetings and travel around campus, hands-on field work, and picking up emergency parts. She supervises 13 mechanics, five at Evergreen, where she spends three days a week, and eight at SJCC, where she spends two days a week. She oversees painters, electricians, locksmiths, HVAC technicians, general maintenance activities - and whatever else comes up. She manages work orders, and is in the process of re-instating a work order system to manage requests from campus staff and students. Although her position is primarily managerial, she helps out the mechanics in the field as needed. Because of budget restrictions, she cannot always ensure that every request will be fixed promptly, so she has to juggle requests and resources, and good communication with customers is essential. "Once they know what's going on, they're usually OK," says Gail. She also responds to e-mail and sometimes meets with people around campus to clarify their needs.

Gail's current job also requires knowledge of and sensitivity to union requirements, something she was not exposed to while working for high tech companies. "You have to go by the book. In this environment, electricians do electrical work, HVAC technicians do HVAC work," Gail says. "In all my other jobs, when you're in maintenance, you do whatever comes up. If you're an electrician and we get a call about a plugged toilet and nobody else is here, you're gonna go plunge it. Here I don't really have that option. That's kind of hard for me. I'm one of those people who likes to do it all." She also has to find positive ways to address resistance to change within the organization and to new procedures.

Gail's dress code is quite casual; she usually wears jeans and tennis shoes.

Career Ladder: The career ladder in facilities management is varied, and depends on the company or facility, whether in-house or contract, the candidate's educational background and experience, and other factors. The salary range for someone new to the field may start between \$40K to \$60K, while someone with extensive experience may earn from \$50K to \$90K and above. Benefits vary depending on the environment and the state of the economy - the recent dot-com failure led to reductions in salaries and benefits overall. In-house management assignments may pay more because of the increased supervision of people required, where outsourced positions may require managing processes rather than people. Gail has landed many management positions with her certificate and Journey-level experience, but having a degree may open doors to promotions at some companies.

Professional Associations: Gail is a member of the International Facilities Management Association, which she finds helpful for networking in her field.

Hobbies: In her free time, Gail enjoys spending time outdoors with her Golden Retriever. She also snow skis, scuba dives (most recently in the Grand Caymans), makes and edits videos, and rides her bike.

Women's Success Stories



STACI ALTEMEYER

Age 36, Caucasian
 Heating, Ventilation, Air Conditioning & Refrigeration
 (HVACR) Service Technician
 Employed by Cold Craft

"I get to wear a uniform that is comfortable, be a hero to the customer, and never have the same boring thing to look forward to tomorrow. I was always good at asking 'why?' and today I know 'how.' The drive is the challenge to find out what the problem is, and the satisfaction is being able to fix it."

Career Quick Look

Salary:	\$16-\$36 per hour	Education:
Years in Field:	6.5 years	San Jose City College, A.A. Degree in HVACR Currently enrolled in Local 104 Building Trades Service Technician Apprenticeship Program
City/State:	San Jose, California	

Getting Started: Staci Altemeyer worked in the restaurant industry for 14 years, starting as a hostess when she was 16, and eventually working her way into restaurant management. Because she wanted to spend time with her children, she left the restaurant business, and started selling puppies, a job which gave her the flexibility she needed to care for her family. Finances were also a factor; she wanted a career where she could earn more. During this time, she began taking courses at Evergreen Valley College and San Jose City College (SJCC). Because her daughter was handicapped and was often ill during this time, it was difficult for her to complete her courses. Eventually, she enrolled in the HVACR program at SJCC because it was across the street from the hospital where her daughter stayed when she was very sick. Entering this program allowed her to complete her courses and still be there for her daughter. Unfortunately, her daughter passed away near the end of Staci's program at SJCC.

Staci continued to sell puppies for another three years, and during the same time she obtained a position at a non-union HVACR company. She learned a lot on this first job, where she did troubleshooting on heating and air conditioning problems, crawled around in crawl spaces and repaired ducts. "What I liked about the service technician job was that I got to work with my hands, and use my brain, and I still got to work with people and talk to people. And the fact that I got to wear a uniform - that was a big one," says Staci.

After three years on that job, she moved on to a union job at Cold Craft, where she worked for one year as a pre-apprentice, and has continued for the past two and one half years as an apprentice, attending the union's required apprenticeship program.

Education: Staci attended San Jose City College and completed her A.A. degree from the HVACR program in 2004. Graduating from this program definitely helped her find her first job in the non-union shop. "San Jose City College did a very good job at preparing me. At the time, I was not working in the field. The whole time I was going to school I had never worked on a unit except for at school. At school, we got to touch equipment, do brazing and soldering, and we made actual refrigerators and did troubleshooting on them. SJCC gave me a very good experience for not being in the field," she says. Staci found the teachers in the Facilities Management program to be very helpful. Staci's boss at Cold Craft recently began teaching at SJCC.

After working in the field for several years, she entered an apprenticeship program supported by her employer, Cold Craft. Although she had already completed the degree program at SJCC, she was required by the union to complete the Local 104 Building Trades Service Technician Apprentice Program in order to complete an apprenticeship and become a Journeyman in her trade. This program requires going to school for two evenings a week at the union hall for five years. Although she is taking similar courses to those in the SJCC program, the apprenticeship requirements have not been a burden. Staci has found the additional schooling quite useful on her job. "You go in to school and say this is what I found, this is what I did, could I have done something different?" She is currently about half way through the apprenticeship program.

Greatest Professional Achievement: Staci counts as her greatest accomplishment the niche she has been able to carve out in the biotech field. "I'm doing work right now in the biotech field as an apprentice that journeymen don't want to do. I work on equipment that most technicians don't know how to work with." An older co-worker who planned to retire worked with her for a couple months and taught her how to work with the specialized biotech refrigeration equipment. When he retired, she took over the account. Recently, she attended a two-day seminar in Chicago to learn more about the equipment. She is pleased to have found a specialty, and believes it gives her job security, since she's the only one trained to work on this equipment in her company.

Barriers: As one of the only women in her classes and at work, Staci says "Being a female, everybody looks at you. You stick out like a sore thumb. If you do well or you make a mistake, everybody knows. That can be good or bad." She reports no problems during her education, except that "In the beginning, guys would try to carry my tool bag for me," says Staci. And with each new class or when a new male started at her work, "the guys would do all the 'manly' work." At first, she resisted their efforts to be helpful. "I had to prove I was as strong as all the guys were, and there were jokes about me being stronger than they were," she says. Now, after being in the field for years, she accepts their help when it's offered and no longer feels the need to prove herself.

Working with Men: "Be yourself," says Staci to women considering working in a male-dominated field. She doesn't like to be around vulgar language or sexual jokes, so when the men around her made such jokes she didn't laugh or join in. "Then everybody got the hint that I didn't appreciate that," she says, and the profanity eventually stopped.

Advice for Women: Staci emphasizes the need for safety for women - and anyone - in this field. At first, she didn't pay enough attention to the safety requirements at her workplace. Recently, she had a couple car accidents, which gave her a bad neck, and also fell off a ladder, sustaining a knee injury. "You've only got one body, and how you treat it is how it's going to treat you. Follow the safety rules, they're there for a reason," she advises.

Typical Workday/Environment: Staci attends weekly meetings at the office, where workers receive safety training, hear office news updates, and report to their co-workers on their successes. At the end of the meeting, they are dispatched to a service call, usually to a residence or business which has no heat or air conditioning. Since Staci only goes into the office once a week, her main office and shop is contained inside her van. Her residential jobs tend to be done in the resident's house, garage, or yard, where commercial jobs are often performed on the roof of the building. She carries a tool bag to troubleshoot problems with heaters and air conditioners. Then she goes to her van to consult her pricing book to see how much it will cost to repair. She develops a quote, presents it to the customer, and attempts to sell the repair. If the repair can't be done that day, she calls the office to get dispatched to her next call.

Each day at 3:30 pm, Staci calls the office and receives the next day's assignments. Since she covers a territory from Gilroy to Palo Alto, some days require a lot of driving between calls. In a typical day, Staci may have two to four calls, each taking one to four hours to complete. The uniform is casual: slacks and a button-down shirt.

Career Ladder: Service technicians starting out on the job may earn \$16 per hour, and with advancement into a journeyman position can increase up to \$36 per hour. Cold Craft offers a good benefit package, with medical and dental insurance for the whole family, a pension, and paid vacations. Although Staci plans to continue in her niche in biotech, there are many other specialty areas, including supermarkets, large commercial establishments, residential, and refrigeration.

She finds biotech work to be very clean, safe, and professional. However, Staci notes that there are only two or three different models of the minus-80-degree freezers used in biotech facilities compared with the multiple models and brands of air conditioners. Because most of this biotech-specific refrigeration equipment is the same, the work with biotech companies can be repetitive.

Professional Associations: None

Hobbies: Staci is a member of a program called Celebrate Recovery through her church, which helps participants recover from "hurt, habit or hang-up." She sponsors six others in the program. She also enjoys the outdoors, parks, camping, and fishing with her eight-year old son and husband.

Women in Facilities Maintenance Tech Websites

Women in HVACR

<http://www.womeninhvacr.org>

National organization with women in the HVACR industry with an annual conference, webinars, membership newsletter and member directory.

Work4Women

<http://www.work4women.org>

On-line support groups for technical/mechanical, information technology, telecommunications, construction, and more. Virtual communities.

Women in Facilities Maintenance Tech ListSrvs

WomenTech Talk

<http://www.womentechworld.org/womentechtalk.htm>

WomenTech Talk lets you meet other women like you through conversations that take place in your email.

WomenTech Talk has nearly 500 women participating and has been in existence since 2000. Join in the monthly discussion panels with experts on topics such as "Developing Male Allies in Your Male-Dominated Field" and "Finding a Mentor."

WomenTechWorld.org

Welcome to the Women's Technician Club

The national online home for women technicians to
connect with each other



WomenTechWorld.org: You're not alone any more. Check out all of the great resources that WomenTechWorld has to offer female technicians, whether you are a network administrator, an air conditioning and refrigeration technician or a female student in a tech major.

WomenTechTalk: Join the exciting WomenTech e-mail discussion group today! There's finally a great way to meet other women just like you through conversations that take place right in your email. WomenTech Talk serves as a source of support and inspiration for over 500 women and has been in existence since 2000.

E-Jobs: Find employers eager to hire women in traditionally male occupations. E-Jobs offers you an Auto Notify feature which gives you email notices when new jobs meeting your criteria have been posted. It also provides the My Checklist feature to save your favorite job opportunities for easy reference.



E-Mentoring: It's hard to be a newbie, but it just became a little bit easier. E-Mentors connects female students in technology/trades with women successfully working in male-dominated fields. E-mentors is for you if you are 18 years of age or older, female, and working in a male-dominated job or career.

Role Model Biographies: Read about women who have succeeded in occupations ranging from auto technician to computer network engineer to detective and more. They are all races and ethnic backgrounds, young and old, and are from urban, rural and suburban communities throughout the United States. These women are just like you!

Institute for Women in Trades, Technology & Science

www.womentechworld.org

National Institute for Women in Trades, Technology & Science

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[WomenTech Educators >](#)**CalWomenTech Project****Background:**

IWITTS was awarded a \$2 million National Science Foundation (NSF) Award to fund the CalWomenTech Project in April of 2006. Through this five-year grant, California community colleges receive expert support and technical assistance to help recruit and retain women into technology programs where they are under-represented.

Eight California community colleges were selected in a competitive process to receive **free** intensive CalWomenTech training and assistance on recruiting and retaining women in technology programs in which they are under-represented, for approximately 3 years. Our focus is terminal associate degrees or certificates in programs for newly emerging industries with jobs that are high skill and high wage, and have a strong connection to employers and local labor market demand.

CalWomenTech Core Strategies:

Tried and true strategies to increase the number of women in CalWomenTech Community College Sites' technology programs and retain them, based on "proven" methods. Our strategies are surefire, easy-to-implement and sites can start to see results the very next semester. See our [WomenTech Digital Library](#) to view the research our work is based on, in addition to our successful track record with community colleges in our national [WomenTech Project](#).

Recruitment Assistance: We develop recruitment posters and flyers (see example on the right) featuring female role models from the site's college as well as a CalWomenTech section of each college's website - both the website content and design (see example on the right).

We provide "free" [WomenTech training](#) on "how to" recruit and retain women and the sites develop a detailed plan with a timeline as part of the workshop. We have been providing this training on a fee basis for over 10 years throughout the US and we've worked in 42 of the 50 states.

Sites receive \$2,000 worth of software from our CalWomenTech Learning Library that enables them to assist students in developing technology building block skills in areas such as [spatial relations](#) and [math](#) that will increase their retention in the classroom.

Sites develop a CalwomenTech Leadership team of ten key

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State & Local Training
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- ▶ [Community College Sites Description](#)
- ▶ [Training and Technical Assistance](#)
- ▶ [Project expertise & project partners](#)
- ▶ [Our Total Quality Management approach](#)
- ▶ [Goals and outcomes/Timeline](#)

[Click here to enlarge sample poster](#)

[Click here to enlarge sample CalWomenTech website draft](#)

players that enables them to showcase their technology program throughout the College. Leadership team members receive a stipend of \$500 yearly. Leadership Team members travel to come to one two-day meeting in the Bay Area annually to meet jointly with the other community colleges in the Project, to share strategies and receive joint training.

We provide on-site WomenTech training and technical assistance and on-line webinars, podcasts, and phone trainings on specialty topic areas such as "how to" develop curriculum examples that appeal to female learning style and interests or how spatial reasoning software has increased retention of female engineering students. Each CalWomenTech site will receive stipends for adjunct faculty to participate as an incentive.

Female students have access to our online community of womentechworld.org and we focus on each site's program career areas. WomenTechWorld.Org includes [e-mentoring](#), [e-jobs](#) job board and [WomenTechTalk](#) email listserv with over 500 members.

IWITTS Brings National Expertise To Your Tech Program:

The [CalWomenTech Project](#) is IWITTS's second grant working with community colleges to increase the number of women in technology, and our third National Science Foundation (NSF) grant. Other successful projects have included The Cisco Gender Initiative and we have worked extensively nationally with NSF Advanced Technology Education Centers in Community Colleges. We have been conducting WomenTech Training nationally on a fee basis for over ten years. [Click Here for More Information on Project Expertise](#)

Project Timeline:

This is a 5-year Project that will end in April 2011.

Current CalWomenTech Sites:

The first four CalWomenTech community colleges that were brought on board in June 2006 are:

- City College of San Francisco Computer Networking and Information Technology Program, with a focus on the new Digital Home Integration Technology certification
- San Diego Mesa College's Geographic Information Systems program
- Cañada College's new 3-D Animation and Video Game Art Program
- El Camino College's Air Conditioning Refrigeration program

The second set of colleges, brought on board in November 2007 are:

- Evergreen Valley College's new Hybrid-Alternative Fuel Program
- Irvine Valley College's Electronic Technology Program
- Las Positas College's Welding and Automotive Programs
- San Jose City College's Facilities Maintenance Technology Program

[Read More about Each College's Program](#)



[Click here to see a sample flyer](#) (pdf)

Endorsements:

"The CalWomenTech Project brings excellent resources to assist us in recruiting and retaining women in our technology programs. An excellent model that other community colleges would benefit from."

*Thomas C. Mohr
President,
Cañada College
CalWomenTech Site, Year 1*

"The CalWomenTech Project provided us with research-based strategies for recruiting and retaining women that were new to us and will greatly enhance our ability to attract and retain women and assist us with improving our program overall."

*Dr. Pierre S. Thiry, P.E., C.C.A.I.
Principal Investigator, NSF
sponsored project iCONS
Instructor, Computer Networking and
Information Technology
Community College of San Francisco
CalWomenTech Site, Year 1*

"The CalWomenTech Project applies research-based, tried and true strategies that provide a road map to recruiting and retaining women in technology. I highly recommend that community colleges apply to be a CalWomenTech Site."

*Dr. Edward J. Leach
Vice President, Services and
Programs
Director, Conference on Information
Technology
League for Innovation in the
Community College*

CalWomenTech Project Goals Ensuring an Effective Project:

The primary goal of the CalWomenTech Project is to increase the number of women enrolled and retained in Science, Technology, Engineering and Math (STEM) education in the 8 selected CalWomenTech community colleges.

[Read more about our goals](#)

Ensuring an Effective Project: our Total Quality Management Model

We've built a Total Quality Management (TQM) approach directly into this project. Throughout the project, we ask for, and incorporate, feedback about our services from our community college team members to make sure we're on track.

[Read more](#)



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"The CalWomenTech Project is solutions oriented: our College has a very doable recruitment and retention success plan along with support on its implementation. We're confident that we'll increase the number of women in our technology programs."

*Dr. Stephanie Rodriguez
Dean, Industry & Technology
El Camino College
CalWomenTech Site, Year 1*

"The CalWomenTech Project assists community colleges with both the nuts and bolts of recruiting and retaining women in technology and bigger picture strategies that will be implemented over time. We highly recommend the CalWomenTech Project to other community colleges."

*Otto Lee
Dean,
School of Business, Computer
Studies, and Technologies
San Diego Mesa College
CalWomenTech Site, Year 1*

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