

# Fire Technology, Academy, and Leadership

*Inland Empire/Desert Region (Riverside and San Bernardino counties combined)*

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*This workforce demand report uses state and federal job projection data developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.*

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## Summary

- Community college fire technology programs prepare students for two middle-skill occupations, collectively referred to as the fire technology occupational group in this report. The occupations in this group are considered **essential critical infrastructure occupations**.
- Employment for the fire technology occupational group is expected to **increase by 9% between 2019 and 2024**. A total of **290 annual job openings** will be available each year over the five-year timeframe.
- The **10<sup>th</sup> percentile hourly wages** for occupations in this group are between **\$21.89 and \$35.49 per hour**. **These wages are above the \$19.94 per hour self-sustainable hourly wage** estimate for a single adult with one child in the Region.
- There were **273 awards issued** from regional community college programs related to fire technology over the last three academic years.
- The COE recommends expanding fire technology and fire academy programs to meet the demand for more firefighters in the Region.
- The COE recommends caution in expanding firefighter programs that lead to the first-line supervisors of firefighter and fire prevention workers occupation due to the low number of annual job openings in the Region.

## Introduction

This report provides data on programs and occupations related to fire technology; the related California Community College programs are:

- Fire Technology (TOP 2133.00)
- Fire Academy (2133.50)

The **fire technology** program prepares students for employment through the instruction of the principles and techniques of preventing, controlling, and extinguishing fires, including firefighter operations, maintenance of fire fighting equipment, fire rescue procedures, and applicable laws and regulations. The **fire academy** program prepares students for employment through studies specific to local and state training requirements for employment and post-employment advancement (Taxonomy of Programs, 2012).

The knowledge, skills, and abilities trained by fire technology programs lead to the occupations listed below collectively referred to as the fire technology occupational group in this report. Both occupations in the fire technology occupational group are considered essential critical infrastructure occupations as identified by the Public Policy Institute of California. This classification of occupations is vital in supporting California's basic economic and safety needs (Bohn et al.). Despite the ongoing pandemic, employment demand should continue due to these occupations' critical nature and social distance ability. Definitions for the occupations listed below are available in the appendix section.

- Firefighters (33-2011)
- First-Line Supervisors of Firefight and Fire Prevention Workers (33-1021)

## Job Opportunities

In 2019, there were 3,336 jobs in the fire technology occupational group in the Inland Empire/Desert Region (IEDR). This occupational group is projected to increase employment by 9% through 2024. Employers are expected to have 1,450 job openings over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 1 displays five-year projected job growth in the IEDR.

*Exhibit 1: Five-year projections for each occupation in the fire technology occupational group, IEDR*

Occupation	2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Firefighters	3,057	3,304	8%	1,320	264	7%
First-Line Supervisors of Firefighting and Prevention Workers	279	316	13%	130	26	~18%
<b>Total</b>	<b>3,336</b>	<b>3,621</b>	<b>9%</b>	<b>1,450</b>	<b>290</b>	<b>8%</b>

Source: EMSI 2020.4

In 2019, there were 37,557 jobs in the fire technology occupational group in California. This occupational group is projected to increase employment by 5% through 2024. Employers are expected to have 15,034 job openings over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 2 displays five-year projected job growth in California.

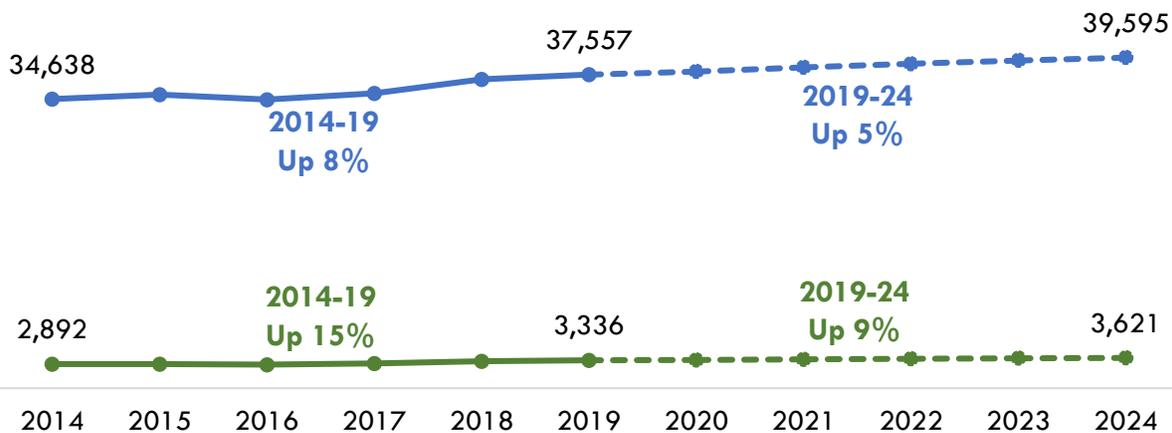
Exhibit 2: Five-year projections for each occupation in the fire technology occupational group, California

Occupation	2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Firefighters	34,290	36,071	5%	13,713	2,743	8%
First-Line Supervisors of Firefighting and Prevention Workers	3,267	3,523	8%	1,320	264	20%
<b>Total</b>	<b>37,557</b>	<b>39,595</b>	<b>5%</b>	<b>15,034</b>	<b>3,007</b>	<b>9%</b>

Source: EMSI 2020.4

Exhibit 3 displays historical (2014 to 2019) and projected (2019-2024) jobs for the fire technology occupational group in the Inland Empire/Desert Region and California. The occupations in this group are expected to grow nearly twice as fast in the Region than the state.

Exhibit 3: Historical and projected jobs for the fire technology occupational group in the Inland Empire/Desert Region (green) and California (blue), 2014 – 2024



Source: EMSI 2020.4

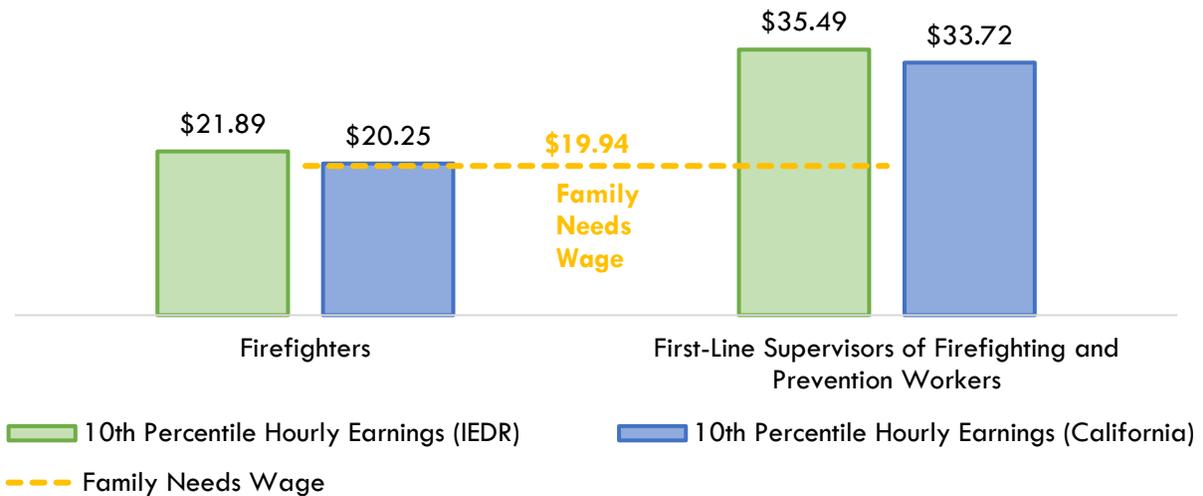
## Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide a self-sustainable level of income. The Family Needs Calculator estimates that a self-sustainable wage for a single adult with one school-age child is \$19.94 per hour or \$41,475 annually in Riverside County, \$19.49

per hour or \$40,539 annually in San Bernardino County (Pearce & Manzer, 2018). For this study, the higher hourly wage requirement in Riverside County is adopted as the self-sufficiently standard for the two-county Region.

The 10<sup>th</sup> percentile hourly wages for the occupations in the fire technology occupational group are above the Family Needs Calculator self-sustainability rate, indicating that 90% of workers in the field earn wages above the self-sustainability rate. Both occupations offer a slightly higher hourly wage in the Region than the state overall. Exhibit 4 displays the 10<sup>th</sup> percentile hourly earnings for each occupation in the IEDR and California. Wages appear to be slightly higher in the IEDR (green) than in California (blue) as a whole.

Exhibit 4: 10<sup>th</sup> percentile hourly earnings for the fire technology occupational group



Source: EMSI 2020.4

According to occupational guides developed by the California Labor Market Information Division, the fire technology occupational group's benefits typically include paid vacation, holidays, sick leave, group health insurance, and retirement programs (Detailed Occupational Guides, 2020).

### Online Job Advertisements

Exhibit 5 displays the number of job online job ads posted during the last year in California, along with the statewide average time to fill for the fire technology occupational group. The average time to fill for

the fire technology occupational group in California is 26 days.

*Exhibit 5: Job ads and time to fill*

Occupation	Job Ads	California Average Time to Fill (Days)
First-Line Supervisors of Firefighting and Prevention Workers	507	30
Firefighters	444	21
<b>Total</b>	<b>951</b>	<b>26</b>

Source: Burning Glass – Labor Insights

## Employers, Skills, Education, and Work Experience

Exhibit 6 displays the employers who posted more than five job ads for the fire technology occupational group in California over the last year.

*Exhibit 6: Employers posting the most job ads for fire technology occupations*

Occupation	Employers
First-Line Supervisors of Firefighting and Prevention Workers (n=452)	<ul style="list-style-type: none"> <li>State of California</li> <li>Orange County Fire Authority</li> <li>Santa Clara County Fire Department</li> </ul>
Firefighters (n=401)	<ul style="list-style-type: none"> <li>San Bernardino County</li> <li>US Forest Service</li> <li>City of Stockton</li> <li>California Conservation Corps</li> <li>Marin County</li> <li>Orange County Fire Authority</li> <li>City of Placentia</li> <li>City of Rialto</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 7 displays a sample of specialized and employability skills that employers seek when looking for workers to fill positions in the fire technology occupational group. Specialized skills are occupation-specific skills that employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job postings may be utilized as a helpful guide for curriculum development.

*Exhibit 7: Sample of in-demand skills from employer job ads*

Occupation	Specialized Skills	Employability Skills
First-Line Supervisors of Firefighting and Prevention Workers (n=397)	<ul style="list-style-type: none"> <li>Fire Protection</li> <li>Budgeting</li> <li>Staff Management</li> </ul>	<ul style="list-style-type: none"> <li>Planning</li> <li>Building Effective Relationships</li> <li>Communication Skills</li> </ul>
Firefighters (n=251)	<ul style="list-style-type: none"> <li>Cardiopulmonary Resuscitation (CPR)</li> <li>Advanced Cardiac Life Support (ACLS)</li> <li>Emergency Medical Care</li> </ul>	<ul style="list-style-type: none"> <li>Physical Abilities</li> <li>Building Effective Relationships</li> <li>Communication Skills</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 8 displays the entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers with "some college, no degree" and an "associate degree" according to the U.S. Census (2016-17) and the real-time minimum advertised education requirement from employer job ads.

*Exhibit 8: Typical entry-level education, educational attainment, and minimum advertised education requirements for the fire technology occupational group*

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Real-Time Minimum Advertised Education Requirement			
			Number of Job Ads	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
First-Line Supervisors of Firefighting and Prevention Workers	Postsecondary nondegree award	57%	269	29%	13%	58%
Firefighters	Postsecondary nondegree award	61%	232	90%	3%	7%

Source: EMSI 2020.4, Burning Glass – Labor Insights

\*Percentage of incumbent workers with a Community College Award or Some Postsecondary Coursework

Exhibit 9 displays the work experience typically required to enter each occupation and the real-time work experience requirements from employer job ads.

*Exhibit 9: Work experience required and real-time work experience requirements*

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of Job Ads	0 – 2 years	3 – 5 years	6+ years
First-Line Supervisors of Firefighting and Prevention Workers	Less than five years	265	23%	44%	33%
Firefighters	None	122	74%	13%	13%

Source: EMSI 2020.4, Burning Glass – Labor Insights

## Certifications

The Office of the State Fire Marshall, the regulatory agency that issues certifications for firefighters in California, developed a certification checklist required for prospective firefighters to complete before becoming a certified firefighter. The checklist of required certifications includes Confined Space Rescue Awareness (FSTEP or IAFF), IS-100 Introduction to Incident Command System (FEMA), IS-700a National Incident Management System An Introduction (FEMA), Wildland Fire Fighter, Hazardous Materials First Responder Operational (FRO), and both the written and skills portions of the firefighter I examination (Cal

Fire, March 2020). Exhibit 10 displays the certifications required by employers posting job ads for the fire technology occupational group in California.

*Exhibit 10: Certifications required by employer job ads for fire technology occupations*

Occupation	Certifications
First-Line Supervisors of Firefighting and Prevention Workers (n=261)	<ul style="list-style-type: none"> <li>• Emergency Medical Technician (EMT) (44 ads)</li> <li>• Firefighter 1 (42 ads)</li> <li>• Fire Inspector 1 (37 ads)</li> </ul>
Firefighters (n=303)	<ul style="list-style-type: none"> <li>• Firefighter 1 (195 ads)</li> <li>• Emergency Medical Technician (EMT) (181 ads)</li> <li>• Paramedic Certification (101 ads)</li> </ul>

Source: Burning Glass – Labor Insights

## Advertised Salary

Exhibit 11 displays advertised salary data from the fire technology occupational group online job advertisements (ads) salary information reveals that employers are willing to pay *firefighters* \$71,000 annually and *first-line supervisors of firefighting and prevention workers* \$101,000 annually, well above the \$42,475 (\$19.94 hourly) required annually for a family of one adult, with a school-age child, to be self-sufficient in Riverside County (\$40,539 annually in San Bernardino County). Consider the salary information with caution since only 54% (513 out of 951) online job postings for these occupations provided salary information. The salary figures are prorated to reflect full-time, annual wage status. Please note that salary figures are prorated to reflect full-time, annual wage status.

*Exhibit 11: Advertised salary information*

Job Title	Number of job postings	Real-Time Salary Information				Average Annual Salary
		Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	
First-Line Supervisors of Firefighting and Prevention Workers	292	6%	11%	25%	58%	\$101,000
Firefighters	221	13%	12%	32%	43%	\$71,000

Source: Burning Glass – Labor Insights

## Specialty Burning Glass Searches

The following sections detail job advertisement demand for specialty fire positions and elements of fire training. The specialty areas include firefighter job function certifications, rescue skills, and leadership positions.

## Firefighter Training

This section analyzes employer demand for various firefighter specialty job functions, such as HAZMAT and Fire Apparatus Driver/Operator, in job ads for the fire technology occupational group over the last 12 months in California. Over this period, there were 951 total ads for the fire technology occupational group.

- **Hazardous Materials or HAZMAT:** The California State Fire Marshall Hazardous Materials First Responder Operational Certificate is a requirement for the Firefighter 1 certification. Despite this, HAZMAT skills were mentioned in only 40 ads over the last 12 months. The low number of ads may be due to the assumption that certified Firefighter 1 candidates already have HAZMAT training and its inclusion in ads would be unnecessary. The employer posting the most ads for HAZMAT skills was the University of California system, which sought well-rounded candidates that could respond to and assist with all potential emergencies on campus.
- **Fire Apparatus Driver/Operator:** Over the last 12 months, 250 job ads mentioned a desire for candidates with fire apparatus maintenance and repair experience. Only ten ads over this period sought certified fire apparatus drivers or operators. Five ads also sought individuals with their Commercial B driver's license. Like other fire positions, an individual must complete the Fire Apparatus Driver/Operator – Pumping Apparatus Certification Task Book before performing a specific job function.

## Fire Rescue

The following section details demand for three rescue modalities found in employer job ads for the fire technology occupational group over the last 12 months in California. Over this period, there were 951 job ads posted for the fire technology occupational group.

- **Water and Boat Rescue:** Water and boat rescue was mentioned in 18 ads over the last 12 months in California, accounting for just under 2% of job ads. The employers posting the most water and boat rescue ads were primarily located in the San Francisco Bay Area, with the City and County of San Francisco and the City of Berkeley posting the most ads.
- **Technical Rescue and Firefighting:** Technical rescue was mentioned in 34 job ads over the last 12 months in California, accounting for over 3% of ads. The employers posting the most ads for firefighter positions that require technical rescue skills are the Orange County Fire Authority and the City of Santa Cruz.
- **Aircraft Rescue and Firefighting:** Aircraft rescue was mentioned in 24 job ads over the last 12 months or approximately 2% of total job ads for the fire technology occupational group. The

employers posting the majority of ads for individuals with aircraft rescue skills are the City of Monterey Fire Department and the Orange County Fire Authority.

## Fire Leadership

The following displays online demand for leadership positions within fire stations and crews. These positions are typically classified as *first-line supervisors of fire fighting and prevention workers* (33-1021). Over the last twelve months, there were 507 online job ads for *First-Line Supervisors of Fire Fighting and Prevention Workers* in California. Below are common job titles associated with this occupation, as well as their frequency in job ads.

- **Chief Fire Officer (Fire Chief):** This job title appeared in 45 ads or nearly 9% of all the *first-line supervisor of fire fighting and prevention worker* ads.
- **Fire Instructor:** This job title appeared in one job ads over the last 12 months in California.
- **Company Officer:** This job title was not found in job ads for fire leadership positions.
- **Fire Command:** This job title was not found in job ads for fire leadership positions.

## Student Completions and Program Outcomes

The following section details student completions and program outcomes recorded in the fire technology (2133.00) and fire academy (2133.50) programs. Exhibits 12 & 14 display annual average completion data for the California Community College fire technology and fire academy programs, based on the most recent three academic years.

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP codes and Region is provided in Exhibits 13 and 15. Dashes indicate there were too few students from which to obtain reliable program outcome information. The outcome methodology is available in the appendix section of this report.

Exhibit 12: 2016-19, Annual average community college awards for the fire technology programs in the IEDR

2133.00 – Fire Technology	Associate degree	Certificate requiring 30< 60-semester units	Certificate requiring 18< 30-semester units	CCC Annual Average Awards, Academic Years 2016-19
Chaffey	16	-	18	34
Copper Mountain	4	1	0	5
Crafton Hills	16	-	-	16
Desert	5	-	4	9
Moreno Valley	15	-	20	35
Mt. San Jacinto	9	4	-	13
Victor Valley	18	-	-	18
<b>Total</b>	<b>82</b>	<b>4</b>	<b>43</b>	<b>129</b>

Source: MIS Data Mart

Exhibit 13: 2133.00 – Fire technology strong workforce program outcomes

Strong Workforce Program Metrics: 2133.00 – Fire Technology Academic Year 2017-18, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2018-19)	3,498	27,464
Completed 9+ career education units in one year (2018-19)	18%	26%
Perkins Economically disadvantaged students (2018-19)	52%	52%
Students who attained a noncredit workforce milestone in a year (2018-19)	-	28%
Students who earned a degree, certificate, or attained apprenticeship (2018-19)	139	1,576
Transferred to a four-year institution (transfers)	20	360
Job closely related to the field of study (2016-17)	71%	73%
Median annual earnings (all exiters)	\$54,358	\$63,336
Median change in earnings (all exiters)	31%	28%
Attained a living wage (completers and skills-builders)	73%	71%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 14: 2016-19, Annual average community college awards for the fire academy programs in the IEDR

2133.50 – Fire Academy	Associate degree	Certificate requiring 30< 60-semester units	Certificate requiring 18< 30-semester units	Certificate requiring 6< 18-semester units	CCC Annual Average Awards, Academic Years 2016-19
<b>Crafton Hills</b>	-	-	-	38	38
<b>Desert</b>	-	-	10	-	10
<b>Moreno Valley</b>	18	-	76	-	94
<b>Mt. San Jacinto</b>	-	-	-	1	1
<b>Victor Valley</b>	-	1	-	-	1
<b>Total</b>	<b>18</b>	<b>1</b>	<b>86</b>	<b>39</b>	<b>144</b>

Source: MIS Data Mart

Exhibit 15: 2133.50 – Fire academy strong workforce program outcomes

Strong Workforce Program Metrics: 2133.50 – Fire Academy Academic Year 2017-18, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2018-19)	423	10,464
Completed 9+ career education units in one year (2018-19)	54%	22%
Perkins Economically disadvantaged students (2018-19)	61%	40%
Students who attained a noncredit workforce milestone in a year (2018-19)	-	83%
Students who earned a degree, certificate, or attained apprenticeship (2018-19)	105	875
Transferred to a four-year institution (transfers)	-	105
Job closely related to the field of study (2016-17)	77%	86%
Median annual earnings (all exiters)	\$95,988	\$92,538
Median change in earnings (all exiters)	38%	33%
Attained a living wage (completers and skills-builders)	89%	82%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

## Recommendation

Community college fire technology programs (TOP 2133.00) and fire academy programs (TOP 2133.50) provide the knowledge, skills, and abilities that lead to the firefighter occupation. With years of work experience, firefighter may have the skills to promote to the first-line supervisors of firefighter and fire prevention workers occupation. Both occupations are considered essential critical infrastructure occupations.

Despite the ongoing pandemic, employment demand should continue due to the critical health and safety services provided by this classification of workers.

In the Region, firefighters are projected to have 264 annual job openings, increasing employment by 8% through 2024. This occupation offers a 10th percentile hourly wage of \$21.89 per hour, above the \$19.94 per hour self-sustainability standard for a single adult with one child in the Region. This occupation typically requires a postsecondary nondegree award to enter employment. According to online job ads, certificates such as firefighter 1, emergency medical technician, and paramedic certification appear to be in demand.

The first-line supervisors of firefighter and fire prevention workers occupation are projected to have 26 annual job openings, increasing employment by 13% through 2024. This occupation offers a 10th percentile hourly wage of \$35.49 per hour, above the \$19.94 per hour self-sustainability standard for a single adult with one child in the Region. This occupation typically requires a postsecondary nondegree award to enter employment. However, 58% of employers were seeking a candidate with a Bachelor's degree. Certifications such as firefighter 1, emergency medical technician, and paramedic certification are in demand. This occupation typically requires less than five years of work experience; most online employer job ads indicated more than three years of work experience.

Seven regional community college programs offered fire technology programs, conferring 129 awards over the last three academic years. According to Strong Workforce metrics, 73% of students attained a living wage after exiting a program, compared to 71% at the state level. Five regional community college programs offered fire academy programs, conferring 144 awards over the last three academic years. According to Strong Workforce metrics, 89% of students attained a living wage after exiting a program, compared to 82% at the state level

The COE recommends expanding fire technology and fire academy programs to meet the demand for more firefighters in the Region. This recommendation is due to the high annual job openings and high wages offered by this occupation.

The COE recommends caution in expanding firefighter programs that lead to the first-line supervisors of firefighter and fire prevention workers occupation due to the low number of annual job openings in the Region (26 annual job openings). Incumbent workers wanting to become a first-line supervisors of firefight and fire prevention workers will need years of work experience to obtain work in this occupation, and the major of employers were seeking a candidate with a Bachelor's degree. Please consult with local employers and their need for more workers in this field.



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## Appendix: Occupation definitions, sample job titles, five-year projections for fire technology occupations

*Occupation Definitions (SOC) code), Education and Training Requirement, Community College Educational Attainment*

### **First-Line Supervisors of Firefighting and Prevention Workers (33-1021)**

Directly supervise and coordinate activities of workers engaged in fire fighting and fire prevention and control.

**Sample job titles:** Battalion Chief, Battalion Fire Chief, Fire Battalion Chief, Fire Captain, Fire Chief, Fire Lieutenant, Fire Marshal, Fire Suppression Captain, Lieutenant Fire Fighter, Training Officer, Assistant Unit Forester, Crew Boss, District Fire Management Officer, Engine Boss, Fire Management Officer, Firefighter Type One (FFT1), Forest Fire Specialist Supervisor, Section Forest Fire Warden, Squad Boss

*Entry-Level Educational Requirement: Postsecondary nondegree award*

*Training Requirement: Between one and twelve months on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 57%*

### **Firefighters (33-2011)**

Control and extinguish fires or respond to emergency situations where life, property, or the environment is at risk. Duties may include fire prevention, emergency medical service, hazardous material response, search and rescue, and disaster assistance.

**Sample job titles:** Apparatus Operator, Fire Captain, Fire Chief, Fire Engineer, Fire Equipment Operator, Fire Fighter, Firefighter, Fireman, Safety Officer, Volunteer Firefighter, Fire Fighter, Fire Management Specialist, Fire Rescue Technician, Fire Technician, Firefighter, Forest Fire Suppression Specialist, Forestry Fire Technician, Hot Shot, On-Scene Supporter, Wildland Firefighter

*Entry-Level Educational Requirement: Postsecondary nondegree award*

*Training Requirement: More than twelve months on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 61%*

## Appendix: Program Completion and Outcome Methodology

Exhibits 12 and 13 display the average annual California Community College (CCC) awards conferred during the three academic years between 2016 and 2019, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and Region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from records provided by California's Employment Development Department's Unemployment Insurance database. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2020a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2020a).

Job postings data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job postings often do not reveal the hiring intentions of employers; it is unknown if employers plan to hire one or multiple workers from a single online job posting, or if they are collecting resumes for future hiring needs. A closed job posting may not be the result of a hired worker.

Table 1: 2019 to 2024 job growth, wages, education, training, and work experience required for the fire technology occupational group, IEDR

Occupation (SOC)	2019 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage Range (25 <sup>th</sup> to 75 <sup>th</sup> percentile)	Median Hourly Wage (50 <sup>th</sup> percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Firefighters (33-2011)	3,057	247	8%	264	\$26.45 to \$37.36	\$31.11	\$67,600	Postsecondary nondegree award & More than 12 months	None
First-Line Supervisors of Firefighting and Prevention Workers (33-1021)	279	37	13%	26	\$39.31 to \$74.79	\$51.73	\$123,900	Postsecondary nondegree award & 1-12 months	Less than 5 years
<b>Total</b>	<b>3,336</b>	<b>284</b>	<b>9%</b>	<b>290</b>	-	-	-	-	-

Source: EMSI 2020.4

Table 2: 2019 to 2024 job growth, wages, education, training, and work experience required for the fire technology occupational group, California

Occupation (SOC)	2019 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage Range (25 <sup>th</sup> to 75 <sup>th</sup> percentile)	Median Hourly Wage (50 <sup>th</sup> percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Firefighters (33-2011)	34,290	1,781	5%	2,743	\$28.61 to \$51.95	\$37.17	\$84,400	Postsecondary nondegree award & More than 12 months	None
First-Line Supervisors of Firefighting and Prevention Workers (33-1021)	3,267	256	8%	264	\$40.02 to \$88.10	\$62.22	\$138,400	Postsecondary nondegree award & 1-12 months	Less than 5 years
<b>Total</b>	<b>37,557</b>	<b>2,037</b>	<b>5%</b>	<b>3,007</b>	-	-	-	-	-

Source: EMSI 2020.4