

November 2022

Labor Market Analysis

Fire Science and Fire Technology



POWERED BY



Prepared by the Central Valley/Mother Lode Center of Excellence

Table of Contents

Summary.....	2
Key findings	2
Introduction	3
Occupational Demand	4
Wages	4
Job Postings	5
Salaries	6
Education.....	6
Baseline and Specialized Skills.....	7
Software Skills.....	7
Certifications	7
Education, Work Experience & Training	8
Supply	8
Student Outcomes	9
Conclusion.....	9
Recommendation	10
Appendix A: Methodology & Data Sources	11

COVID-19 Statement: This report includes employment projection data by Lightcast. Lightcast’s projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

If for any reason this document is not accessible or if you have specific needs for readability, please contact us and we will do our utmost to accommodate you with a modified version. To make a request, contact Nora Seronello by phone at (209) 575-6894 or by email seronellon@mjc.edu.

Summary

Please note the COVID-19 statement on page 1 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for Fire Science and Fire Technology. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations. Three occupations related to Fire Science and Fire Technology were identified for Columbia College:

- 33-1021, First-Line Supervisors of Firefighting and Prevention Workers
- 33-2011, Firefighters
- 33-2021, Fire Inspectors and Investigators

Key findings:

- **Occupational demand** — There was 1,501 workers employed in jobs related to Fire Science and Fire Technology in 2021 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is firefighters with 1,280 workers, a projected growth rate of 5% over the next five years, and 110 annual openings.
- **Wages** — First-line supervisors of firefighting and prevention workers earn the highest entry-level wage, \$36.98/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Daily Dispatch, City Lodi, and City Modesto.
- **Occupational titles** — The most common occupational title in job postings in the subregion is Municipal Firefighters. The most common job title is Battalion Chief.
- **Skills and certifications** — The top baseline skill is building effective relationships, the top specialized skill is fire protection, and the top software skill is Microsoft Office. The most in-demand certification is an Emergency Medical Technician (EMT).
- **Education** — A postsecondary nondegree award is typically required for firefighters, first-line supervisors of firefighting and prevention workers, and fire inspectors and investigators.
- **Supply** — Analysis of postsecondary completions shows that on average 135 awards were conferred in the Central Valley/Mother Lode region each year.

Recommendation:

Based on a comparison of occupational demand and supply, there is an undersupply of 51 trained workers in the subregion and 238 workers in the region. The Center of Excellence recommends that Columbia College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of Fire Science and Fire Technology workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Columbia College to provide labor market information for Fire Science and Fire Technology. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the NCV/NML subregion is \$12.65/hour.¹ Analysis of the program and occupational data related to Fire Science and Fire Technology resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 33-1021, First-Line Supervisors of Firefighting and Prevention Workers
- 33-2011, Firefighters
- 33-2021, Fire Inspectors and Investigators

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

First-Line Supervisors of Firefighting and Prevention Workers

Job Description: Directly supervise and coordinate activities of workers engaged in firefighting and fire prevention and control.

Knowledge: Public Safety and Security, Customer and Personal Service, Education and Training, Building and Construction, Administration and Management

Skills: Active Listening, Critical Thinking, Social Perceptiveness, Coordination, Judgment and Decision Making

Firefighters

Job Description: 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.

Knowledge: Public Safety and Security, Customer and Personal Service, Education and Training, Building and Construction, English Language

Skills: Critical Thinking, Coordination, Judgment and Decision Making, Service, Orientation, Active Listening, Active Learning

Fire Inspectors and Investigators

Job Description: Inspect buildings to detect fire hazards and enforce local ordinances and state laws, or investigate and gather facts to determine cause of fires and explosions.

Knowledge: Public Safety and Security, Customer and Personal Service, Building and Construction, Law and Government, Education and Training

Skills: Active Listening, Critical Thinking, Speaking, Writing, Reading Comprehension

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

Occupational Demand

The NCV/NML subregion employed 1,501 workers in Fire Science and Fire Technology occupations in 2021 (Exhibit 1). The largest occupation is firefighters with 1,280 workers. This occupation is projected to grow by 5% over the next five years and has the greatest number of projected annual openings, 110.

Exhibit 1. Fire Science and Fire Technology employment and occupational projections in the NCV/NML subregion

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Firefighters	1,280	1,342	63	5%	110
First-Line Supervisors of Firefighting and Prevention Workers	162	172	10	6%	13
Fire Inspectors and Investigators	59	65	6	10%	7
TOTAL	1,501	1,579	79	5%	130

Wages

Exhibit 2a shows the hourly wages of the Fire Science and Fire Technology occupations. First-line supervisors of firefighting and prevention workers earn the highest entry-level wage, \$36.98/hour in the subregion.² Please note 10th and 25th percentiles are considered entry-level wages while 75th and 90th are considered experienced wages, either by gained long-term employment, received extra training, etc.

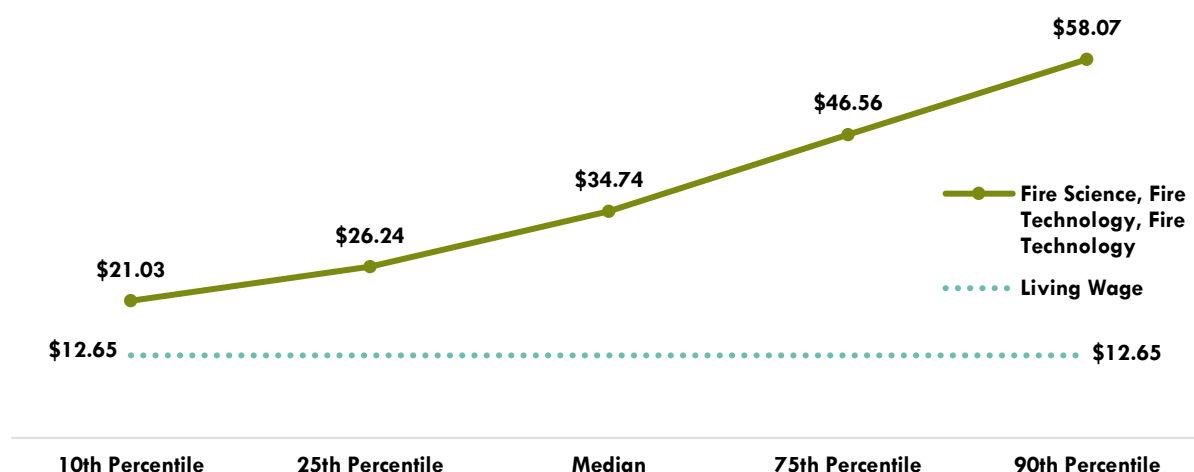
Exhibit 2a. Fire Science and Fire Technology hourly wages in the NCV/NML subregion

Occupation	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings
First-Line Supervisors of Firefighting and Prevention Workers	\$36.98	\$46.36	\$60.27
Firefighters	\$21.78	\$32.52	\$38.14
Fire Inspectors and Investigators	\$19.94	\$25.35	\$41.29

Exhibit 2b shows the average hourly wages for Fire Science and Fire Technology occupations, the average entry-level wage exceeds the average living wage for the North Central Valley/Northern Mother Lode (NCV/NML) subregion.

² Entry-level wages are derived from the 25th percentile.

Exhibit 2b. Fire Science and Fire Technology average hourly wages in the NCV/NML subregion



Job Postings

There were 63 job postings for the three occupations in the NCV/NML subregion from May 2022 to October 2022.³ The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of Fire Science and Fire Technology by number of job postings

Employer	Job Postings	% Job Postings
Daily Dispatch	5	10%
City Lodi	4	8%
City Modesto	3	6%
Stanislaus County	3	6%
state of california	3	6%
City Stockton	2	4%
Greater Valley Conservation Corps	2	4%
Kern County	2	4%
Prevent Incorporated	2	4%
Tesla	2	4%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across five O*NET OnLine occupations. The occupational title Municipal Firefighters is listed in 24 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Battalion Chief in eight job postings, Firefighter Paramedic in three job postings, and Deputy Campus Fire Marshal in two job postings.

³ Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Exhibit 4. Top occupational titles in job postings for Fire Science and Fire Technology

Occupational Title	Job Postings	% of Job Postings
Municipal Firefighters	24	38%
Municipal Fire Fighting and Prevention Supervisors	20	32%
Fire Inspectors	14	22%
Forest Fire Fighting and Prevention Supervisors	3	5%
Forest Firefighters	2	3%

Salaries

Exhibit 5 shows the “Market Salaries” for Fire Science and Fire Technology occupations. These are calculated by Burning Glass using a machine learning model built off of millions of job postings every year. This accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for Fire Science and Fire Technology occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$35,632
25th Percentile	\$39,041
50th Percentile	\$52,607
75th Percentile	\$73,191
90th Percentile	\$94,878

Education

Of the 63 job postings, 32 listed an education level preferred for the positions being filled. Among those, 66% requested high school or vocational training, 38% requested an associate degree, and 38% requested a bachelor’s degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.

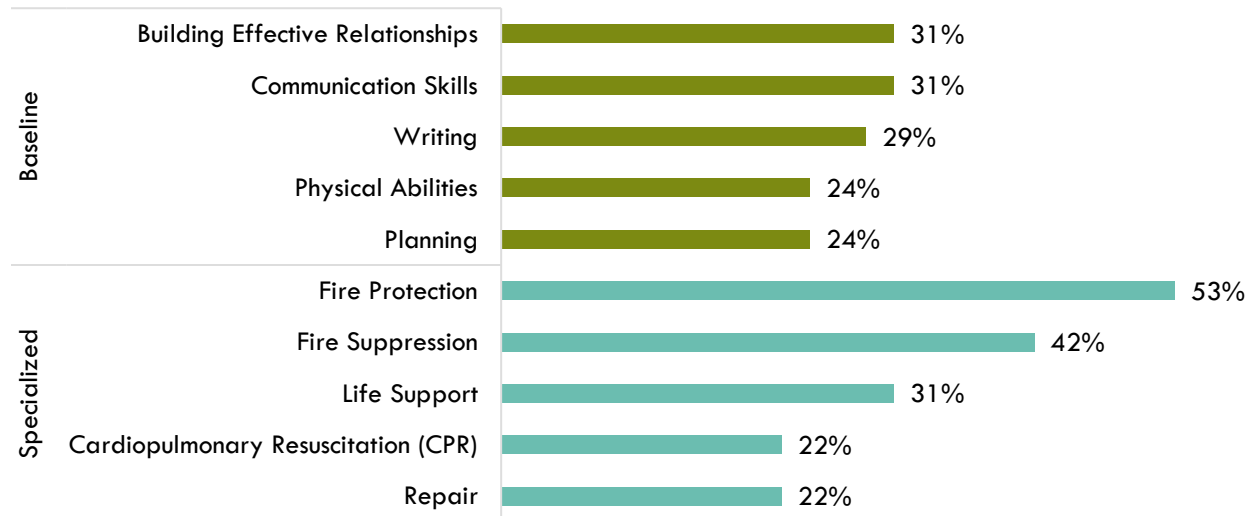
Exhibit 6. Education levels requested in job postings for Fire Science and Fire Technology

Education Level	Job Postings	% of Job Postings
High school or vocational training	21	66%
Associate degree	12	38%
Bachelor's degree	12	38%
Master's degree	2	6%
Doctoral degree	2	6%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are building effective relationships, 31% of job postings, communication skills, 31%, and writing, 29%. The top three specialized skills are fire protection, 53% of job postings, fire suppression, 42%, and life support, 31%.

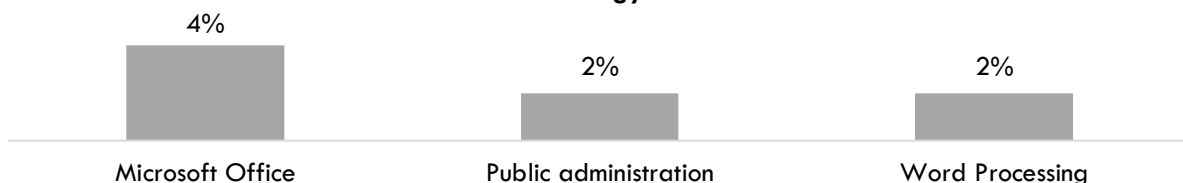
Exhibit 7. In-demand Fire Science and Fire Technology baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and Public administration were the top two software skills identified in job postings (Exhibit 8).

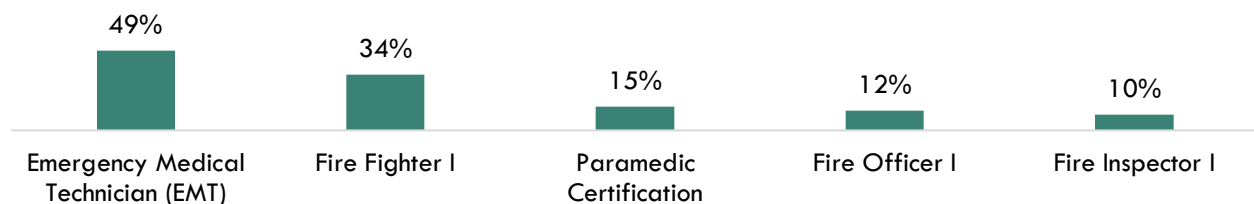
Exhibit 8. In-demand Fire Science and Fire Technology software skills



Certifications

Of the 63 job postings, 41 contained certification data. Among those, 53% indicated a need for a Emergency Medical Technician (EMT). The next top certifications are Fire Fighter I and a Paramedic Certification (Exhibit 9). Please note 83% of job posting indicated a need for a driver's license, but it is not a certification.

Exhibit 9. Top Fire Science and Fire Technology certifications requested in job postings



Education, Work Experience & Training

A postsecondary nondegree award is typically required for firefighters, first-line supervisors of firefighting and prevention workers, and fire inspectors and investigators (Exhibit 10).

Exhibit 10. Education, work experience, training, and Current Population Survey results for Fire Science and Fire Technology occupations⁴

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Firefighters	Postsecondary nondegree award	None	Long-term	59.4%
First-Line Supervisors of Firefighting and Prevention Workers	Postsecondary nondegree award	Less than 5 years	Moderate-term	55.2%
Fire Inspectors and Investigators	Postsecondary nondegree award	5 years or more	Moderate-term	44.1%

Supply

Analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) included the TOP code and title: 213300 - Fire Technology. Analysis of the last three years of data shows that, on average, 135 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for Fire Science and Fire Technology occupations in the region

TOP/CIP Code- Title	College	Associate Degree	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Subtotal
213300 - Fire Technology	Bakersfield	25			8	32
	Columbia	15	5	25		44
	Fresno City	9			1	10
	Merced	7			2	9
	Modesto	18			8	26
	Porterville				4	4
	Sequoias	8			1	9
TOTAL		82	5	25	23	135

⁴ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

There is an undersupply of 51 Fire Science and Fire Technology workers in the NCV/NML subregion and 238 workers in the region (Exhibit 12).

Exhibit 12. Fire Science and Fire Technology workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the supply gap in the NCV/NML subregion and region

Region	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or Oversupply
NCV/NML	130	79	51
CVML	373	135	238

Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to Fire Science and Fire Technology. Of note, 48 fire technology students received a degree or certificate or attained apprenticeship journey status; 81% of students obtained a job closely related to their field of study; 78% had a median change in earnings; and 74% of students attained a living wage.

Exhibit 13. Regional metrics for the TOP code related to Fire Science and Fire Technology

Metric	Fire Technology 213300
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	48
Number of Students Who Transferred	*
Job Closely Related to Field of Study	81%
Median Change in Earnings	78%
Attained a Living Wage	74%
* denotes data not available.	

Conclusion

The entry-level wages of the three occupations exceed the NCV/NML subregion's average living wage. There were 63 job postings in the past six months for occupations related to Fire Science and Fire Technology in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is building effective relationships, and the top specialized skill is fire protection.
- The top software skill is public administration.
- The top certification is an Emergency Medical Technician (EMT).

There is an undersupply of trained workers, a shortage of 51 in the NCV/NML subregion and 238 in the region.

Recommendation

Based on these findings, it is recommended that Columbia College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of Fire Science and Fire Technology workers in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (LIGHTCAST). LIGHTCAST occupational employment data are based on final LIGHTCAST industry data and final LIGHTCAST staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level LIGHTCAST earnings by industry: economicmodeling.com .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Burning Glass: burning-glass.com/ .
Additional Education Requirements/Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org .

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (LIGHTCAST) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.