Labor Market Analysis for Program Modification: 2133.00/Fire Technology (Fire Technology Associate Degree)

CVML Center of Excellence, November 2024

CENTER OF EXCELLENCE FOR LABOR MARKET RESEARCH
CENTRAL VALLEY/MOTHER LODE

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met ☒	Endorsed: Some LMI Criteria Met ☐	Not LMI Endorsed ☐
Program LMI Endorsement Criteria			
Supply Gap:	Yes ☑	No ☐	
	Comments: There is projected to be **257 annual job openings** throughout the SCV/SML subregion for *Fire Prevention Professionals*, which **is more than the 192 awards conferred by educational institutions**.		
Living Wage: (Entry-Level, 25th)	Yes ☑	No ☐	
	Comments: The entry-level wages for *Firefighters ($27.73) and Fire Inspectors and Investigators ($35.06)* are above the SCV/SML living wage of $16.08.		
Education:	Yes ☑	No ☐	
	Comments: The typical entry-level education for *Firefighters and Fire Inspectors and Investigators* is a postsecondary nondegree award, while the typical entry-level education for *Forest Fire Inspectors and Prevention Specialists* is a high school diploma or equivalent. Between 47% and 59% of workers in the field have completed some college or an associate degree as their highest level of education.		
Emerging Occupation(s)			
	Yes ☐	*No* ☑	
	Comments: N/A		

The CVML Center of Excellence for Labor Market Research (CVML COE) prepared this report to determine whether there is a supply gap in the South Central Valley/Southern Mother Lode regional labor market related to the following middle-skill occupations:

- Firefighters (33-2011)
- Fire Inspectors and Investigators (33-2021)
- Forest Fire Inspectors and Prevention Specialists (33-2022)

Based on the available data, there appears to be a supply gap for the three *Fire Prevention* occupations. In addition to the occupations having entry-level wages above the subregion's living wage, the typical education requirements for the occupations align with a community college education. **Therefore, due to all the regional labor market criteria being met, the COE endorses this proposed program.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for *Fire Prevention Professionals*.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Firefighters (33-2011)	NCV/NML: 141 SCV/SML: 250	NCV/NML: 107 SCV/SML: 192	NCV/NML: $25.61 SCV/SML: $27.73	Postsecondary nondegree award	59%
Fire Inspectors and Investigators (33-2021)	NCV/NML: 2 SCV/SML: 6		NCV/NML: $28.04 SCV/SML: $35.06	Postsecondary nondegree award	47%
Forest Fire Inspectors and Prevention Specialists (33-2022)	NCV/NML: 4 SCV/SML: 1		NCV/NML: $25.67 SCV/SML: N/A	High school diploma or equivalent	47%
Total	**404**	**299**	**-**	**-**	**-**

Demand:

- The number of jobs related to Fire Prevention Professionals is projected to increase 13% in the SCV/SML subregion through 2028, equating to 257 annual job openings.
- The entry-level hourly wages for Fire Prevention Professionals are between $27.73 and $35.06 in SCV/SML, which is above the subregional living wage of $16.08.
- There were 112 online job postings for Fire Prevention Professionals over the past 12 months. The highest number of postings were for Firefighters.
- The typical entry-level education for *Firefighters* and *Fire Inspectors and Investigators* is a postsecondary nondegree award, while the typical entry-level education for *Forest Fire Inspectors and Prevention Specialists* is a high school diploma or equivalent.
- Between 47% and 59% of workers in the field have completed some college or an associate degree as their highest level of education.

Supply:

- Between 2020 and 2023, there were 192 awards conferred by community colleges in the SCV/SML subregion.
- Between 2019 to 2022, there were no non-community college institutions in the region that conferred awards in relevant programs.

Demand

Occupational Projections

Exhibit 2 shows the annual percent change in jobs for the three *Fire Prevention* occupations from 2018 through 2028. Employment in these occupations had a 2% decrease in 2020 (SCV/SML) compared to the 6% decrease across all occupations in 2020 in the CVML region. After the 2% decrease, employment experienced an increase of 4% in 2021 and 7% in 2022 (SCV/SML). Also notable was the 9% decrease in employment for *Fire Prevention* occupations in 2023 (NCV/NML). Employment projections through 2028 for *Fire Prevention Professionals* is projected to either decline slightly or remain steady across the two subregions.

Exhibit 2: Annual Percent Change for Jobs in Fire Prevention Professionals, 2018-2028

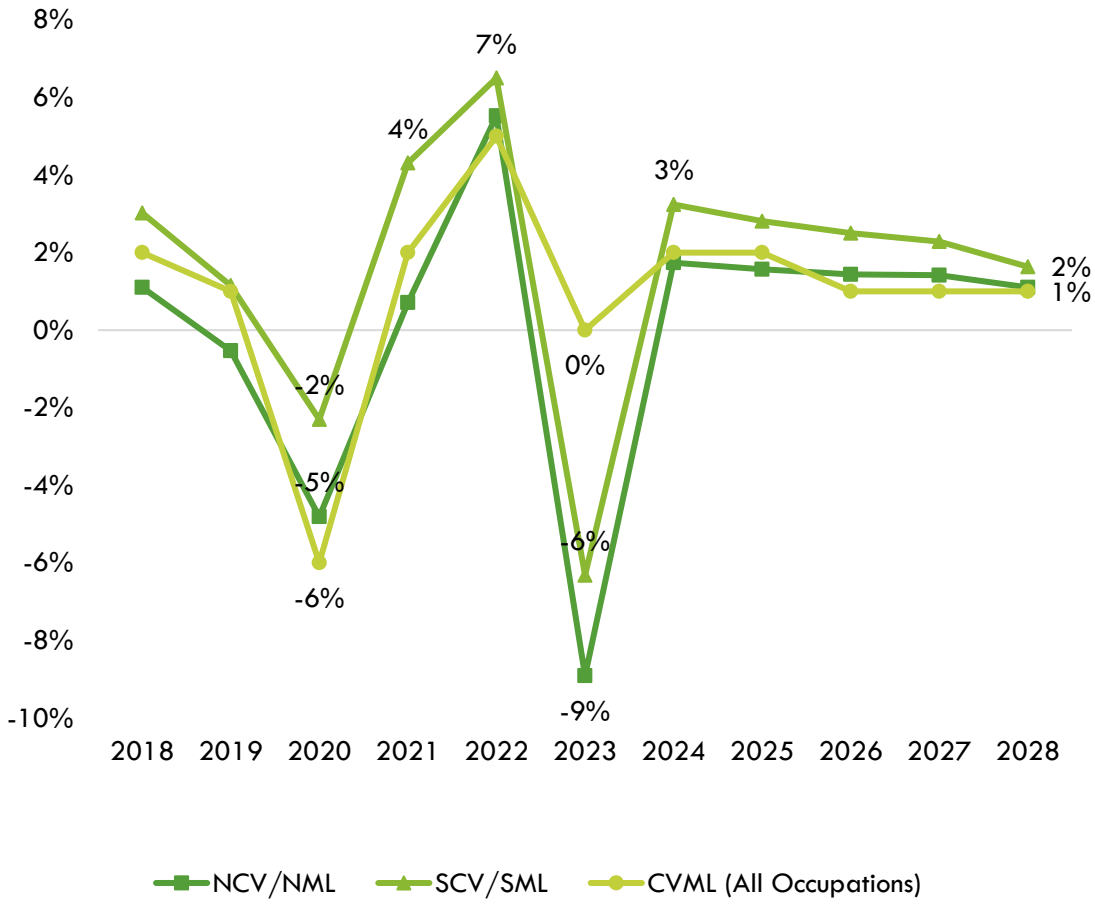


Exhibit 3 shows the five-year occupational demand projections for Fire Prevention Professionals. In the SCV/SML subregion, the number of jobs related to these occupations is projected to increase by 13% through 2028. There is projected to be 257 jobs available annually.

Exhibit 3: Occupational Demand in NCV/NML, SCV/SML and CVML[1]

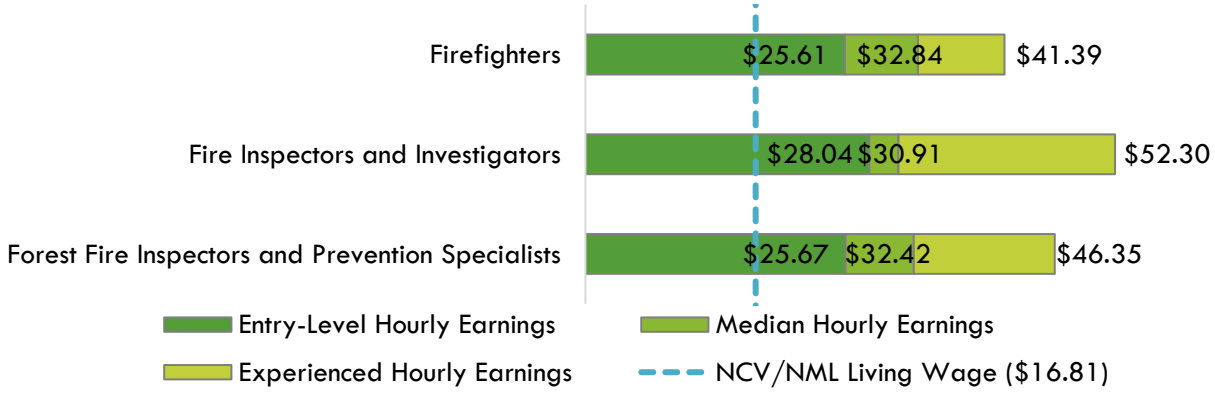
Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
NCV/NML	1,580	1,698	118	7%	147
SCV/SML	2,451	2,772	321	13%	257
CVML	**4,031**	**4,470**	**439**	**11%**	**404**

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for *Fire Prevention Professionals* as they relate to the subregions and region's living wage. NCV/NML, SCV/SML and CVML wages are included below to provide a complete analysis of the subregion.

Firefighters ($25.61), Fire Inspectors and Investigators ($28.04), and Forest Fire Inspectors and Prevention Specialists ($25.67) all earn significantly more than the NCV/NML living wage of $16.81 for one adult. The collective average wage for these occupations in the NCV/NML subregion ($36.30) is below the average statewide wage of $42.39. Exhibit 4A shows the wage range for Fire Prevention Professionals and how they compare to the NCV/NML subregion's living wage.

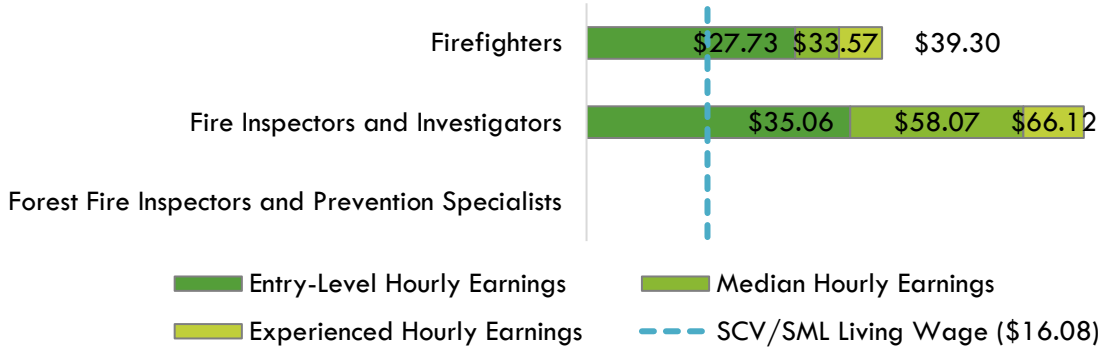
Exhibit 4A: Wages by Occupation in NCV/NML



[1] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

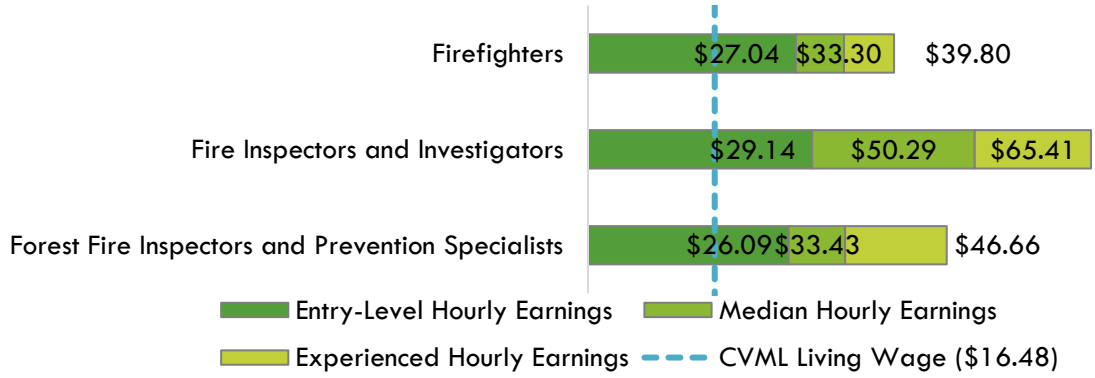
Firefighters ($27.73) and Fire Inspectors and Investigators ($35.06) earn significantly more than the SCV/SML living wage of $16.08 for one adult. The collective average wage for these occupations in the SCV/SML subregion ($35.37) is below the average statewide wage of $42.39. Exhibit 4B shows the wage range for Fire Prevention Professionals and how they compare to the SCV/SML subregion's living wage. **Note: Hourly wage data for Forest Fire Inspectors and Prevention Specialists is not available for the SCV/SML subregion.**

Exhibit 4B: Wages by Occupation in SCV/SML



Firefighters ($27.04), Fire Inspectors and Investigators ($29.14), and Forest Fire Inspectors and Prevention Specialists ($26.09) all earn significantly more than the CVML living wage of $16.48 for one adult. The collective average wage for these occupations in the CVML region ($35.74) is below the average statewide wage of $42.39. Exhibit 5 shows the wage range for Fire Prevention Professionals and how they compare to the CVML region's living wage.

Exhibit 5: Wages by Occupation in CVML



Job Postings:

Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors^2. For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast's database.

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.[2]

There were 112 online job postings related to *Fire Prevention Professionals* listed in the past 12 months. Exhibit 6 shows the number of job postings for the occupations studied in this report.

Exhibit 6: Number of Job Postings by Occupation (n=112)

Occupations	Job Postings	Percentage of Job Postings
Firefighters	78	70%
Fire Inspectors and Investigators	34	30%
Forest Fire Inspectors and Prevention Specialists	0	0%

The top employers in the region for *Fire Prevention Professionals*, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=112)

Employer	Job Postings	Percentage of Job Postings
National Park Service	12	11%
Wildfire Defense Systems	11	10%
Tulare County	10	9%
United States Department of the Interior	8	7%
Kern County	6	5%
City of Coalinga	4	4%
RLH Fire Protection	4	4%
Geil Enterprises	3	3%
Johnson Controls	2	2%
HCI Systems	2	2%

[2] K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), https://link.springer.com/book/10.1007/978-81-322-3972-7.

The top specialized, common, and software skills for *Fire Prevention Professionals* listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

Exhibit 8: Top Skills by Number of Job Postings (n=112)

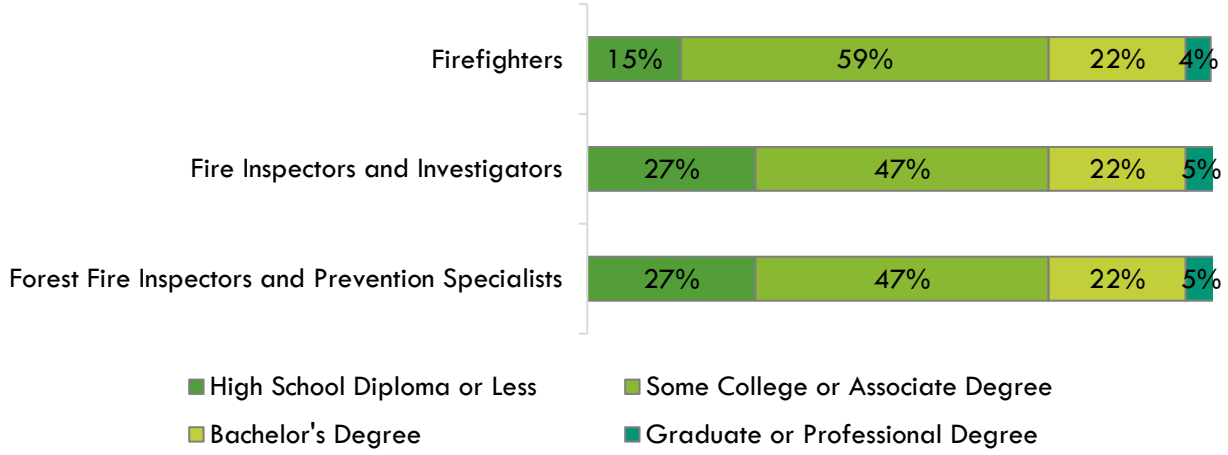
Top Specialized Skills	Top Soft Skills	Top Computer Skills
Firefighting (68)	Operations (53)	Microsoft Excel (4)
Fire Prevention (45)	Good Driving Record (34)	Microsoft Word (2)
Fire Suppression Systems (42)	Communication (30)	Application Programming Interface (API) (2)
Fire Behavior (34)	Management (27)	Business Software (2)
Wildfire Suppression (32)	Record Keeping (18)	Operating Systems (2)
Fire Alarm Systems (27)	First Aid (16)	Make (Software) (2)
Incident Management (27)	Customer Service (13)	Microsoft Outlook (2)
Alarm Devices (25)	Physical Fitness (13)	Microsoft Office (2)
Fire Safety (23)	Report Writing (12)	Microsoft PowerPoint (2)
Incident Command Systems (23)	Planning (12)	JavaScript (Programming Language) (1)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a postsecondary nondegree award as the typical entry-level education for *Firefighters* and *Fire Inspectors and Investigators,* and a high school diploma or equivalent for *Forest Fire Inspectors and Prevention Specialists*. National-level educational attainment data indicates that between 47% and 59% of *Fire Prevention Professionals* have completed some college or an associate degree as their highest level of education, as shown in Exhibit 9.

Of the 112 online job postings, 48% (equivalent to 54 postings) of cumulative job postings for *Fire Prevention Professionals* listed a minimum education requirement in the SCV/SML. Of the 54 postings, 65% (35) requested a high school diploma or GED.

Exhibit 9: National-level Educational Attainment for Fire Prevention Professionals



Educational Supply

Community College Supply:

Exhibit 10 shows the annual and three-year average number of awards conferred by community colleges in the related TOP codes: Fire Technology (2133.00), Wildland Fire Technology (2133.10), and Fire Academy (2133.50). The colleges with the most completions in the CVML region are Fresno City (77) and Columbia (55).

Exhibit 10: Regional Community College Awards (Certificates and Degrees) 2020-21 through 2022-23

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Award Average
2133.00	Fire Technology	Columbia	35	42	88	55
		Merced	6	9	2	6
		Modesto	26	39	21	29
		North CVML	**67**	**90**	**111**	**89**
		Bakersfield	30	49	73	51
		Fresno City	22	37	36	32
		Porterville	0	0	5	2
		Reedley College	0	13	15	9
		Sequoias	14	13	21	16
		South CVML	**66**	**112**	**150**	**109**
		Supply Total/Average	**133**	**202**	**261**	**199**

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Award Average
2133.10	Wildland Fire Technology	-	0	0	0	0
		North CVML	**0**	**0**	**0**	**0**
		Bakersfield	1	0	3	1
		Porterville	30	0	0	10
		Reedley College	0	1	2	1
		South CVML	**31**	**1**	**5**	**12**
		Supply Total/Average	**31**	**1**	**5**	**12**

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Award Average
2133.50	Fire Academy	Modesto	18	18	18	18
		North CVML	**18**	**18**	**18**	**18**
		Fresno City	39	42	54	45
		Sequoias	30	0	46	25
		South CVML	**69**	**42**	**100**	**70**
		Supply Total/Average	**87**	**60**	**118**	**88**

Community College Student Outcomes:

Exhibit 11 shows the Strong Workforce Program (SWP) metrics for Fire Technology programs in Kern Community College District (KCCD), SCV/SML, CVML, and California. Of the 1,739 Fire Technology students in the 2022-23 academic year, 59% (1,028) attended a KCCD college.

KCCD students that exited Fire Technology programs in the 2021-22 academic year had lower median annual earnings ($46,542) compared to all Fire Technology students in SCV/SML ($49,142) and statewide ($67,628). Approximately 70% of Fire Technology students in SCV/SML reported working in a job closely related to their field of study, which is slightly below Fire Technology students in in the greater CVML region (76%). Notably, a lower percentage of KCCD Fire Technology students attained the living wage (75%) when compared to all Fire Technology students in SCV/SML (79%). However, both figures are higher than the percentage of Fire Technology students who attained the living wage statewide (73%).

Exhibit 11: Fire Technology (2133.00) Strong Workforce Program Metrics, 2020-21

SWP Metric	KCCD	SCVML	CVML	California
Students (2022-23)	1,028	1,739	2,501	32,250
Earned 9+ Career Education Units (2022-23)	75%	62%	55%	24%
Completed Noncredit Workforce Preparation Milestone (2022-23)	91%	75%	74%	40%
Earned an Award: Degree or Certificate or Attained Apprenticeship Journey Level Status (2022-23)	7%	8%	9%	5%
Job Closely Related to Field of Study (2020-21)	Insufficient Data	70%	76%	73%
Transferred to a Four-Year Institution: Four-Year Postsecondary Institution (2021-22)	Insufficient Data	1%	1%	1%
Median Annual Earnings (2021-22)	$46,542	$49,142	$51,724	$67,628
Median Change in Earnings (2021-22)	90%	43%	58%	36%
Attained Living Wage (2021-22)	75%	79%	78%	73%

Appendix A: Methodology

The CVML COE prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the CVML COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

The CVML COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a "supply table" with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the CVML COE. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study which can signal demand and show what employers are looking for in potential employees but is not a perfect measure of the quantity of open positions.

All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/
Living Wage	The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, childcare, health care, transportation, and taxes. For more information, see: https://selfsufficiencystandard.org/California/ The living wage for one adult in Kern County is $15.16 per hour ($31,532.80) annually. This figure is used by the CCCCO to calculate the percentage of students that attained the regional living wage.
Typical Education and Training Requirements, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/
Educational Supply	The CCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions
Student Metrics and Demographics	DataVista, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://datavista.cccco.edu/

Data Type	Source
Population and Occupation Demographics	The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml

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