

February 2021

# Labor Market Analysis

## Drafting Technology/Draftsman Architectural Draftsman/Mechanical



Prepared by the Central Valley/Mother Lode Center of Excellence

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**COVID-19 Statement:** This report includes employment projection data by Emsi. Emsi'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](mailto:seronellon@mjc.edu).*

# Summary

Please note the COVID-19 statement on page 2 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 Drafting Technology/Draftsman Architectural Draftsman/Mechanical. Seven occupations related to this subject were identified for Merced College:

- 17-3011, Architectural and Civil Drafters
- 17-3098, Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other
- 17-3023, Electrical and Electronic Engineering Technologists and Technicians
- 17-3013, Mechanical Drafters
- 17-3027, Mechanical Engineering Technologists and Technicians
- 17-3012, Electrical and Electronics Drafters
- 17-3019, Drafters, All Other

## Key findings:

- **Occupational demand** — Nearly 980 workers were employed in jobs related to Drafting Technology/Draftsman Architectural Draftsman/Mechanical in 2019 in the North Central Valley/Northern Mother Lode (SCV/SML) subregion. The largest occupation is calibration technologists and technicians and engineering technologists and technicians, except drafters, all other with 254 workers in 2019, a projected growth rate of 3% over the next five years, and 23 annual openings.
- **Wages** — Calibration technologists and technicians and engineering technologists and technicians (except drafters, all other) earn the highest entry-level wage, \$24.37/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Amazon, The News Tribune Com, and Danaher Corporation.
- **Occupational titles** — The most common occupational title in job postings in the subregion is industrial engineering technicians. The most common job title is maintenance technician.
- **Skills and certifications** — The top baseline skill is troubleshooting, the top specialized skill is repair, and the top software skill is AutoCAD. The most in-demand certification is a driver's license.
- **Education** — An associate degree is the typical entry-level education required for the seven occupations.
- **Supply** — Analysis of postsecondary completions in the region shows that on average 117 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 46 trained workers in the subregion and 245 workers in the region. The Center of Excellence recommends that Merced College work with the Advanced Manufacturing Regional Director, the college's advisory board, and local industry in the expansion of programs to address the shortage of Drafting Technology/Draftsman Architectural Draftsman/Mechanical workers in the region.

# Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Merced College to provide labor market information for Drafting Technology/Draftsman Architectural Draftsman/Mechanical. The geographical focus for this report is the North Central Valley/Northern Mother Lode (SCV/SML) 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 North Central Valley/Northern Mother Lode (NCV/NML) subregion is \$10.27/hour.<sup>1</sup> Analysis of the program and occupational data related to Drafting Technology/Draftsman Architectural Draftsman/Mechanical resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 17-3011, Architectural and Civil Drafters
- 17-3098, Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other
- 17-3023, Electrical and Electronic Engineering Technologists and Technicians
- 17-3013, Mechanical Drafters
- 17-3027, Mechanical Engineering Technologists and Technicians
- 17-3012, Electrical and Electronics Drafters
- 17-3019, Drafters, All Other

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. Data was not available for Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other; and Drafters, All Other.

## **Architectural and Civil Drafters**

**Job Description:** Prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Use knowledge of building materials, engineering practices, and mathematics to complete drawings.

**Knowledge:** Design, Building and Construction, Engineering and Technology, Computers and Electronics, Clerical, English Language

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

## **Electrical and Electronic Engineering Technologists and Technicians**

**Job Description:** Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, adjust, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions.

**Knowledge:** Computers and Electronics, Engineering and Technology, English Language, Design, Mathematics

**Skills:** Critical Thinking, Reading Comprehension, Complex Problem Solving, Active Listening, Troubleshooting

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<sup>1</sup> 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://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

### **Mechanical Drafters**

**Job Description:** Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.

**Knowledge:** Design, Engineering and Technology, Mechanical, Mathematics, English Language

**Skills:** Active Learning, Active Listening, Critical Thinking, Mathematics, Reading Comprehension

### **Mechanical Engineering Technologists and Technicians**

**Job Description:** Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery and equipment under direction of engineering staff or physical scientists.

**Knowledge:** Engineering and Technology, Design, Mechanical, Mathematics, Computers and Electronics

**Skills:** Reading Comprehension, Active Listening, Critical Thinking, Operation Monitoring, Complex Problem Solving

### **Electrical and Electronics Drafters**

**Job Description:** Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment.

**Knowledge:** Engineering and Technology, Design, English Language, Computers and Electronics, Mathematics,

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

## Occupational Demand

The North Central Valley/Northern Mother Lode subregion employed 979 workers in Drafting Technology/Draftsman Architectural Draftsman/Mechanical occupations in 2019 (Exhibit 1). The largest occupation is calibration technologists and technicians and engineering technologists and technicians, except drafters, all other with 254 workers in 2019. This occupation is projected to grow by 3% over the next five years and has the greatest number of projected annual openings, 23.

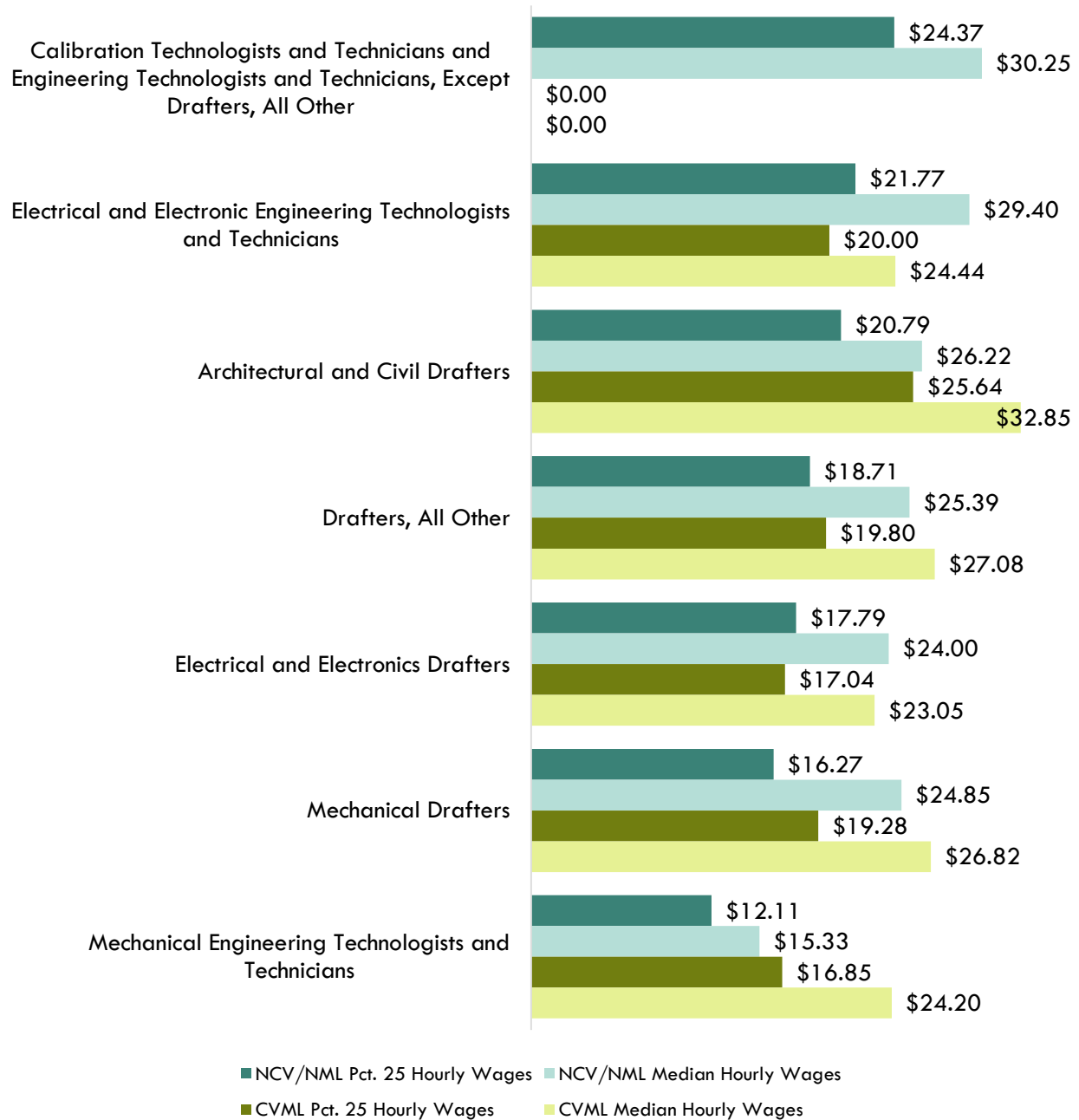
**Exhibit 1. Drafting Technology/Draftsman Architectural Draftsman/Mechanical employment and occupational projections in the SCV/SML subregion**

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other	254	261	7	3%	23
Architectural and Civil Drafters	253	254	1	0%	23
Electrical and Electronic Engineering Technologists and Technicians	188	203	15	8%	19
Mechanical Drafters	190	187	(4)	(2%)	17
Mechanical Engineering Technologists and Technicians	44	50	6	12%	5
Electrical and Electronics Drafters	33	33	0	1%	3
Drafters, All Other	16	17	1	6%	2
<b>TOTAL</b>	<b>979</b>	<b>1,005</b>	<b>26</b>	<b>3%</b>	<b>92</b>

# Wages

Exhibit 2 compares the entry-level and experienced wages of the Drafting Technology/Draftsman Architectural Draftsman/Mechanical occupations. Calibration technologists and technicians and engineering technologists and technicians (except drafters, all other) earn the highest entry-level wage, \$24.37/hour in the subregion.

**Exhibit 2. Entry-level and experienced wage comparison in the SCV/SML subregion and region**



# Job Postings

There were 741 job postings for the seven occupations in the SCV/SML subregion from August 2020 to January 2021.<sup>2</sup> The employers with the most job postings are listed in Exhibit 3.

## Exhibit 3. Top employers of Drafting Technology/Draftsman Architectural Draftsman/Mechanical by number of job postings

Employer	Job Postings	% Job Postings
Amazon	23	4%
The News Tribune Com	9	2%
Danaher Corporation	8	1%
Lawrence Livermore National Laboratory	8	1%
Tesla	8	1%
Delicato Family Wines	7	1%
Altium Packaging	6	1%
Cepheid	6	1%
Ej Gallo	6	1%
Flory Group Incorporated	6	1%

Exhibit 4 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across 10 O\*NET OnLine occupations. The occupational title industrial engineering technicians is listed in 347 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Maintenance Technician in 100 job postings, Maintenance Technician III in 16 job postings, and Maintenance Worker in 16 job postings.

## Exhibit 4. Top occupational titles in job postings for Drafting Technology/Draftsman Architectural Draftsman/Mechanical

Occupational Title	Job Postings	% of Job Postings
Industrial Engineering Technicians	347	47%
Manufacturing Production Technicians	85	11%
Electronics Engineering Technicians	71	10%
Drafters, All Other	54	7%
Engineering Technicians, Except Drafters, All Other	42	6%
Electro-Mechanical Technicians	26	4%
Mechanical Drafters	25	3%
Mechanical Engineering Technicians	15	2%
Civil Engineering Technicians	14	2%
Electrical Engineering Technicians	14	2%

## Salaries

Exhibit 5 shows the “Market Salaries” for Drafting Technology/Draftsman Architectural Draftsman/Mechanical occupations that are calculated by Burning Glass which uses a machine learning

<sup>2</sup> 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.

model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

#### Exhibit 5. Salaries for Drafting Technology/Draftsman Architectural Draftsman/Mechanical

Market Salary Percentile	Salary Amount
10th Percentile	\$31,693
25th Percentile	\$35,739
50th Percentile	\$42,898
75th Percentile	\$51,096
90th Percentile	\$62,586

#### Education

Of the 741 job postings, 435 listed an education level preferred for the positions being filled. Of those, 77% requested high school or vocational training, 27% requested an associate degree, and 17% 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 total more than 100%.

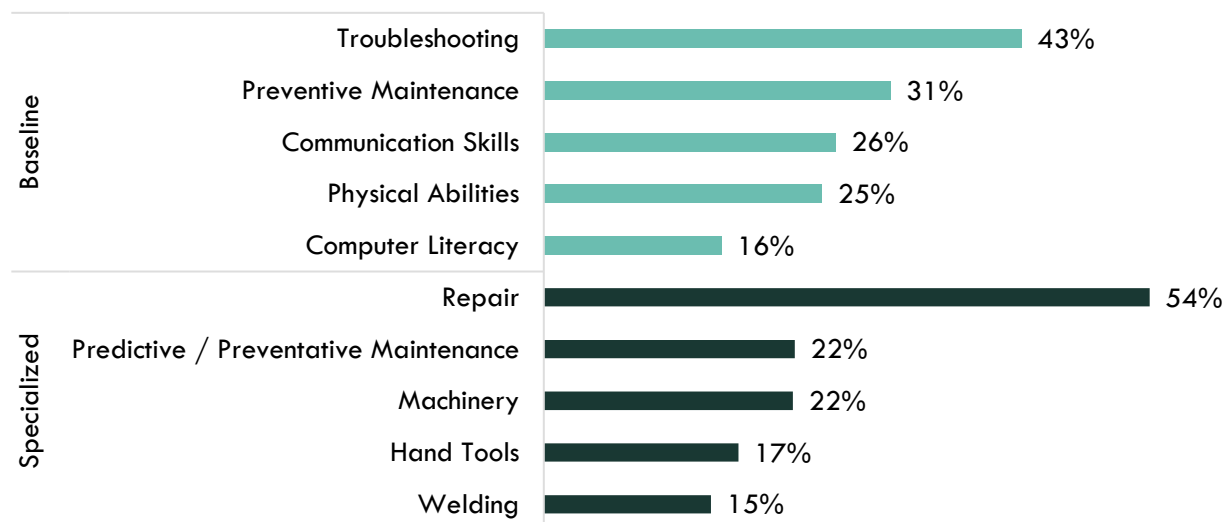
#### Exhibit 6. Education levels requested in job postings for Drafting Technology/Draftsman Architectural Draftsman/Mechanical

Education Level	Job Postings	% of Job Postings
High school or vocational training	335	77%
Associate degree	119	27%
Bachelor's degree	72	17%

#### Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are troubleshooting, 43% of job postings, preventive maintenance, 31%, and communication skills, 26%. The top three specialized skills are repair, 54% of job postings, predictive/preventive maintenance, 22%, and machinery, 22%.

#### Exhibit 7. In-demand Drafting Technology/Draftsman Architectural Draftsman/Mechanical baseline and specialized skills

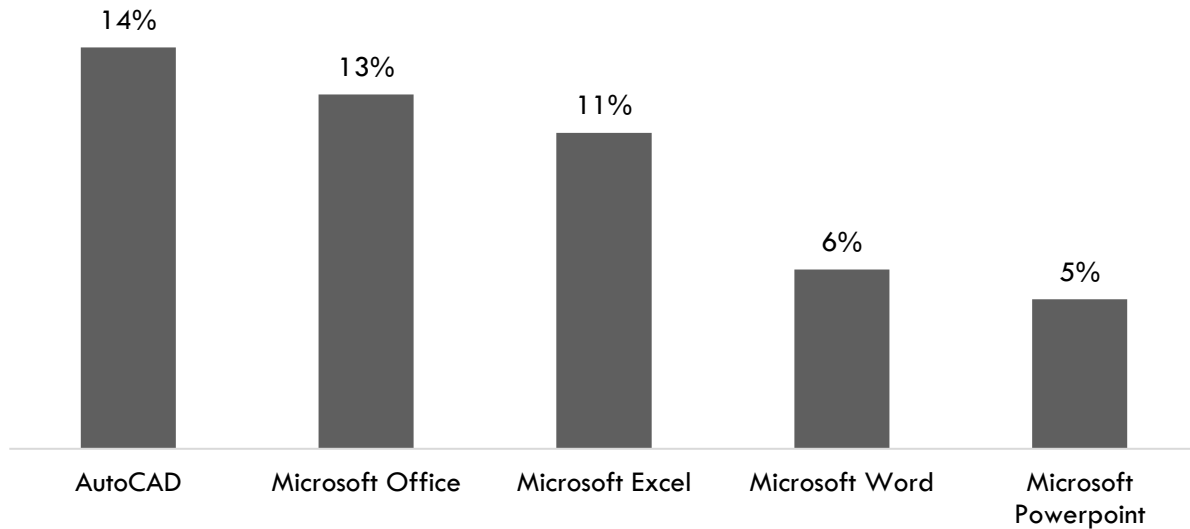




### Software Skills

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

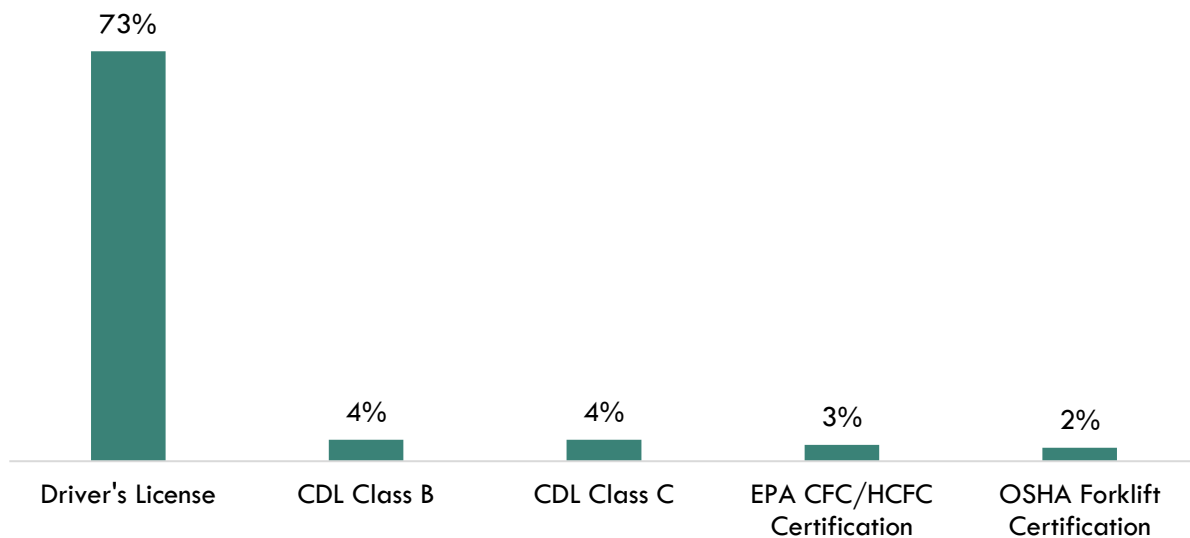
**Exhibit 8. In-demand Drafting Technology/Draftsman Architectural Draftsman/Mechanical software skills**



### Certifications

Of the 741 job postings, 208 contained certification data. Among those, 73% indicated a need for a driver's license. The next top certifications are CDL Class B and CDL Class C (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

**Exhibit 9. Top Drafting Technology/Draftsman Architectural Draftsman/Mechanical certifications requested in job postings**



# Education, Work Experience & Training

An associate degree is the typical entry-level education required for the seven occupations (Exhibit 10).

**Exhibit 10. Education, work experience, training, and Current Population Survey results for Drafting Technology/Draftsman Architectural Draftsman/Mechanical occupations<sup>3</sup>**

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Architectural and Civil Drafters	Associate degree	None	None	60.2%
Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other	Associate degree	None	None	53.5%
Electrical and Electronic Engineering Technologists and Technicians	Associate degree	None	None	53.5%
Mechanical Drafters	Associate degree	None	None	60.2%
Mechanical Engineering Technologists and Technicians	Associate degree	None	None	53.5%
Electrical and Electronics Drafters	Associate degree	None	None	60.2%
Drafters, All Other	Associate degree	None	None	60.2%

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<sup>3</sup> "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

# Supply

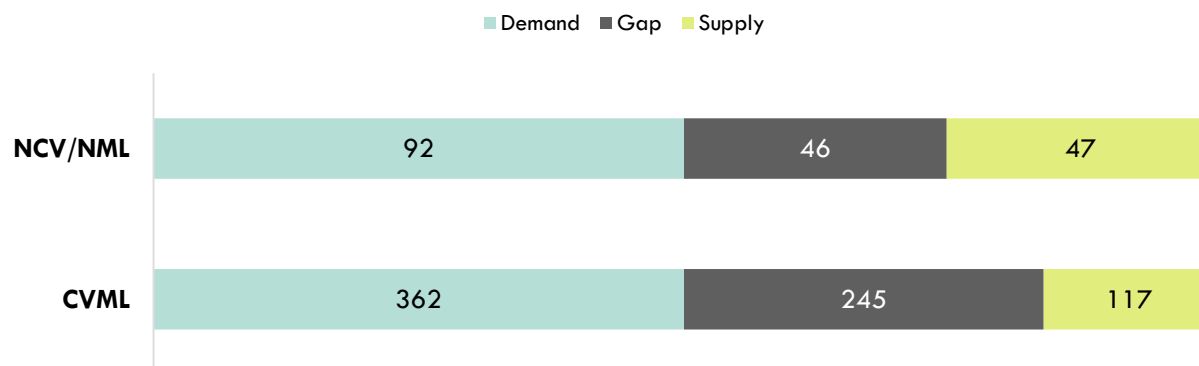
Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP codes and titles: 095300 - Drafting Technology and 095340 - Mechanical Drafting. Analysis of the last three years of data shows that, on average, 117 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

**Exhibit 11. Postsecondary supply for Drafting Technology/Draftsman Architectural Draftsman/Mechanical occupations in the region**

TOP Code - Title	Colleges	Associate Degree	Certificate 12 < 18 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Subtotal
<b>095300 - Drafting Technology</b>	Bakersfield	12			2	40	54
	Fresno City	6			7		13
	Merced	0					0
	San Joaquin Delta	10		7			17
<b>095340 - Mechanical Drafting</b>	Merced	6		8	8		22
	San Joaquin Delta	4			3		7
	Sequoias		3				3
<b>TOTAL</b>		<b>37</b>	<b>3</b>	<b>16</b>	<b>21</b>	<b>40</b>	<b>117</b>

There is an undersupply of 46 Drafting Technology/Draftsman Architectural Draftsman/Mechanical workers in the SCV/SML subregion and 245 workers in the region (Exhibit 12).

**Exhibit 12. Drafting Technology/Draftsman Architectural Draftsman/Mechanical workforce annual demand and supply in the SCV/SML subregion and region**



## Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP codes related to Drafting Technology/Draftsman Architectural Draftsman/Mechanical. There were 35 drafting students who received a degree or certificate or attained apprenticeship journey status and 25 who transferred; 62% of students obtained a job closely related to their field of study; 34% reported a median change in earnings, and 76% attained a living wage. By comparison, there were 17 mechanical drafting students who received a degree or certificate or attained apprenticeship journey status, and 78% who attained a living wage.

**Exhibit 13. Regional metrics for the TOP codes related to Drafting Technology/Draftsman Architectural Draftsman/Mechanical**

Metric	Drafting Technology 095300	Mechanical Drafting 095340
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	35	17
Number of Students Who Transferred	25	*
Job Closely Related to Field of Study	62%	*
Median Change in Earnings	34%	*
Attained a Living Wage	76%	78%
* denotes data not available.		

## Conclusion

The entry-level wages of the seven occupations exceed the SCV/SML subregion's average living wage. There were 741 job postings in the past six months for occupations related to Drafting Technology/Draftsman Architectural Draftsman/Mechanical in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is troubleshooting, and the top specialized skill is repair.
- The top software skill is AutoCAD.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 46 in the SCV/SML subregion and 245 in the region.

## Recommendation

Based on these findings, it is recommended that Merced College work with the Advanced Manufacturing Regional Director, the college's advisory board, and local industry in the expansion of programs to address the shortage of Drafting Technology/Draftsman Architectural Draftsman/Mechanical 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. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI 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 EMSI earnings by industry: <a href="http://economicmodeling.com">economicmodeling.com</a> .
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: <a href="https://www.bls.gov/emp/tables/educational-attainment.htm">https://www.bls.gov/emp/tables/educational-attainment.htm</a> .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a> .
Job Posting and Skills Data	Burning Glass: <a href="http://burning-glass.com/">burning-glass.com/</a> .
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: <a href="http://onetonline.org">onetonline.org</a> .

## 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. (EMSI) 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.