March 2022

Labor Market Analysis

Electro-Mechanical Apprenticeship

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California Community Colleges

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.

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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 electro-mechanical apprenticeship. Three occupations related to electro-mechanical apprenticeship were identified for Modesto Junior College:

- 17-3023, Electrical and Electronic Engineering Technologists and Technicians
- 17-3024, Electro-Mechanical and Mechatronics Technologists and Technicians
- 49-2094, Electrical and Electronics Repairers, Commercial and Industrial Equipment

Key findings:

- **Occupational demand —** Nearly 400 workers were employed in jobs related to electro-mechanical apprenticeship in 2020 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is electrical and electronics repairers, commercial and industrial equipment with 210 workers, a projected growth rate of 8% over the next five years, and 20 annual openings.

- **Wages —** Electrical and electronics repairers, commercial and industrial equipment earn the highest entry-level wage, $23.77/hour in the subregion. Please note there was no wage data available for electro-mechanical and mechatronics technologists and technicians.

- **Employers —** Employers with the most job postings in the subregion are Hupp Draft Services, Amazon, and Cepheid.

- **Occupational titles —** The most common occupational title in job postings in the subregion is Electronics Engineering Technicians. The most common job title is Calibration Technician II.

- **Skills and certifications —** The top baseline skill is troubleshooting, the top specialized skill is repair, and the top software skill is Microsoft Excel. The most in-demand certification is a driver's license.

- **Education —** A postsecondary nondegree award is typically required for electronics repairers, commercial and industrial equipment. An associate degree is typically required for the remaining two occupations related to electro-mechanical apprenticeship.

- **Supply —** Analysis of postsecondary completions shows that on average 17 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 38 trained workers in the subregion and 149 workers in the region. The Center of Excellence recommends that Modesto Junior College work with the regional directors, the college's advisory board, and local industry in the development of programs to address the shortage of electro-mechanical apprenticeship workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Modesto Junior College to provide labor market information for electro-mechanical apprenticeship. 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 electro-mechanical apprenticeship resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 17-3023, Electrical and Electronic Engineering Technologists and Technicians
- 17-3024, Electro-Mechanical and Mechatronics Technologists and Technicians
- 49-2094, Electrical and Electronics Repairers, Commercial and Industrial Equipment

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.

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

Electro-Mechanical and Mechatronics Technologists and Technicians
Job Description: Operate, test, maintain, or adjust unmanned, automated, servomechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment to observe or record visual information at sites such as oil rigs, crop fields, buildings, or for similar infrastructure, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.
Knowledge: Mechanical, Computers and Electronics, Engineering and Technology, English Language, Production and Processing
Skills: Operations Monitoring, Monitoring, Quality Control Analysis, Troubleshooting, Critical Thinking

Electrical and Electronics Repairers, Commercial and Industrial Equipment
Job Description: Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.
Knowledge: Computers and Electronics, Mechanical, Production and Processing, Customer and Personal Service, Mathematics
Skills: Operations Monitoring, Repairing, Monitoring, Critical Thinking, Equipment Maintenance, Quality Control Analysis

[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 385 workers in electro-mechanical apprenticeship occupations in 2020 (Exhibit 1). The largest occupation is electrical and electronics repairers, commercial and industrial equipment with 210 workers in 2020. This occupation is projected to grow by 8% over the next five years and has the greatest number of projected annual openings, 20.

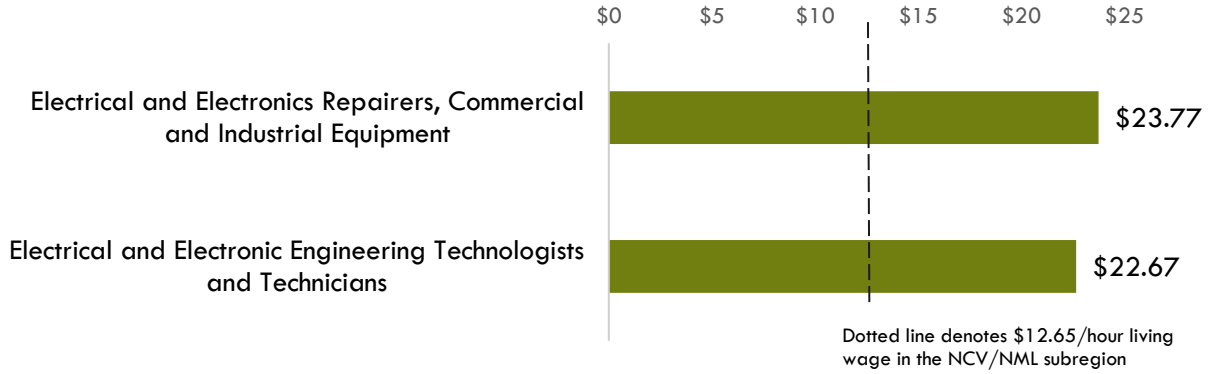
Exhibit 1. Electro-mechanical apprenticeship employment and occupational projections in the NCV/NML subregion

Occupation	2020 Jobs	2025 Jobs	5-Year Change	5-Year % Change	Annual Openings
Electrical and Electronics Repairers, Commercial and Industrial Equipment	210	226	16	8%	20
Electrical and Electronic Engineering Technologists and Technicians	170	186	16	9%	20
Electro-Mechanical and Mechatronics Technologists and Technicians	<10	<10	Insf. Data	Insf. Data	1
TOTAL	**385**	**418**	**33**	**9%**	**41**

Wages

Exhibit 2 shows the entry-level hourly wages of the electro-mechanical apprenticeship occupations. Electrical and electronics repairers, commercial and industrial equipment earn the highest entry-level wage, $23.77/hour in the subregion[2]. Please note there was no wage data available for electro-mechanical and mechatronics technologists and technicians.

Exhibit 2. Electro-mechanical apprenticeship entry-level wages in the NCV/NML subregion



Job Postings

There were 161 job postings for the three occupations in the NCV/NML subregion from September 2021 to Febuary 2022.[3] The employers with the most job postings are listed in Exhibit 3.

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

[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 3. Top employers of electro-mechanical apprenticeship by number of job postings

Employer	Job Postings	% Job Postings
Hupp Draft Services	9	7%
Amazon	7	5%
Cepheid	7	5%
Danaher Corporation	6	4%
Flory Group Incorporated	5	4%
Merced Irrigation District	5	4%
Tesla	4	3%
California Natural Products	3	2%
Department of Veterans Affairs	3	2%
Hilmar Cheese Company	3	2%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across four O*NET OnLine occupations. The occupational title Electronics Engineering Technicians is listed in 90 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Calibration Technician II in 13 job postings, Draft Beer Technician in 11 job postings, and Automation Technician in 10 job postings.

Exhibit 4. Top occupational titles in job postings for electro-mechanical apprenticeship

Occupational Title	Job Postings	% of Job Postings
Electronics Engineering Technicians	90	56%
Electro-Mechanical Technicians	42	26%
Electrical Engineering Technicians	15	9%
Robotics Technicians	14	9%

Salaries

Exhibit 5 shows the "Market Salaries" for electro-mechanical apprenticeship 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 electro-mechanical apprenticeship occupations

Market Salary Percentile	Salary Amount
10th Percentile	$31,589
25th Percentile	$41,495
50th Percentile	$47,687
75th Percentile	$55,928
90th Percentile	$68,931

Education

Of the 161 job postings, 109 listed an education level preferred for the positions being filled. Among those, 73% requested high school or vocational training, 39% requested an associate degree, and 9% 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%.

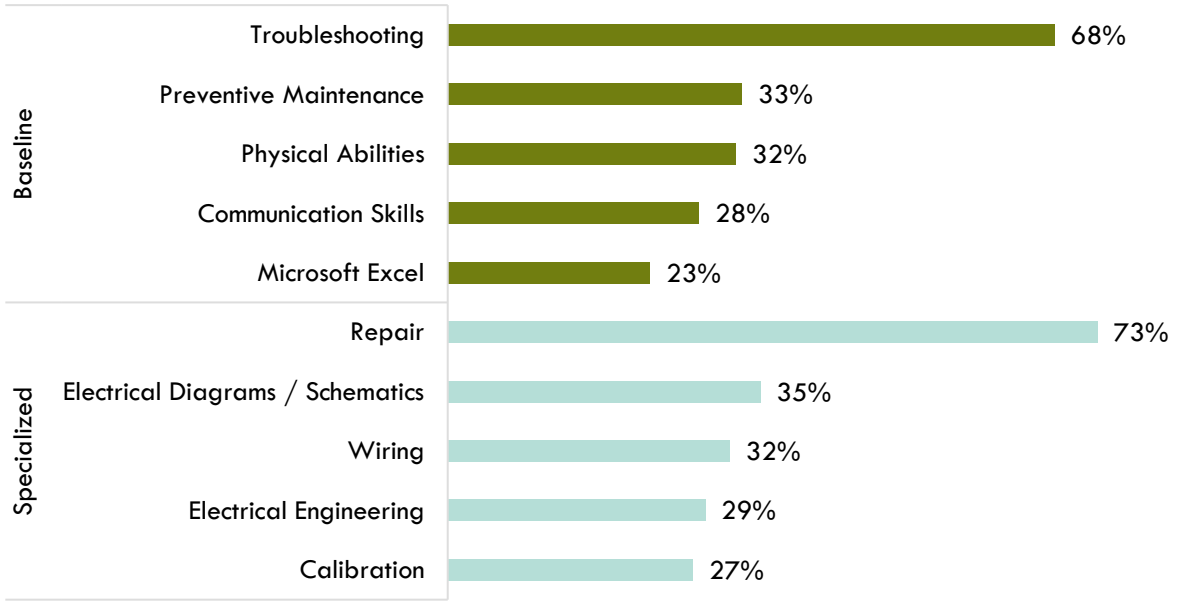
Exhibit 6. Education levels requested in job postings for electro-mechanical apprenticeship

Education Level	Job Postings	% of Job Postings
High school or vocational training	80	73%
Associate's degree	42	39%
Bachelor's degree	10	9%
Master's degree	4	4%

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, 68% of job postings, preventive maintenance, 33%, and physical abilities, 32%. The top three specialized skills are repair, 73% of job postings, electrical diagrams /schematics, 35%, and wiring, 32%.

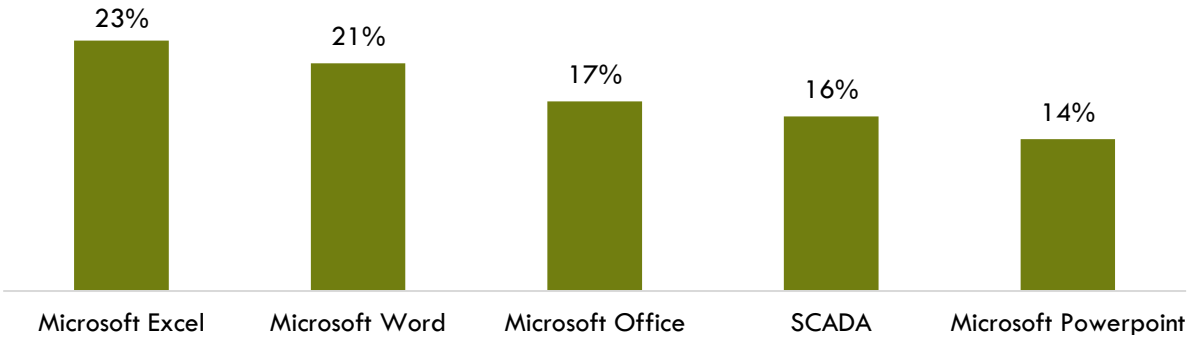
Exhibit 7. In-demand electro-mechanical apprenticeship baseline and specialized skills



Software Skills

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

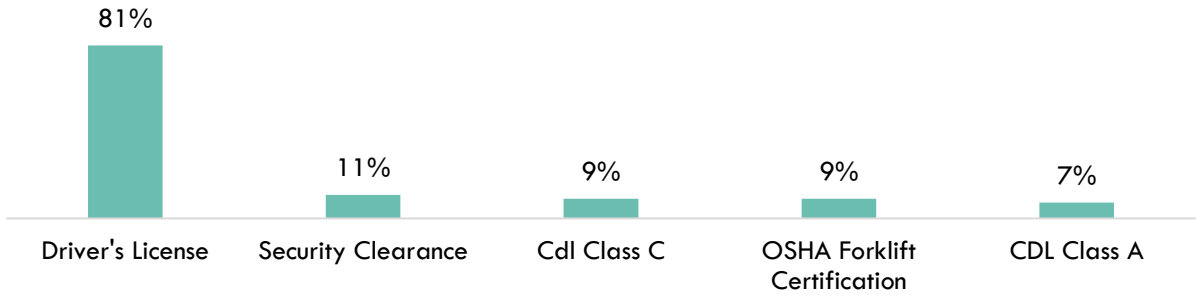
Exhibit 8. In-demand electro-mechanical apprenticeship software skills



Certifications

Of the 161 job postings, 54 contained certification data. Among those, 81% indicated a need for a driver's license. The next top certifications are security clearance and Cdl Class C (Exhibit 9).

Exhibit 9. Top electro-mechanical apprenticeship certifications requested in job postings



Education, Work Experience & Training

A postsecondary nondegree award is typically required for electronics repairers, commercial and industrial equipment. An associate degree is typically required for the remaining two occupations related to electro-mechanical apprenticeship (Exhibit 10).

Exhibit 10. Education, work experience, training, and Current Population Survey results for electro-mechanical apprenticeship occupations[4]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Electrical and Electronics Repairers, Commercial and Industrial Equipment	Postsecondary nondegree award	None	Long-term	44.4%
Electrical and Electronic Engineering Technologists and Technicians	Associate's degree	None	None	64.2%
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate's degree	None	None	50.7%

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

Supply

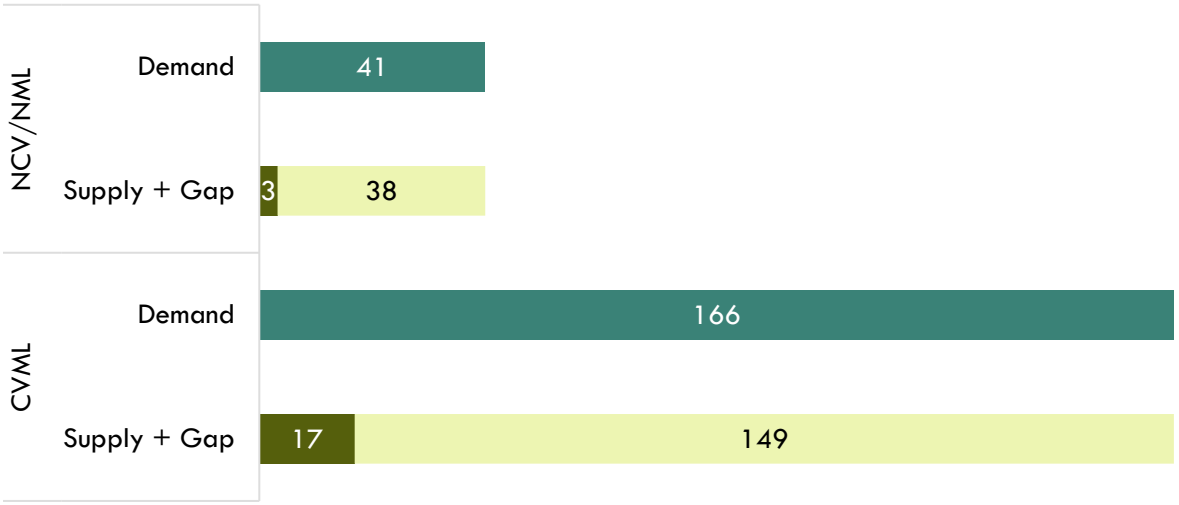
Analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) included the TOP code and title: 093500 - Electro-Mechanical Technology. Analysis of the last three years of data shows that, on average, 17 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for electro-mechanical apprenticeship occupations in the region

TOP/ CIP Code- Title	College	Associate Degree	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Subtotal
093500 - Electro-Mechanical Technology	Bakersfield	11	1	2	14
	San Joaquin Delta	2	0	1	3
TOTAL		**13**	**1**	**3**	**17**

There is an undersupply of 38 electro-mechanical apprenticeship workers in the NCV/NML subregion and 149 workers in the region (Exhibit 12).

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



Student Outcomes

There was no employment and wage outcomes data available from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to electro-mechanical apprenticeship.

Conclusion

The entry-level wages of the three occupations exceed the NCV/NML subregion's average living wage. There were 161 job postings in the past six months for occupations related to electro-mechanical apprenticeship 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 Microsoft Excel.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 38 in the NCV/NML subregion and 149 in the region.

Recommendation

Based on these findings, it is recommended that Modesto Junior College work with the regional directors, the college's advisory board, and local industry in the development of programs to address the shortage of electro-mechanical apprenticeship 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. (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: 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. (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.