

**Program Endorsement Brief: 0935.00/Electro-Mechanical Technology  
Automation Fundamentals**

Orange County Center of Excellence, December 2020

**Summary Analysis**

<b>Program Endorsement:</b>	<b>Endorsed: All Criteria Met</b> <input checked="" type="checkbox"/>	<b>Endorsed: Some Criteria Met</b> <input type="checkbox"/>	<b>Not Endorsed</b> <input type="checkbox"/>
<b>Program Endorsement Criteria</b>			
<b>Supply Gap:</b>	Yes <input checked="" type="checkbox"/>	No	<input type="checkbox"/>
<b>Living Wage: (Entry-Level, 25<sup>th</sup>)</b>	Yes <input checked="" type="checkbox"/>	No	<input type="checkbox"/>
<b>Education:</b>	Yes <input checked="" type="checkbox"/>	No	<input type="checkbox"/>
<b>Emerging Occupation(s)</b>			
	Yes <input checked="" type="checkbox"/>	No	<input type="checkbox"/>

The Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to two middle-skill occupations: *Electro-Mechanical and Mechatronics Technologists and Technicians* (17-3024), and *Mechanical Engineering Technologists and Technicians* (17-3027). Middle-skill occupations typically require some postsecondary education, but less than a bachelor’s degree.<sup>1</sup>

In addition to traditional labor market information, this report analyzes online job postings for 21 job titles that are closely related to automation to better understand the fundamental knowledge, skills, and abilities (KSAs) that are typically required for automation roles. 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.

Based on the available data there appears to be a supply gap for these automation occupations in the region. Furthermore, the majority of annual openings for these occupations typically require an associate degree and entry-level wages exceed the living wage in both Los Angeles and Orange counties. **Therefore, due to all of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

**Demand:**

- **Supply Gap Criteria** – Over the next five years, there is projected to be **262 jobs available annually** in the region due to retirements and workers leaving the field, **which is more than the 157 awards conferred annually** by educational institutions in the region

<sup>1</sup> The COE classifies middle-skill jobs as the following:

- 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.

- **Living Wage Criteria** –Within Orange County, **all of the annual job openings** for these automation occupations have **entry-level wages above the county’s living wage** (\$17.36/hour).<sup>2</sup>
- **Educational Criteria** – Within the LA/OC region, **all of the annual job openings** for occupations related to automation **typically require an associate degree**.
  - Furthermore, the national-level educational attainment data indicates **53.1% of workers in the field have completed some college or an associate degree**.

**Supply:**

- There are **8 community colleges** in the LA/OC region that issue awards related to these automation occupations, conferring an average of **130 awards annually** between 2016 and 2019.
- Between 2014 and 2017, there was an average of **27 awards conferred annually** in related training programs by non-community college institutions, all of which were generated by **2 individual four-year colleges throughout** the region.

**Occupational Demand**

Exhibit 1 shows the five-year occupational demand projections for these automation occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to decrease by 2% through 2024. However, there will be more than 260 job openings per year through 2024 due to retirements and workers leaving the field.

*This report includes employment projection data by Emsi which uses EDD information. 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. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it 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. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.*

**Exhibit 1: Occupational demand in Los Angeles and Orange Counties<sup>3</sup>**

<b>Geography</b>	<b>2019 Jobs</b>	<b>2024 Jobs</b>	<b>2019-2024 Change</b>	<b>2019-2024 % Change</b>	<b>Annual Openings</b>
Los Angeles	1,699	1,644	(54)	(3%)	165
Orange	981	983	2	0%	97
<b>Total</b>	<b>2,679</b>	<b>2,627</b>	<b>(52)</b>	<b>(2%)</b>	<b>262</b>

<sup>2</sup> Living wage data was pulled from California Family Needs Calculator on 12/8/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

<sup>3</sup> Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

## **Wages**

The labor market endorsement in this report considers the entry-level hourly wages for automation occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

**Orange County**—All of the annual openings for these automation occupations have entry-level wages above the living wage for one adult (\$17.36 in Orange County). Typical entry-level hourly wages are in a range between \$23.45 and \$25.94. Experienced workers can expect to earn wages between \$37.32 and \$41.24, which are higher than the living wage estimate. Orange County's average wages are above the average statewide wage of \$30.80 for these occupations.

**Los Angeles County**—All of the annual openings for these automation occupations have entry-level wages above the living wage for one adult (\$15.04 in Los Angeles County). Typical entry-level hourly wages are in a range between \$22.55 and \$25.37. Experienced workers can expect to earn wages between \$35.95 and \$40.59, which are higher than the living wage estimate. Los Angeles County's average wages are above the average statewide wage of \$30.80 for these occupations.

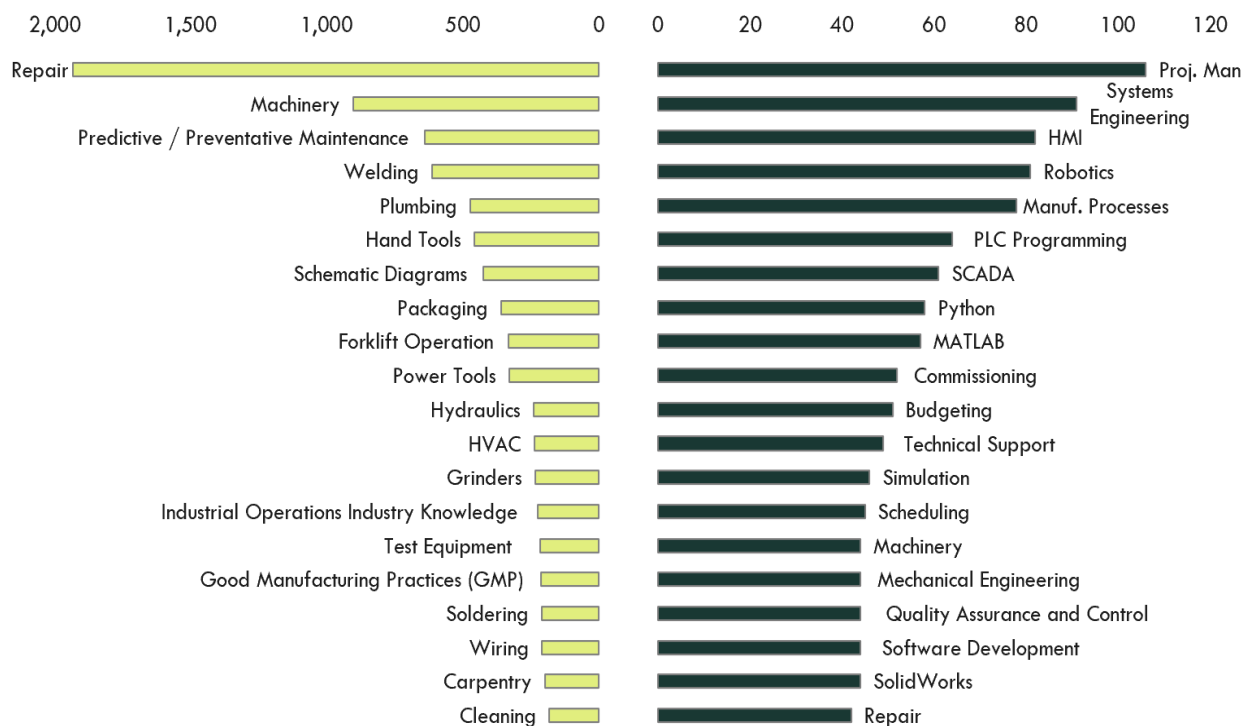
## **Job Postings**

There were 1,062 online job postings related to these automation occupations listed in the past 12 months. The highest number of job postings were for mechanical technician, electro-mechanical assembler, calibration technician, mechanical inspector, and electro-mechanical technicians. The top skills were: repair, calibration, test equipment, hand tools, soldering, and schematics. The top three employers, by number of job postings, in the region were: Northrop Grumman, Asurion, and SpaceX.

To better understand the demand for positions specifically related to automation roles and related skills, this section analyzes online job postings for 21 job titles related to automation. The full list of job titles is included in Appendix B. Over the past 12 months, there were 2,907 online job postings related to these automation job titles. The occupations with the highest number of job posting were Industrial Machinery Mechanics, Manufacturing Production Technicians, and Maintenance and Repair Workers, General. The top job titles were maintenance mechanic, manufacturing technician, and electronic technician. The top employers, by number of job postings, in the region were: Northrop Grumman, Boeing, Jones Lang Lasalle Incorporated, and B. Braun Medical Incorporated.

Exhibit 2, on the following page, shows the top 20 skills requested in online job postings by education level. Postings that request an associate degree or less are related to maintenance and repair, while postings that request a bachelor's degree or above are related to more specialized areas of automation, engineering, and project management. The top five requested skills in postings that require an associate degree or less are repair, machinery, predictive/preventative maintenance, welding, and plumbing. The top five requested skills in postings that require a bachelor's degree or above are project management, systems engineering, Human Machine Interface (HMI), robotics, and manufacturing processes.

## Exhibit 2: Top 20 industrial automation skills listed in online job postings by education level



*It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.*

### Educational Attainment

The Bureau of Labor Statistics (BLS) lists an associate degree as the typical entry-level education for Electro-Mechanical and Mechatronics Technologists and Technicians and Mechanical Engineering Technologists and Technicians. In the LA/OC region, all of the annual job openings typically require an associate degree. Furthermore, the national-level educational attainment data indicates 53.1% of workers in the field have completed some college or an associate degree. Of the 54% of job postings listing a minimum education requirement in Los Angeles/Orange County, 82% (467) requested a high school diploma or equivalent and 18% (102) requested an associate degree.

### Educational Supply

**Community College Supply**—Exhibit 3, on the following page, shows the three-year average number of awards conferred by community colleges in the related TOP codes: Electro-Mechanical Technology (0935.00) and Industrial Systems Technology and Maintenance (0945.00). The college with the most completions in the region is LA Trade. Over the past 12 months, there were three other related program recommendation requests from regional community colleges.

**Exhibit 3: Regional community college awards (certificates and degrees), 2016-2019**

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
0935.00	Electro-Mechanical Technology	Orange Coast	-	3	2	2
		Santa Ana	0	0	1	0
		<b>OC Subtotal</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>2</b>
<b>Supply Subtotal/Average</b>			<b>0</b>	<b>3</b>	<b>3</b>	<b>2</b>
0945.00	Industrial Systems Technology and Maintenance	Fullerton	0	2	0	1
		Santiago Canyon	8	6	23	12
		<b>OC Subtotal</b>	<b>8</b>	<b>8</b>	<b>23</b>	<b>13</b>
		LA Harbor	1	1	1	1
		LA Trade	122	94	90	102
		Long Beach	1	1	0	1
		West LA	0	19	14	11
		<b>LA Subtotal</b>	<b>124</b>	<b>115</b>	<b>105</b>	<b>115</b>
<b>Supply Subtotal/Average</b>			<b>132</b>	<b>123</b>	<b>128</b>	<b>128</b>
<b>Supply Total/Average</b>			<b>132</b>	<b>126</b>	<b>131</b>	<b>130</b>

**Non-Community College Supply**—It is important to consider the supply from four-year institutions in the region that provide training programs for these automation fundamentals occupations. Exhibit 4 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Code: Engineering Technology, General (15.0000). Though there are four additional related CIP codes, non-community college institutions did not confer awards under those CIP codes over the past three years. Due to different data collection periods, the most recent three-year period of available data is from 2014 to 2017. Between 2014 and 2017, four-year colleges in the region conferred an average of 27 awards annually in related training programs.

**Exhibit 4: Regional non-community college awards, 2014-2017**

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
15.0000	Engineering Technology, General	California State Polytechnic University-Pomona	26	42	11	26
		California State University-Long Beach	1	0	0	0
<b>Supply Total/Average</b>			<b>27</b>	<b>42</b>	<b>11</b>	<b>27</b>

Appendix A: Occupational demand and wage data by county

Exhibit 5. Orange County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	386	380	(6)	(2%)	38	\$23.45	\$29.85	\$37.32
Mechanical Engineering Technologists and Technicians (17-3027)	594	602	8	1%	59	\$25.94	\$34.14	\$41.24
<b>Total</b>	<b>981</b>	<b>983</b>	<b>2</b>	<b>0%</b>	<b>97</b>			

Exhibit 6. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	659	629	(30)	(5%)	63	\$22.55	\$28.73	\$35.95
Mechanical Engineering Technologists and Technicians (17-3027)	1,040	1,016	(24)	(2%)	101	\$25.37	\$33.52	\$40.59
<b>Total</b>	<b>1,699</b>	<b>1,644</b>	<b>(54)</b>	<b>(3%)</b>	<b>165</b>			

**Exhibit 7. Los Angeles and Orange Counties**

<b>Occupation (SOC)</b>	<b>2019 Jobs</b>	<b>2024 Jobs</b>	<b>5-Yr Change</b>	<b>5-Yr % Change</b>	<b>Annual Openings</b>
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	1,045	1,009	(36)	(3%)	101
Mechanical Engineering Technologists and Technicians (17-3027)	1,634	1,618	(16)	(1%)	161
<b>Total</b>	2,679	2,627	<b>(52)</b>	<b>(2%)</b>	262

**Appendix B: Automation Job Titles Used in Burning Glass Search**

- Automation Design Engineer
- Automation Engineer
- Control Systems Engineer
- Control Systems Technician
- DCS Automation
- Digital Controls System
- Electro-Mechanical Technician
- Electronic Specialist
- Electronic Technician
- HMI Automation
- Human Machine Interface Automation Engineer
- Industrial Control Technician
- Industrial Maintenance Technician
- Maintenance Mechanic
- Manufacturing Technician
- PLC Programmer
- Robotics Software Engineer
- Robotics Technician
- SCADA Programmer

## Appendix C: Sources

- O\*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

For more information, please contact:

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December 2020

