

**Program Endorsement Brief: 0934.20/Industrial Electronics  
Automated Control Systems**  
Orange County Center of Excellence, May 2021

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**Summary Analysis**

<b>Program Endorsement:</b>	<b>Endorsed: All Criteria Met</b> <input type="checkbox"/>	<b>Endorsed: Some Criteria Met</b> <input checked="" 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 type="checkbox"/>	No <input checked="" type="checkbox"/>	
<b>Education:</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
<b>Emerging Occupation(s)</b>			
	Yes <input type="checkbox"/>	No <input checked="" 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 four middle-skill occupation(s): *Electrical and Electronic Engineering Technologists and Technicians (17-3023)*; *Industrial Engineering Technologists and Technicians (17-3026)*; *Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)*; and *Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers (51-2028)*. 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 and automated control systems to better understand the knowledge, skills, and abilities (KSAs) that are typically required for automation roles that cut across numerous occupations. 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 automated control systems occupations in the region. Furthermore, nearly one-third of *Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers*, the occupation with the majority of annual openings in the region, have completed an associate degree or some college as their highest level of education. However, the majority of annual openings for these occupations have entry-level wages below the living wage in both Los Angeles and Orange counties. **Therefore, due to some of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

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<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.

### **Demand:**

- **Supply Gap Criteria** – Over the next five years, there is projected to be **2,125 jobs available annually** in the region due to retirements and workers leaving the field, **which is more than the 1,245 awards conferred annually** by educational institutions in the region.
- **Living Wage Criteria** –Within Orange County, **the majority (70%) of annual job openings for these automated control systems occupations have entry-level wages below the county's living wage (\$17.36/hour).**<sup>2</sup>
- **Educational Criteria** –Within the LA/OC region, **66% of the annual job openings** for occupations related to automated control systems **typically require a high school diploma or equivalent.**
  - However the national-level educational attainment data indicates **between 29.9% and 64.2% of workers in the field have completed some college or an associate degree as their highest level of education.**

### **Supply:**

- There are **23 community colleges** in the LA/OC region that issue awards related to these automated control systems occupations, conferring an average of **922 awards annually** between 2017 and 2020.
- Between 2016 and 2019, there was an average of **323 awards conferred annually** in related training programs by non-community college institutions, all of which were generated by **15 individual institutions throughout** the region.

### **Occupational Demand**

Exhibit 1, on the following page, shows the five-year occupational demand projections for these automated control systems occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to decrease by 6% through 2024. However, there will be more than 2,100 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.*

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<sup>2</sup> Living wage data was pulled from California Family Needs Calculator on 5/10/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

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

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	14,171	13,124	(1,047)	(7%)	1,245
Orange	9,933	9,493	(440)	(4%)	880
<b>Total</b>	<b>24,104</b>	<b>22,617</b>	<b>(1,487)</b>	<b>(6%)</b>	<b>2,125</b>

### Wages

The labor market endorsement in this report considers the entry-level hourly wages for these program name 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**—The majority (70%) of annual openings for these automated control systems occupations have entry-level wages below the living wage for one adult (\$17.36 in Orange County). Typical entry-level hourly wages are in a range between \$15.03 and \$25.01. Experienced workers can expect to earn wages between \$21.96 and \$44.38, which are higher than the living wage estimate. Orange County’s average wages are below the average statewide wage of \$26.52 for these occupations.

**Los Angeles County**—The majority (63%) of annual openings for program name occupations have entry-level wages below the living wage for one adult (\$15.04 in Los Angeles County). Typical entry-level hourly wages are in a range between \$13.98 and \$23.59. Experienced workers can expect to earn wages between \$20.43 and \$41.77, which are higher than the living wage estimate. Los Angeles County’s average wages are below the average statewide wage of \$26.52 for these occupations.

### Job Postings

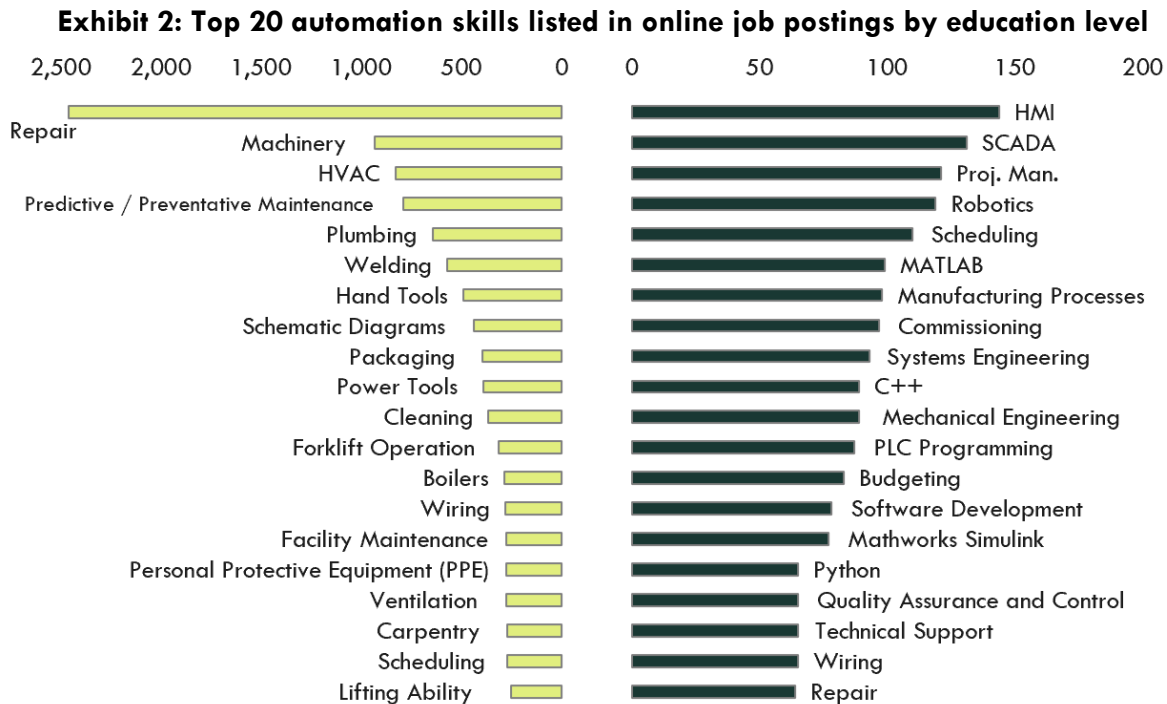
There were 5,427 online job postings related to these automated control systems occupations listed in the past 12 months. The highest number of job postings were for maintenance technician, mechanical assembler, test technician, electro-mechanical assembler, and electronic assembler. The top skills were: repair, hand tools, schematic wiring, predictive/preventative maintenance, and soldering. The top three employers, by number of job postings, in the region were Goodyear, Cushman and Wakefield, and Orange County Sanitation District.

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 3,970 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 HVAC service technician. The top employers, by number of job

<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.

postings, in the region were: Sears, Northrop Grumman, Boeing, and B. Braun Medical, Incorporated.

Exhibit 2 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 requested skills in postings that require an associate degree or less are repair, machinery, HVAC, predictive/preventative maintenance, plumbing, and welding. The top five requested skills in postings that require a bachelor’s degree or above are Human Machine Interface (HMI), SCADA, project management, robotics, scheduling, and MATLAB.



*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 a high school diploma or equivalent as the typical entry-level education for Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers, a postsecondary nondegree award for Electrical and Electronics Repairers, Commercial and Industrial Equipment, and an associate degree for Electrical and Electronic Engineering Technologists and Technicians and Industrial Engineering Technologists and Technicians. In the LA/OC region, the majority of annual job openings (68%) typically require a high school diploma or equivalent. However, the national-level educational attainment data indicates between 29.9% and 64.2% of workers in the field have completed some college or an associate degree.

Of the 54% of job postings for these occupations listing a minimum education requirement in Los Angeles/Orange County, 85% (2,481) requested a high school diploma or equivalent and 15% (443) requested an associate degree. Of the 60% of job postings specifically related to automation job titles, 68% (1,615) requested a high school diploma or equivalent, 7% (172) requested an associate degree, and 24% (558) requested a bachelor's degree.

### Educational Supply

**Community College Supply**—Exhibit 3 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Engineering Technology, General (Requires Trigonometry) (0924.00); Electronics and Electric Technology (0934.00); Computer Electronics (0934.10); Industrial Electronics (0934.20); Electrical Systems and Power Transmission (0934.40); Industrial Systems Technology and Maintenance (0945.00); and Manufacturing and Industrial Technology (0956.00). The colleges with the most completions in the region are Pasadena, Santiago Canyon, and LA Trade. Over the past 12 months, there was one other related program recommendation requests from regional community colleges.

**Exhibit 3: Regional community college awards (certificates and degrees), 2017-2020**

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
0924.00	Engineering Technology, General (Requires Trigonometry)	Cerritos	23	26	15	21
		East LA	-	-	1	0
		Glendale	17	14	7	13
		Mt San Antonio	-	-	2	1
		Pasadena	173	176	216	188
		<b>LA Subtotal</b>	<b>213</b>	<b>216</b>	<b>241</b>	<b>223</b>
		Santa Ana	1	1	3	2
		<b>OC Subtotal</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Supply Subtotal/Average</b>			<b>214</b>	<b>217</b>	<b>244</b>	<b>225</b>
0934.00	Electronics and Electric Technology	East LA	15	4	1	7
		El Camino	11	9	8	9
		Glendale	4	1	5	3
		LA City	-	-	4	1
		LA Pierce	14	11	4	10
		LA Swest	2	-	9	4
		LA Valley	15	25	14	18
		Long Beach	46	55	50	50
		Mt San Antonio	88	42	48	59
		Pasadena	31	27	24	27
		Rio Hondo	9	3	-	4

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
		<b>LA Subtotal</b>	<b>235</b>	<b>177</b>	<b>167</b>	<b>193</b>
		Coastline	95	88	58	80
		Irvine	20	17	37	25
		Orange Coast	11	4	12	9
		Saddleback	8	13	14	12
		Santa Ana	3	5	8	5
		<b>OC Subtotal</b>	<b>137</b>	<b>127</b>	<b>129</b>	<b>131</b>
<b>Supply Subtotal/Average</b>			<b>372</b>	<b>304</b>	<b>296</b>	<b>324</b>
0934.10	Computer Electronics	East LA	50	35	34	40
		El Camino	13	15	6	11
		LA City	1	-	-	0
		LA Trade	11	8	10	10
		LA Valley	1	-	-	0
		Mt San Antonio	10	10	12	11
		<b>LA Subtotal</b>	<b>86</b>	<b>68</b>	<b>62</b>	<b>72</b>
		Orange Coast	7	4	5	5
		Saddleback	18	19	13	17
		<b>OC Subtotal</b>	<b>25</b>	<b>23</b>	<b>18</b>	<b>22</b>
<b>Supply Subtotal/Average</b>			<b>111</b>	<b>91</b>	<b>80</b>	<b>94</b>
0934.20	Industrial Electronics	El Camino	1	-	-	0
		<b>LA Subtotal</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>0</b>
<b>Supply Subtotal/Average</b>			<b>1</b>	<b>-</b>	<b>-</b>	<b>0</b>
0934.40	Electrical Systems and Power Transmission	LA Trade	1	-	-	0
		<b>LA Subtotal</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>0</b>
		Santiago Canyon	3	166	56	75
		<b>OC Subtotal</b>	<b>3</b>	<b>166</b>	<b>56</b>	<b>75</b>
<b>Supply Subtotal/Average</b>			<b>4</b>	<b>166</b>	<b>56</b>	<b>75</b>
0945.00	Industrial Systems Technology and Maintenance	LA Harbor	1	1	1	1
		LA Swest	-	-	9	3
		LA Trade	94	90	61	82
		Long Beach	1	-	-	0
		West LA	19	14	20	18

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
		<b>LA Subtotal</b>	<b>115</b>	<b>105</b>	<b>91</b>	<b>104</b>
		Fullerton	2	-	-	1
		Santiago Canyon	6	23	16	15
		<b>OC Subtotal</b>	<b>8</b>	<b>23</b>	<b>16</b>	<b>16</b>
<b>Supply Subtotal/Average</b>			<b>123</b>	<b>128</b>	<b>107</b>	<b>119</b>
0956.00	Manufacturing and Industrial Technology	Cerritos	6	2	-	3
		Compton	2	-	-	1
		El Camino	3	2	-	2
		Glendale	-	-	2	1
		LA Trade	-	5	9	5
		LA Valley	2	3	9	5
		Mt San Antonio	9	13	14	12
		<b>LA Subtotal</b>	<b>22</b>	<b>25</b>	<b>34</b>	<b>27</b>
		Fullerton	11	9	38	19
		Irvine	1	3	-	1
		Saddleback	9	11	7	9
		Santa Ana	1	-	3	1
		Santiago Canyon	27	41	10	26
		<b>OC Subtotal</b>	<b>49</b>	<b>64</b>	<b>58</b>	<b>57</b>
		<b>Supply Subtotal/Average</b>			<b>71</b>	<b>89</b>
<b>Supply Total/Average</b>			<b>896</b>	<b>995</b>	<b>875</b>	<b>922</b>

**Non-Community College Supply**—It is important to consider the supply from other institutions in the region that provide training programs for these automation occupations. Exhibit 4, on the following page, shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: Engineering Technology, General (15.0000), Electrical and Electronic Engineering Technologies/Technicians, Other (15.0399), Instrumentation Technology/Technician (15.0505), Automation Engineer Technology/Technician Industrial Technology/Technician (15.0612), Industrial Production Technologies/Technicians, Other (15.0699), Computer Engineering Technology/Technician (15.1201), Computer Installation and Repair Technology/Technician (47.01014). Due to different data collection periods, the most recent three-year period of available data is from 2016 to 2019. Between 2016 and 2019, four-year colleges in the region conferred an average of 323 awards annually in related training programs.

**Exhibit 4: Regional non-community college awards, 2017-2020**

CIP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
15.0000	Engineering Technology, General	California State Polytechnic University-Pomona	11	1	4	5
		<b>LA Subtotal</b>	<b>11</b>	<b>1</b>	<b>4</b>	<b>5</b>
<b>Supply Subtotal/Average</b>			<b>11</b>	<b>1</b>	<b>4</b>	<b>5</b>
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	California State Polytechnic University-Pomona	34	48	42	41
		California State University-Long Beach	13	22	12	16
		DeVry University-California	41	31	30	34
		<b>LA Subtotal</b>	<b>88</b>	<b>101</b>	<b>84</b>	<b>91</b>
<b>Supply Subtotal/Average</b>			<b>88</b>	<b>101</b>	<b>84</b>	<b>91</b>
15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other	Southern California Institute of Technology	2	1	-	1
		<b>OC Subtotal</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>1</b>
<b>Supply Subtotal/Average</b>			<b>2</b>	<b>1</b>	<b>-</b>	<b>1</b>
15.0612	Industrial Technology/Technician	California State University-Los Angeles	50	32	40	41
		<b>LA Subtotal</b>	<b>50</b>	<b>32</b>	<b>40</b>	<b>41</b>
<b>Supply Subtotal/Average</b>			<b>1</b>	<b>-</b>	<b>-</b>	<b>0</b>
15.1201	Computer Engineering Technology/Technician	California State University-Long Beach	13	11	11	12



CIP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
		DeVry University-California	15	7	4	9
		<b>LA Subtotal</b>	<b>28</b>	<b>18</b>	<b>15</b>	<b>20</b>
<b>Supply Subtotal/Average</b>			<b>28</b>	<b>18</b>	<b>15</b>	<b>20</b>
47.0104	Computer Installation and Repair Technology/Techncian	ABC Adult School	-	5	7	4
		ABCO Technology	32	19	43	31
		Eagle Rock College	1	-	-	0
		Hacienda La Puente Adult Education	26	17	11	18
		UEI College-Gardena	17	26	6	16
		United Education Institute-Encino	37	37	17	30
		United Education Institute-West Covina	45	52	37	45
		<b>LA Subtotal</b>	<b>158</b>	<b>156</b>	<b>121</b>	<b>145</b>
		United Education Institue-Anaheim	24	31	5	20
		<b>OC Subtotal</b>	<b>24</b>	<b>31</b>	<b>5</b>	<b>20</b>
<b>Supply Subtotal/Average</b>			<b>182</b>	<b>187</b>	<b>126</b>	<b>84</b>
<b>Supply Total/Average</b>			<b>361</b>	<b>340</b>	<b>269</b>	<b>323</b>

**Appendix A: Occupational demand and wage data by county**

**Exhibit 4. Orange County**

<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>	<b>Entry-Level Hourly Earnings (25<sup>th</sup> Percentile)</b>	<b>Median Hourly Earnings</b>	<b>Experienced Hourly Earnings (75<sup>th</sup> Percentile)</b>
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	2,256	2,061	(195)	(9%)	175	\$25.01	\$31.73	\$40.61
Industrial Engineering Technologists and Technicians (17-3026)	630	629	(0)	(0%)	54	\$24.13	\$32.74	\$44.38
Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)	590	523	(67)	(11%)	37	\$22.61	\$31.54	\$43.82
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers (51-2028)	6,458	6,280	(178)	(3%)	614	\$15.03	\$17.79	\$21.96
<b>Total</b>	<b>9,933</b>	<b>9,493</b>	<b>(440)</b>	<b>(4%)</b>	<b>880</b>			

**Exhibit 5. Los Angeles County**

<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>	<b>Entry-Level Hourly Earnings (25<sup>th</sup> Percentile)</b>	<b>Median Hourly Earnings</b>	<b>Experienced Hourly Earnings (75<sup>th</sup> Percentile)</b>
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	3,887	3,520	(367)	(9%)	306	\$23.59	\$30.07	\$38.61
Industrial Engineering Technologists and Technicians (17-3026)	1,023	968	(54)	(5%)	82	\$22.58	\$30.73	\$41.75
Electrical and Electronics Repairers, Commercial and	1,167	1,052	(115)	(10%)	74	\$21.55	\$30.05	\$41.77

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Industrial Equipment (49-2094)								
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers (51-2028)	8,094	7,583	(511)	(6%)	784	\$13.98	\$16.55	\$20.43
<b>Total</b>	<b>14,171</b>	<b>13,124</b>	<b>(1,047)</b>	<b>(7%)</b>	<b>1,245</b>			

**Exhibit 6. Los Angeles and Orange Counties**

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	6,143	5,581	(563)	(9%)	481
Industrial Engineering Technologists and Technicians (17-3026)	1,652	1,598	(55)	(3%)	136
Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)	1,757	1,576	(182)	(10%)	110
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers (51-2028)	14,552	13,863	(689)	(5%)	1,398
<b>Total</b>	<b>24,104</b>	<b>22,617</b>	<b>(1,487)</b>	<b>(6%)</b>	<b>2,125</b>

## 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:

Jesse Crete, Ed. D., Director  
Center of Excellence, Orange County  
[crete\\_jesse@rscgd.edu](mailto:crete_jesse@rscgd.edu)

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