

**Program Endorsement Brief: 0934.00/Electronics and Electric Technology
Embedded Systems Technician; Industrial Robotics Technician**

Orange County Center of Excellence, January 2021

Summary Analysis

Program Endorsement:	Endorsed: All Criteria Met <input type="checkbox"/>	Endorsed: Some Criteria Met <input checked="" type="checkbox"/>	Not Endorsed <input type="checkbox"/>
Program Endorsement Criteria			
Supply Gap:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/> (See comments below)	
Living Wage: (Entry-Level, 25th)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Education:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Emerging Occupation(s)			
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 one middle-skill occupation: *electrical and electronic engineering technologists and technicians* (17-3023). Middle-skill occupations typically require some postsecondary education, but less than a bachelor’s degree.¹

In addition to traditional labor market information, this report analyzes online job postings for 21 job titles that are closely related to industrial 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 does not appear to be a supply gap for *electrical and electronic engineering technologists and technicians* in the region; however, the oversupply is within the COE’s acceptable margin (25% over or under the number of annual job openings) and is therefore considered “supply met” rather than a “supply gap”. However, the Bureau of Labor Statistics lists an associate degree as the typical entry-level education, and entry-level wages exceed the living wage in both Los Angeles and Orange counties. **Therefore, due some of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

¹ 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 **586 jobs available annually** in the region due to retirements and workers leaving the field, **which is more than the 690 awards conferred annually** by educational institutions in the region.
 - The labor market information suggests that the **supply has been met for this occupation within the LA/OC region** since the average number of annual awards (supply) is within the COE's 25% margin of annual job openings (demand).
 - However, there were **1,667 online job postings related to electrical and electronic engineering technologists and technicians** listed in the past 12 months. The highest number of job postings were for test technicians, electronics technicians, low voltage technicians, electrical technicians, and electromechanical technicians.
 - Additionally, over the past 12 months, there were **2,907 online job postings for job titles related to industrial automation** for which this program trains.
- **Living Wage Criteria** – Within Orange County, **typical entry-level hourly wages for electrical and electronic engineering technologists and technicians are \$23.56, which is higher than the California Family Needs Calculator** hourly wage (living wage) for one adult in the region (\$17.36 in Orange County).²
- **Educational Criteria** – The Bureau of Labor Statistics (BLS) lists an **associate degree as the typical entry-level education** for *electrical and electronic engineering technologists and technicians*.
 - Furthermore, the national-level educational attainment data indicates **61.3% of workers in the field have completed some college or an associate degree**.

Supply:

- There are **19 community colleges** in the LA/OC region that issue awards related to electronics and electric technology, conferring an average of **400 awards annually** between 2016 and 2019.
- Between 2014 and 2017, there was an average of **290 awards conferred annually** in related training programs by non-community college institutions throughout the region.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for *electrical and electronic engineering technologists and technicians*. 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 nearly 600 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

² Living wage data was pulled from California Family Needs Calculator on 1/21/2021. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

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 Counties³

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	3,788	3,686	(102)	(3%)	369
Orange	2,206	2,208	2	0%	217
Total	5,994	5,893	(101)	(2%)	586

Wages

The labor market endorsement in this report considers the entry-level hourly wages for *electrical and electronic engineering technologists and technicians* 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 typical entry-level hourly wages for *electrical and electronic engineering technologists and technicians* are \$23.56, which is above the living wage for one adult (\$17.36 in Orange County). Experienced workers can expect to earn wages of \$40.59, which is higher than the living wage estimate. Orange County’s average wages are below the average statewide wage of \$33.78 for this occupation.

Los Angeles County— The typical entry-level hourly wages for *electrical and electronic engineering technologists and technicians* are \$22.59, which is above the living wage for one adult (\$15.04 in Los Angeles County). Experienced workers can expect to earn wages of \$39.05, which is higher than the living wage estimate. Los Angeles County’s average wages are below the average statewide wage of \$33.78 for this occupation.

Job Postings

There were 1,667 online job postings related to *electrical and electronic engineering technologists and technicians* listed in the past 12 months. The highest number of job postings were for test technicians, electronics technicians, low voltage technicians, electrical technicians, and electromechanical technicians. The top skills were: repair, test equipment, schematic diagrams, wiring, and oscilloscopes. The top three employers, by number of job postings, in the region were: L3 Harris, Orange County Sanitation District, and The Boeing Company.

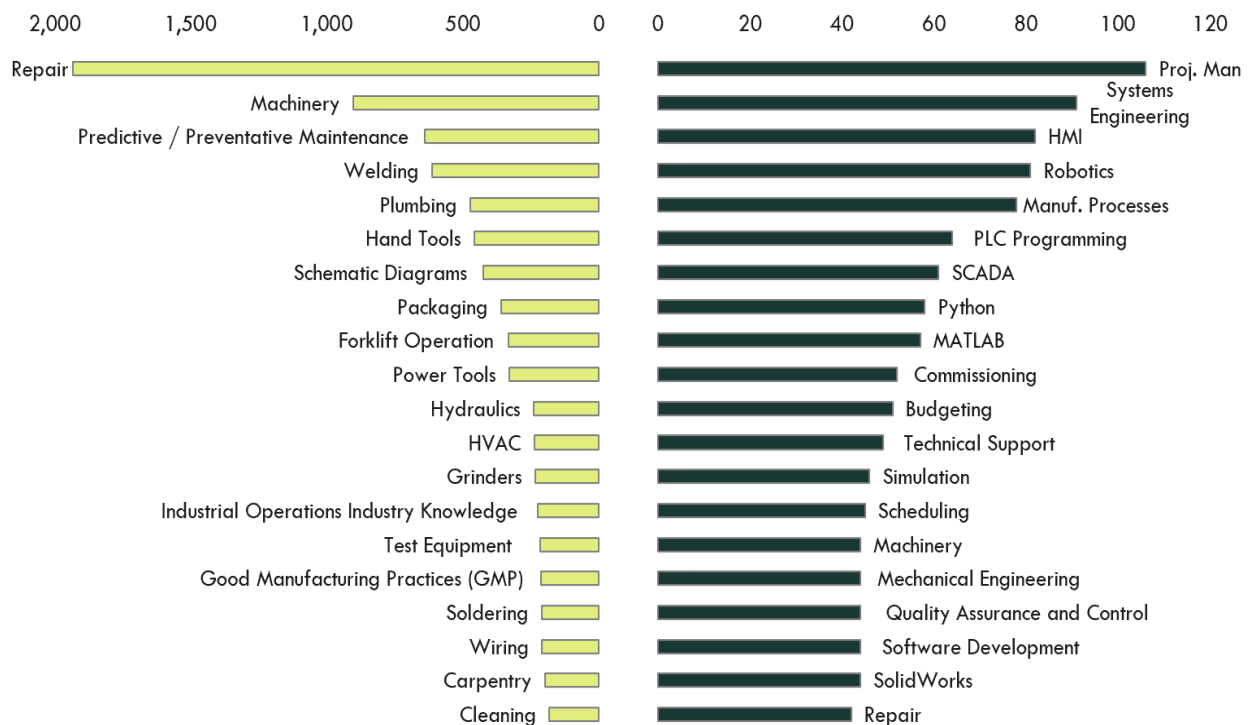
To better understand the demand for positions specifically related to industrial automation roles and related skills, this section analyzes online job postings for 21 job titles related to automation.

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

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 mechanics, manufacturing technicians, and electronic technicians. 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 shows the top 20 skills for industrial automation job titles 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 *electrical and electronic engineering technologists and technicians*. Furthermore, the national-level educational attainment data indicates 61.3% of workers in the field have completed some college or an associate degree. Of the 55% of *electrical and electronic engineering technologists and technicians* job postings listing a minimum education requirement in Los Angeles/Orange County, 64% (580) requested a high school diploma and 36% (332) requested an associate 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 (0924.00), Electronics and Electric Technology (0934.00), Industrial Electronics (0934.20), Electrical Systems and Power Transmission (0934.40), and Instrumentation Technology (0943.00). The colleges with the most completions in the region are: Pasadena, Coastline, and Santiago Canyon. Over the past 12 months, there were eight 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
0924.00	Engineering Technology, General (requires Trigonometry)	Cerritos	6	23	26	18
		East LA	1	-	-	0
		Glendale	12	17	14	14
		Pasadena	122	173	176	157
		LA Subtotal	141	213	216	190
		Santa Ana	5	1	1	2
		OC Subtotal	5	1	1	2
Supply Subtotal/Average			146	214	217	192
0934.00	Electronics and Electric Technology	East LA	12	15	4	10
		El Camino	6	11	9	9
		Glendale	9	4	1	5
		LA City	14	-	-	5
		LA Pierce	40	14	11	22
		LA Southwest	4	2	-	2
		LA Valley	24	15	25	21
		Long Beach	44	46	55	48
		Mt San Antonio	36	88	42	55
		Pasadena	27	31	27	28
		Rio Hondo	1	9	3	4

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
		LA Subtotal	217	235	177	210
		Coastline	100	95	88	94
		Irvine	25	20	17	21
		Orange Coast	7	11	4	7
		Saddleback	17	8	13	13
		Santa Ana	14	3	5	7
		OC Subtotal	163	137	127	142
		Supply Subtotal/Average	380	372	304	352
0934.20	Industrial Electronics	El Camino	-	1	-	0
		LA Subtotal	0	1	0	0
		Supply Subtotal/Average	0	1	0	0
0934.40	Electrical Systems and Power Transmission	LA Trade-Tech	-	1	-	0
		LA Subtotal	0	1	0	0
		Santiago Canyon	1	3	166	57
		OC Subtotal	1	3	166	57
		Supply Subtotal/Average	1	4	166	57
		Supply Total/Average	527	591	687	602

Non-Community College Supply—For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for *electrical and electronic engineering technologists and technicians*. Exhibit 4 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 (15.000), Electrical, Electronic and Communications Engineering Technology/Technician (15.0303), Electrical and electronic Engineering Technologies/Technicians, Other (15.0399), Industrial Technology/Technician (15.0612), and Electrical and Power Transmission Installation/Installer, General (46.0301). 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 290 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
15.0303	Electrical, Electronic and Communications Engineering Technology/ Technician	California State Polytechnic University-Pomona	28	34	34	32
		California State University-Long Beach	18	16	13	16
		DeVry University-California	94	66	41	67
		ITT Technical Institute-Orange	64	-	-	21
		ITT Technical Institute-San Dimas	38	-	-	13
		ITT Technical Institute-Sylmar	40	-	-	13
		ITT Technical Institute-Torrance	30	-	-	10
15.0399	Electrical and Electronic Engineering Technologies/ Technicians, Other	ITT Technical Institute-Orange	25	-	-	8
		ITT Technical Institute-San Dimas	22	-	-	7
		ITT Technical Institute-Sylmar	14	-	-	5
		ITT Technical Institute-Torrance	23	-	-	8
		Southern California Institute of Technology	1	4	2	2
15.0612	Industrial Technology/Technician	California State University-Los Angeles	34	41	50	42
46.0301	Electrical and Power Transmission Installation/ Installer, General	InterCoast Colleges-Anaheim	27	-	-	9
		InterCoast Colleges-West Covina	31	-	-	10
Supply Total/Average			516	203	151	290

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)
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	2,206	2,208	2	0%	217	\$23.56	\$30.87	\$40.59

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)
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	3,788	3,686	(102)	(3%)	369	\$22.59	\$29.64	\$39.05

Exhibit 7. 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)	5,994	5,893	(101)	(2%)	586

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)

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