Industrial Automation Occupations

Labor Market Analysis: Imperial County   **September 2024**

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED LEVEL OF EDUCATION
● **Proceed with New Program**	☑ ☐	☑ ☐	☐ Doctorate Degree ☐ Master's Degree ☐ Bachelor's Degree ☐ Associate Degree ☐ Some College or Certificate ☑ HS Diploma or Equivalent ☐ Less Than a HS Diploma ☐ Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	**NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING**	**NUMBER OF ANNUAL JOB OPENINGS**	
☑ ☐	LOW	HIGH	

The San Diego & Imperial Center of Excellence (COE) developed this brief to assist the region's community colleges with strategic planning and program development. *Industrial Automation Occupations* include "Electrical and Electronic Engineering Technologists and Technicians," "Electro-Mechanical and Mechatronics Technologists and Technicians," "Mechanical Engineering Technologists and Technicians," "Industrial Machinery Mechanics," and "Maintenance and Repair Workers, General." According to available data, *Industrial Automation Occupations* in Imperial County have a labor market demand of 80 annual job openings (while average demand for a single occupation in Imperial County is 13 annual job openings), and one institution supplies 30 awards for these occupations, suggesting that there is a supply gap in the labor market. Employers historically reported to the California Employment Development Department (EDD) and U.S. Bureau of Labor Statistics (BLS) that on average *Industrial Automation Occupations* earned entry-level earnings of $26.66 per hour, which is above the living wage in Imperial County. Comparatively, recent online job postings (2021-2023) show median earnings between $19 to $25 per hour. This brief recommends proceeding with developing a new program or modifying an existing program because there is a supply gap in the region, entry-level wages pay above the living wage, and only one institution supplies awards in Imperial County. However, colleges should note that the typical entry-level education for these occupations is a high school diploma or equivalent, or less.

Introduction

This report provides labor market information in Imperial County for the following occupational code in the Standard Occupational Classification (SOC)[1] system:

- **Electrical and Electronic Engineering Technologists and Technicians (SOC 17-3023):** 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.

- **Electro-Mechanical and Mechatronics Technologists and Technicians (SOC 17-3024):** 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.

- **Industrial Machinery Mechanics (SOC 49-9041):** Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems. May also install, dismantle, or move machinery and heavy equipment according to plans.

- **Maintenance and Repair Workers, General (SOC 49-9071):** Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of a building in repair. Duties may involve pipe fitting; HVAC maintenance; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

- **Mechanical Engineering Technologists and Technicians (SOC 17-3027):** Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery and equipment under direction of engineering staff or physical scientists.

For the purpose of this report, these occupations are referred to as *Industrial Automation Occupations*.

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[1] The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. bls.gov/soc.

Projected Occupational Demand

Between 2023 and 2028, employers in Imperial County will need to hire 80 workers annually to fill new jobs and backfill jobs in *Industrial Automation Occupations* due to attrition caused by turnover and retirement, for example (Exhibit 1). "Maintenance and Repair Workers, General" are projected to have the most labor market demand between 2023 and 2028, with 58 annual job openings.

Exhibit 1: Number of Jobs for *Industrial Automation Occupations* (2023-2028)[2]

Occupational Title	2023 Jobs	2028 Jobs	2023 – 2028 Net Jobs Change	2023 - 2028 % Net Jobs Change	Annual Job Openings (Demand)
Maintenance and Repair Workers, General	509	558	49	10%	58
Industrial Machinery Mechanics	140	161	21	15%	16
Electrical and Electronic Engineering Technologists and Technicians	37	45	8	22%	6
Mechanical Engineering Technologists and Technicians	<10	<10	Insf. Data	Insf. Data	Insf. Data
Electro-Mechanical and Mechatronics Technologists and Technicians	<10	<10	Insf. Data	Insf. Data	Insf. Data
Total	686	764	78	11%	80

Earnings

According to traditional[3] labor market information (LMI), entry-level hourly earnings for *Industrial Automation Occupations* range from $18.39 to $36.43 (Exhibit 2).

Exhibit 2: Hourly Earnings for *Industrial Automation Occupations* in Imperial County[4]

Occupational Title	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Electrical and Electronic Engineering Technologists and Technicians	$36.43	$46.48	$47.15
Industrial Machinery Mechanics	$25.15	$29.24	$36.12
Maintenance and Repair Workers, General	$18.39	$22.69	$29.56
Mechanical Engineering Technologists and Technicians	Insf. Data	Insf. Data	Insf. Data
Electro-Mechanical and Mechatronics Technologists and Technicians	Insf. Data	Insf. Data	Insf. Data

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[2] Lightcast 2024.03; QCEW, Non-QCEW, Self-Employed.
[3] Traditional LMI is generally historical data captured by the U.S. Bureau of Labor Statistics (BLS) or the California Employment Development Department (EDD). It does not account for recent technological, economic, or legislative changes that may affect labor market demand and wages.
[4] Lightcast 2024.03; QCEW, Non-QCEW, Self-Employed.

On average, the entry-level hourly earnings are $26.66—or $55,452 annual salary[5]; this is more than the living wage for a single adult in Imperial County, which is $15.11 per hour (Exhibit 3).[6]

Exhibit 3: Hourly Earnings[7] for *Industrial Automation Occupations* in Imperial County[8]
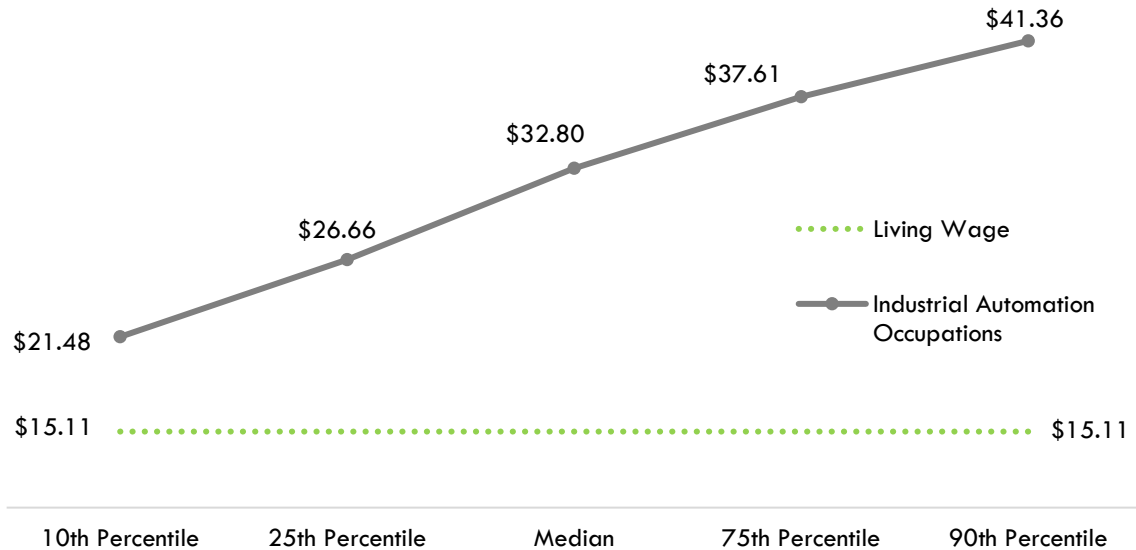
Between January 1, 2021 and December 30, 2023, employers advertised between $19 to $25 per hour in online job postings for *Industrial Automation Occupations* in Imperial County (Exhibit 4).[9] This suggests that employers in recent years are increasing wages due to labor market forces that may not be captured by traditional LMI.

Exhibit 4: Median Advertised Salaries in Online Job Postings for
***Industrial Automation Occupations* in Imperial County (2021-2023)**

Expected Level of Education

According to traditional LMI, *Industrial Automation Occupations* have a national educational attainment of high school diploma or equivalent to an associate degree.[10] (Exhibit 5).

Exhibit 5: National Educational Attainment for *Industrial Automation Occupations*[11]

Occupational Title	Typical Entry-Level Education
Electrical and Electronic Engineering Technologists and Technicians	Associate degree
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate degree
Mechanical Engineering Technologists and Technicians	Associate degree
Industrial Machinery Mechanics	High school diploma or equivalent
Maintenance and Repair Workers, General	High school diploma or equivalent

Similarly, online job postings between January 1, 2021 and December 31, 2023 in Imperial County had a high school or GED as the most requested educational requirement for *Industrial Automation Occupations;* however, employers also expected the following certifications (Exhibit 6).[12]

Exhibit 6: Top Certifications for *Industrial Automation Occupations* in Imperial County in Online Job Postings (2021-2023)[13]

1. Cisco Certified Network Associate
2. CDL Class A License
3. Automotive Service Excellence (ASE) Certification
4. Cardiopulmonary Resuscitation (CPR) Certification
5. Certified Accounting Technician
6. Commercial Driver's License (CDL)

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[10] Lightcast 2024.03; QCEW, Non-QCEW, Self-Employed.
[11] Lightcast 2024.03; QCEW, Non-QCEW, Self-Employed.
[12] Lightcast 2024.03; "Job Posting Analytics." 2021-2023.
[13] Lightcast 2024.03; "Job Posting Analytics." 2021-2023.

Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. There are nine TOP codes and 24 CIP codes related to *Industrial Automation Occupations* (Exhibit 7).

Exhibit 7: Related TOP and CIP Codes for *Industrial Automation Occupations*[14]

TOP or CIP Code	TOP or CIP Program Title
TOP 0924.00	Engineering Technology, General (requires Trigonometry)
TOP 0934.00	Electronics and Electric Technology
TOP 0934.10	Computer Electronics
TOP 0934.20	Industrial Electronics
TOP 0934.40	Electrical Systems and Power Transmission
TOP 0943.00	Instrumentation Technology
TOP 0945.00	Industrial Systems Technology and Maintenance
TOP 0956.00	Manufacturing and Industrial Technology
TOP 0999.00	Other Engineering and Related Industrial Technologies
CIP 15.0000	Engineering Technologies/Technicians, General
CIP 15.0201	Civil Engineering Technologies/Technicians
CIP 15.0303	Electrical, Electronic and Communications Engineering Technology/Technician
CIP 15.0306	Integrated Circuit Design Technology/Technician
CIP 15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other
CIP 15.0404	Instrumentation Technology/Technician
CIP 15.0405	Robotics Technology/Technician
CIP 15.0406	Automation Engineer Technology/Technician
CIP 15.0611	Metallurgical Technology/Technician
CIP 15.0612	Industrial Technology/Technician
CIP 15.0613	Manufacturing Engineering Technology/Technician
CIP 15.0699	Industrial Production Technologies/Technicians, Other
CIP 15.0803	Automotive Engineering Technology/Technician
CIP 15.0805	Mechanical/Mechanical Engineering Technology/Technician
CIP 15.1201	Computer Engineering Technology/Technician

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[14] This brief uses a conservative estimate of program supply and only calculates awards from the TOP code listed in Exhibit 7.

TOP or CIP Code	TOP or CIP Program Title
CIP 15.1203	Computer Hardware Technology/Technician
CIP 15.9999	Engineering/Engineering-Related Technologies/Technicians, Other
CIP 46.0301	Electrical and Power Transmission Installation/Installer, General
CIP 47.0101	Electrical/Electronics Equipment Installation and Repair Technology/Technician, General
CIP 47.0104	Computer Installation and Repair Technology/Technician
CIP 47.0105	Industrial Electronics Technology/Technician
CIP 47.0199	Electrical/Electronics Maintenance and Repair Technologies/Technicians, Other
CIP 47.0303	Industrial Mechanics and Maintenance Technology/Technician
CIP 50.0404	Industrial and Product Design

According to TOP data, one community college supplies the region with awards for these occupations: Imperial Valley College. According to CIP data, no non-community college supplies the region with awards (Exhibit 8).

Exhibit 8: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Year 2019-20 Through Program Year 2022-23 Average)

TOP6 or CIP Code	TOP6 or CIP Program Title	3-Yr Annual Average CC Awards (PY20-21 to PY22-23)	Other Educational Institutions 3-Yr Annual Average Awards (PY19-20 to PY21-22)	Total Average Supply (PY19-20 to PY22-23)
0934.00	Electronics and Electric Technology	**21**	**0**	**0**
	Imperial Valley	**21**	**0**	
	• Associate Degree	3	0	
	• Cert 16 < 30 units	6	0	
	• Cert < 6 units	12	0	
0934.20	Industrial Electronics	**1**	**0**	**0**
	Imperial Valley	**1**	**0**	
	• Cert 16 < 30 units	0	0	
	• Cert < 6 units	1	0	
0934.40	Electrical Systems and Power Transmission	**8**	**0**	**0**
	Imperial Valley	**8**	**0**	
	• Cert 16 < 30 units	8	0	
			Total	**30**

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply[15] suggests that there is a supply gap for these occupations in Imperial County, with 80 annual openings and 30 awards. Comparatively, there are 21,828 annual openings in California and 3,053 awards, suggesting that there is a supply gap across the state[16] (Exhibit 9).

Exhibit 9: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

	Demand (Annual Openings)	Supply (Annual Awards)	Supply Gap or Oversupply
Imperial	80	30	**50**
California	21,828	3,053	**18,775**

Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.
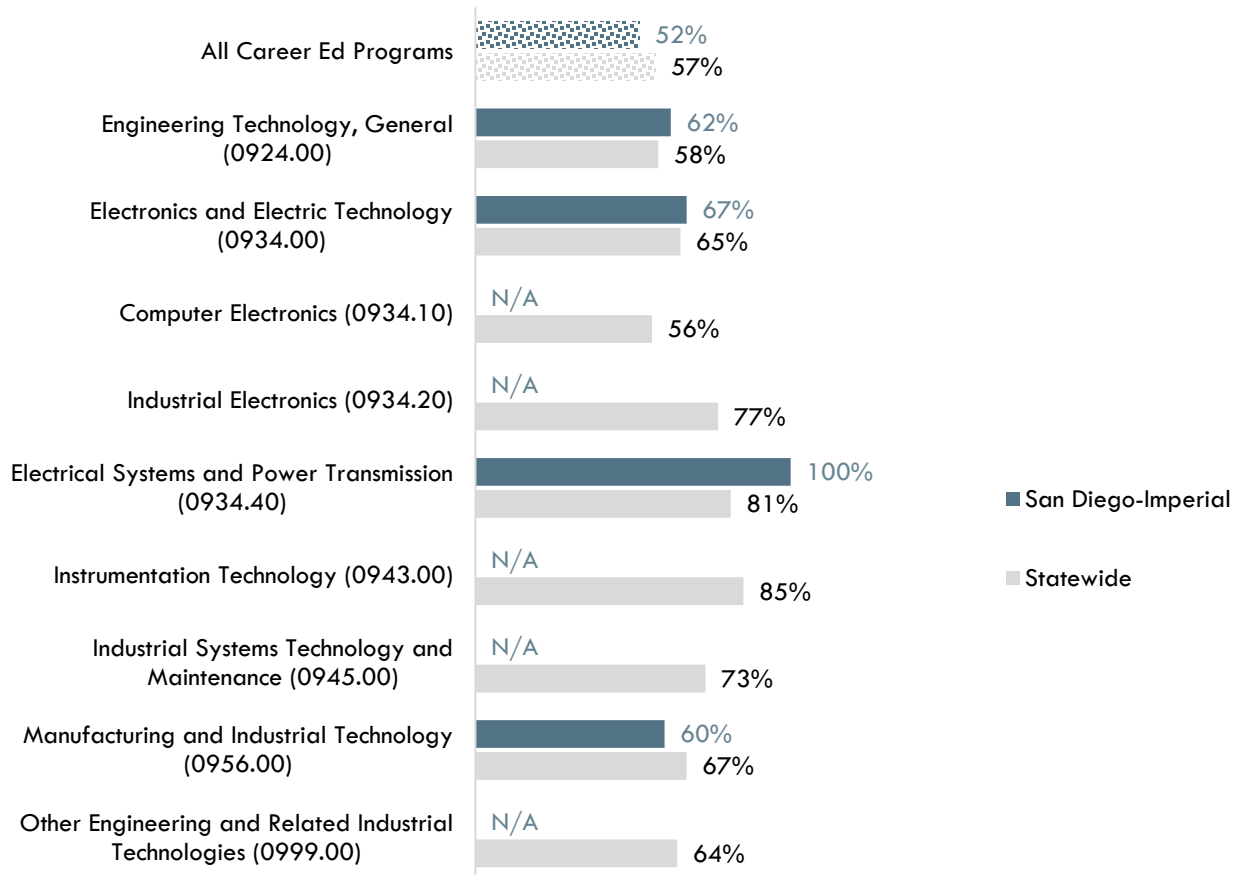
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[15] Labor supply can be found from two different sources: Lightcast or the California Community Colleges Chancellor's Office MIS Data Mart. Lightcast uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.
[16] "Supply and Demand," Centers of Excellence Student Outcomes, coeccc.net/our-resources.

Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 60 to 100 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *Industrial Automation Occupations,* compared 56 to 85 percent statewide and 57 percent of students in Career Education programs in general across the state (Exhibit 10).[17]

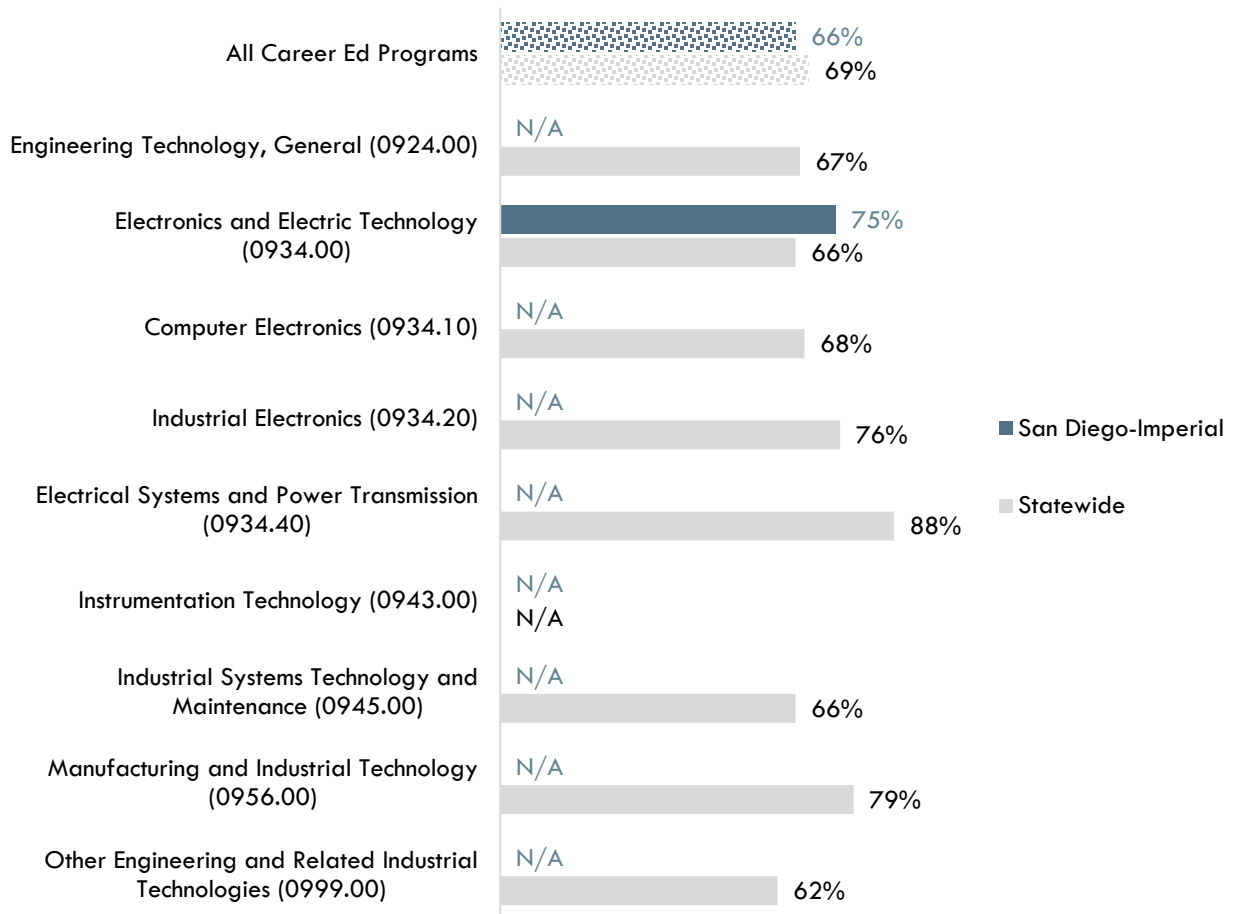**Exhibit 10: Percentage of Students Who Earned a Living Wage by Program, PY2020-21 [18]**

Program	San Diego-Imperial	Statewide
All Career Ed Programs	52%	57%
Engineering Technology, General (0924.00)	62%	58%
Electronics and Electric Technology (0934.00)	67%	65%
Computer Electronics (0934.10)	N/A	56%
Industrial Electronics (0934.20)	N/A	77%
Electrical Systems and Power Transmission (0934.40)	100%	81%
Instrumentation Technology (0943.00)	N/A	85%
Industrial Systems Technology and Maintenance (0945.00)	N/A	73%
Manufacturing and Industrial Technology (0956.00)	60%	67%
Other Engineering and Related Industrial Technologies (0999.00)	N/A	64%

"N/A" indicates insufficient data

According to the California Community Colleges LaunchBoard, 75 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a program related to *Industrial Automation Occupations,* compared to 62 to 88 percent statewide and 69 percent of students in Career Education programs in general across the state (Exhibit 11).[19]

Exhibit 11: Percentage of Students in a Job Closely Related to Field of Study by Program, PY2019-20[20]

| Program	San Diego-Imperial	Statewide
All Career Ed Programs	66%	69%
Engineering Technology, General (0924.00)	N/A	67%
Electronics and Electric Technology (0934.00)	75%	66%
Computer Electronics (0934.10)	N/A	68%
Industrial Electronics (0934.20)	N/A	76%
Electrical Systems and Power Transmission (0934.40)	N/A	88%
Instrumentation Technology (0943.00)	N/A	N/A
Industrial Systems Technology and Maintenance (0945.00)	N/A	66%
Manufacturing and Industrial Technology (0956.00)	N/A	79%
Other Engineering and Related Industrial Technologies (0999.00)	N/A	62%

"N/A" indicates insufficient data

[19] "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.
[20] Most recent year with available data is Program Year 2019-20. Percentage of Students in a Job Closely Related to Field of Study: Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

Online Job Postings

This report analyzes not only historical and projected (traditional LMI) data, but also recent data from online job postings (real-time LMI). Online job postings may provide additional insight about recent changes in the labor market that are not captured by historical data. Between 2020 and 2023, there was an average of 88 online job postings per year for *Industrial Automation Occupations* in Imperial County (Exhibit 12). Please note that online job postings do not equal labor market demand; demand is represented by annual job openings (see Exhibit 1). While this brief includes online jobs postings data to help with curriculum development, the community colleges should note that this type of data is impacted by several variables: employers may post a position multiple times to increase the pool of applicants; a job posting can remain posted after a business decides not to fill a position; or an employer may use one posting to fill multiple positions, for example.

Exhibit 12: Number of Online Job Postings for *Industrial Automation Occupations* in Imperial County (2020-2023)[21]

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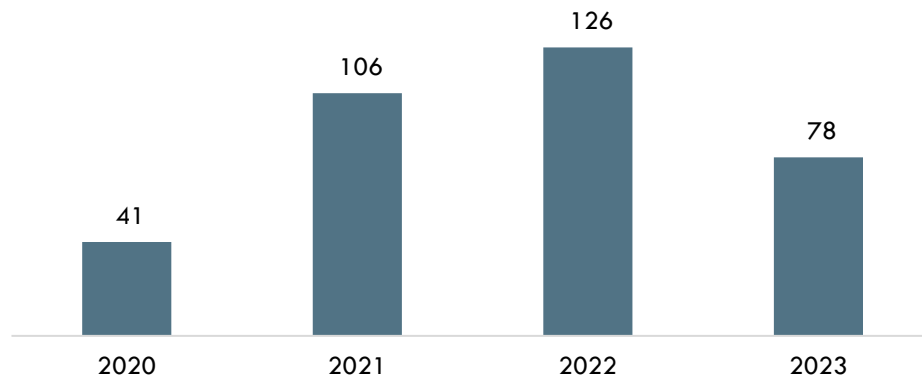
[21] Lightcast 2024.03; "Job Posting Analytics." 2020-2023.

Employers

Between January 1, 2021 and December 31, 2023, the top five employers in Imperial County for *Industrial Automation Occupations* were The Conam Group, Imperial Valley College, USG Corporation, Spectrum, and Nutrien Ag Solutions based on online job postings (Exhibit 13).

Exhibit 13: Top Employers for *Industrial Automation Occupations* in Imperial County[22]

Top Employers	
• The Conam Group	• Ormat Technologies
• Imperial Valley College	• Advanced Technology Services
• USG Corporation	• Pioneers Memorial Healthcare District
• Spectrum	• Marriott International
• Nutrien Ag Solutions	• State of California

Skills

Exhibit 14 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2021 and December 31, 2023.

Exhibit 14: Top Skills for *Industrial Automation Occupations* in Imperial County[23]

Specialized Skills	Soft Skills	Software Skills
• Plumbing	• Communication	• Microsoft Excel
• HVAC	• Operations	• Microsoft Outlook
• Preventive Maintenance	• Troubleshooting	• Microsoft Word
• Power Tool Operation	• Customer Service	
• Construction	• Management	
• Grinding Machine	• Lifting Ability	
• Welding	• Computer Literacy	
• Drilling	• Problem Solving	
• Sawing	• Good Driving Record	
• Hammers	• Computer Terminals	
• Hand Tools	• Leadership	
• Automation	• Microsoft Word	
• Occupational Safety and Health Administration	• Decision Making	
• Electric Motors	• Research	
• Carpentry	• English Language	

[22] Lightcast 2024.03; "Job Posting Analytics." 2021-2023.
[23] Lightcast 2024.03; "Job Posting Analytics." 2021-2023.

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