


Industrial Automation Occupations

Baccalaureate Labor Market Analysis

October 2024

SUMMARY

BDP PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	JOB POSTINGS WITH BA/BS OFFER HIGHER WAGES THAN THOSE WITHOUT BA/BS?	EXPECTED EDUCATION FOR OCCUPATIONS ANALYZED
 <p>Proceed with Caution</p>	 	 	<p>Associate degree expected, but bachelor's degree preferred in online job postings</p>
DOES A SIMILAR PROGRAM EXIST AT A UC OR CSU?	EXISTING ASSOCIATE DEGREE PROGRAM IN REGION?	NUMBER OF ANNUAL JOB OPENINGS	OCCUPATIONS PAY LIVING WAGES FOR A...?
<p>YES, a UC or CSU currently offers a similar program but not in the same CIP code</p>	 	<p>LOW</p> 	<p><input checked="" type="checkbox"/> Single Adult <input type="checkbox"/> Adult with Child</p>

The San Diego & Imperial Center of Excellence (COE) developed this brief to determine if an unmet workforce need exists for a baccalaureate degree program (BDP) for [Industrial Automation Occupations](#) under CIP code 15.0403 (Electromechanical/Electromechanical Engineering Technology/Technician). According to Assembly Bill No. 927, community college districts seeking approval for a BDP must 1) not offer “program curricula already offered by the California State University or the University of California” systems, 2) “continue to offer an associate degree program in the same academic subject”¹ of the proposed BDP, and 3) “provide evidence of unmet workforce needs.”²

This brief recommends that the regional colleges proceed with caution when developing a BDP for [Industrial Automation Occupations](#) because 1) **a UC or CSU reported having similar programs in the state, but not for CIP code 15.0403;** 2) **entry-level wages are above the living wage for a single adult but are insufficient to support an adult with a child;** and 3) **these occupations typically require an associate degree according to the Bureau of Labor Statistics, but 40 percent of online job postings required a bachelor’s degree. Additionally, employers advertised higher salaries in postings that require a bachelor’s degree than those that do not.**

¹ “The bill would require a community college district to continue to offer an associate degree program in the same academic subject for which a baccalaureate degree program has been approved, unless the community college district has received approval from the chancellor to eliminate the associate degree program, as specified.”

² “AB-927 Public postsecondary education: community colleges: statewide baccalaureate degree.” California Legislative Information. Accessed 09/05/2023. leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB927

INTRODUCTION

According to Assembly Bill No. 927, community college districts seeking approval to offer a baccalaureate degree program (BDP) must:³

1. Not offer a BDP or “program curricula already offered by the California State University or the University of California”
2. “Continue to offer an associate degree program in the same academic subject for which a baccalaureate degree program has been approved”
3. Identify and document unmet workforce needs “in the local community or region of the district”

To determine the need for a new BDP, this brief examines labor market information (LMI) for **Industrial Automation Occupations** using the following Standard Occupational Classification (SOC)⁴ codes:

- **Electrical and Electronics Drafters** (SOC 17-3012): Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment.
- **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.

Please note: Due to the lack of available labor market data specific to Imperial County for the **Industrial Automation Occupations**, data from San Diego County was utilized as a representative benchmark for this report.

³ “AB-927 Public postsecondary education: community colleges: statewide baccalaureate degree.” California Legislative Information. Accessed 09/05/2023. leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB927

⁴ 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/](https://www.bls.gov/soc/).

According to available LMI, [Industrial Automation Occupations](#) may have no work experience but require an [associate degree](#). On average, the entry-level hourly earnings for [Industrial Automation Occupations](#) are \$28.03, which is above the \$26.64 per hour living wage for a single adult but below the \$48.33 per hour living wage for a single adult with a preschool child in San Diego County.⁵

SOC Title (SOC Code)	Entry-Level Hourly Earnings ⁶	Median Hourly Earnings	Typical Entry-Level Education	Work Experience Required
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	\$30.24	\$34.35	Associate degree	None
Electrical and Electronics Drafters (17-3012)	\$25.81	\$34.04	Associate degree	None
Average	\$28.03	\$34.20		

The following sections “assess the workforce value of [a] proposed baccalaureate degree program” for [Industrial Automation Occupations](#) in accordance with AB-927.⁷

⁵ “Sustainability Calculator (formerly the Family Needs Calculator),” Center for Women’s Welfare, University of Washington, last updated 2024. mavencollaborative.org/family-sustainability-index/.

⁶ 25th Percentile. Lightcast. 2024.03; QCEW, Non-QCEW, Self-Employed.

⁷ “AB-927 Public postsecondary education: community colleges: statewide baccalaureate degree.” California Legislative Information. Accessed 09/05/2024. leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB927

BDP PROPOSAL REQUIREMENTS

UC and CSU Programs

According to AB-927, community colleges must not offer a BDP or program curricula already offered by the CSU or UC systems. To determine if a BDP already exists for [Industrial Automation Occupations](#), the COE examined CSU and UC programs in related Classification of Instructional Programs (CIP) codes.⁸

According to CIP data, the following institutions from the UC and CSU systems offer programs related to [Industrial Automation Occupations](#) (Exhibit 1).

Exhibit 1: California UC and CSU Institutions with Related Programs by CIP Code (2022)⁹

CIP Code and Title
15.0001 Applied Engineering Technologies/Technicians <ul style="list-style-type: none">No CSU or UC
15.0303 Electrical, Electronic, and Communications Engineering Technology/Technician <ul style="list-style-type: none">California State Polytechnic University-PomonaCalifornia State University-Long Beach
15.0306 Integrated Circuit Design Technology/Technician <ul style="list-style-type: none">No CSU or UC
15.0403 Electromechanical/Electromechanical Engineering Technology/Technician <ul style="list-style-type: none">No CSU or UC
15.0404 Instrumentation Technology/Technician <ul style="list-style-type: none">No CSU or UC
15.0405 Robotics Technology/Technician <ul style="list-style-type: none">No CSU or UC
15.0406 Automation Engineer Technology/Technician <ul style="list-style-type: none">No CSU or UC
15.0407 Mechatronics, Robotics, and Automation Engineering Technology/Technician <ul style="list-style-type: none">No CSU or UC
15.0805 Mechanical/Mechanical Engineering Technology/Technician <ul style="list-style-type: none">California State Polytechnic University-Pomona

⁸ CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data). The COE uses the national SOC-CIP crosswalk to determine which programs could potentially train for the occupation in question. nces.ed.gov/ipeds/cipcode/post3.aspx?y=56

⁹ Lightcast. Q3 2024 Data Set. Program Overview. Completions by Institutions. Completions data for 2020 and 2022 to account for programs not captured after decline in enrollment from the COVID-19 pandemic.

CIP Code and Title

[15.1301 Drafting and Design Technology/Technician, General](#)

- No CSU or UC

[15.1302 CAD/CADD Drafting and/or Design Technology/Technician](#)

- No CSU or UC

[15.1305 Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD](#)

- No CSU or UC

[15.1307 3-D Modeling and Design Technology/Technician](#)

- No CSU or UC
-

Existing Associate Degree Program(s)

AB-927 also states that districts should “continue to offer an associate degree program in the same academic subject for which a baccalaureate degree program has been approved.” To determine if an associate degree program in the same subject area exists, the COE reviewed the [California Community Colleges Chancellor’s Office’s official TOP-CIP crosswalk](#) and found that there are nine TOP codes and 13 CIP codes related to Industrial Automation Occupations (Exhibit 2).

Exhibit 2: Chancellor’s Office TOP-CIP Crosswalk for Baccalaureate Degree Programs

TOP Code	TOP Title	CIP Code	CIP Title
0924.00	Engineering Technology, General (requires Trigonometry)	15.0001	Applied Engineering Technologies/Technicians
0934.00	Electronics and Electric Technology	15.0303	Electrical, Electronic and Communications Engineering Technology/Technician
0934.10	Computer Electronics	15.0306	Integrated Circuit Design Technology/Technician
0935.00	Electro-Mechanical Technology	15.0403	Electromechanical/Electromechanical Engineering Technology/Technician
0934.70	Electron Microscopy	15.0404	Instrumentation Technology/Technician
0943.00	Instrumentation Technology		
0956.00	Manufacturing and Industrial Technology	15.0405	Robotics Technology/Technician
	No Match	15.0406	Automation Engineer Technology/Technician
0935.00	Electro-Mechanical Technology	15.0407	Mechatronics, Robotics and Automation Engineering Technology/Technician
0956.00	Manufacturing and Industrial Technology		
0924.00	Engineering Technology, General (requires Trigonometry)	15.0805	Mechanical/Mechanical Engineering Technology/Technician
0956.00	Manufacturing and Industrial Technology		
0953.00	Drafting Technology	15.1301	Drafting and Design Technology/Technician, General
0953.00	Drafting Technology	15.1302	CAD/CADD Drafting and/or Design Technology/Technician
0953.30	Electrical, Electronic and Electro- Mechanical Drafting	15.1305	Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD
0956.00	Manufacturing and Industrial Technology	15.1307	3-D Modeling and Design Technology/Technician

According to the [Chancellor's Office Curriculum Inventory \(COCI\)](#), five regional community colleges offer an associate degree program for the CIP codes listed above (Exhibit 3).¹⁰

Exhibit 3: San Diego Community Colleges with Associate Degree Programs in Related CIP Codes

CIP Code	CIP Title	Community College(s) with Existing Program in CIP Code
15.0001	Applied Engineering Technologies/Technicians	• None
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	• Imperial Valley
15.0306	Integrated Circuit Design Technology/Technician	• San Diego City
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	• None
15.0404	Instrumentation Technology/Technician	• None
15.0405	Robotics Technology/Technician	• Palomar
15.0406	Automation Engineer Technology/Technician	• None
15.0407	Mechatronics, Robotics and Automation Engineering Technology/Technician	• Palomar
15.0805	Mechanical/Mechanical Engineering Technology/Technician	• Palomar
15.1301	Drafting and Design Technology/Technician, General	• MiraCosta • Palomar • Southwestern
15.1302	CAD/CADD Drafting and/or Design Technology/Technician	• MiraCosta • Palomar • Southwestern
15.1305	Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD	• Palomar
15.1307	3-D Modeling and Design Technology/Technician	• Palomar

WORKFORCE NEEDS ASSESSMENT: SUPPLY VS. DEMAND

According to AB-927, community colleges must identify and document unmet workforce needs “in the local community or region of the district.” To assess the regional workforce need for [Industrial Automation Occupations](#), this section compares educational supply with labor market demand.

¹⁰ “Programs. California Community Colleges Curriculum Inventory (COCI).” Accessed 09/05/2024. coci2.ccctechcenter.org/programs

Educational Supply

Baccalaureate educational supply for an occupation can be estimated by analyzing the number of completions¹¹ in related CIP codes. According to CIP data, no postsecondary institutions supply San Diego County (Exhibit 4) and 320 completions in California (Exhibit 5) for Industrial Automation Occupations.

Exhibit 4: Number of Completions by Postsecondary Institutions (San Diego County, 2022)

CIP Code	CIP Title	Completions (2022)
Total		0

Exhibit 5: Number of Completions by Postsecondary Institutions (California, 2022)

CIP Code	CIP Title	Completions (2022)
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	52
15.0406	Automation Engineer Technology/Technician	11
15.0805	Mechanical/Mechanical Engineering Technology/Technician	48
15.1301	Drafting and Design Technology/Technician, General	153
15.1302	CAD/CADD Drafting and/or Design Technology/Technician	51
15.1305	Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD	2
15.1307	3-D Modeling and Design Technology/Technician	3
Total		320

¹¹ Completion numbers include bachelor's degree programs or higher.

Labor Market Demand

In 2018, there were 499 and 5,650 jobs for [Industrial Automation Occupations](#) in San Diego County and California, respectively. In 2023, the number of jobs in San Diego County increased to 579, which was an 16 percent increase. In California, the number of jobs for [Industrial Automation Occupations](#) decreased to 5,602, which was a one percent decrease (Exhibit 6).

Exhibit 6: Historical Employment Trend for Industrial Automation Occupations¹²

SOC Code	Occupational Title	2018 Jobs		2023 Jobs	
		San Diego	California	San Diego	California
17-3012	Electrical and Electronics Drafters	348	3,731	357	3,345
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	151	1,919	222	2,257
	Total	499	5,650	579	5,602

Between 2023 and 2033, employers in San Diego County will need to hire 54 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement for [Industrial Automation Occupations](#) (Exhibit 7). Across California, the projected demand will be 518 annual job openings between 2023 and 2033.

Exhibit 7: Labor Demand (Annual Job Openings) for Industrial Automation Occupations¹³

SOC Code	Occupational Title	Average Annual Job Openings		Total 10-Yr Demand (2023-2033)	
		San Diego	California	San Diego	California
17-3012	Electrical and Electronics Drafters	32	297		
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	22	221		
	Total	54	518		

¹² Lightcast. 2024.03; QCEW, Non-QCEW, Self-Employed.

¹³ Lightcast. 2024.03; QCEW, Non-QCEW, Self-Employed.

Demand vs. Supply

Comparing labor market demand (annual job openings) with educational supply (bachelor's degree completions) suggests that there is a **supply gap** for **Industrial Automation Occupations** in San Diego County, with **54** annual openings and **zero** awards. Comparatively, there are **518** annual openings in California and **320** awards, suggesting that there is also a **supply gap** across the state ¹⁴ (Exhibit 8).

Exhibit 8: Labor Demand (Job Openings) vs. Educational Supply (Completions)¹⁵

	Demand (Job Openings)	Supply (Completions)	Supply Gap or Oversupply
San Diego	54	0	54
California	518	320	198

¹⁴ "Supply and Demand," Centers of Excellence Student Outcomes, coecc.net/our-resources

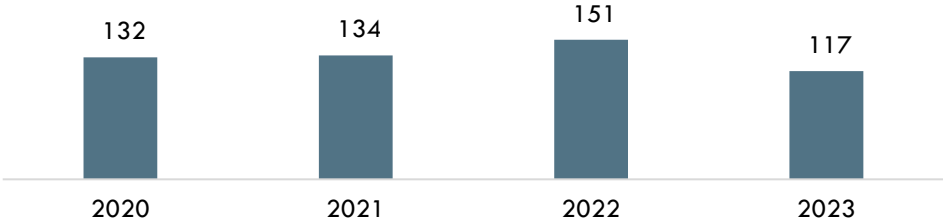
¹⁵ This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.

OTHER LMI TO CONSIDER FOR PROGRAM DEVELOPMENT

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 134 online job postings per year for Industrial Automation Occupations in San Diego County (Exhibit 9). Please note that online job postings do **not** equal labor market demand; demand is represented by annual job openings (see Exhibit 7). 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 9: Number of Online Job Postings for Industrial Automation Occupations in San Diego County (2020-2023)¹⁶



¹⁶ Lightcast; "Job Posting Analytics." 2020-2023.

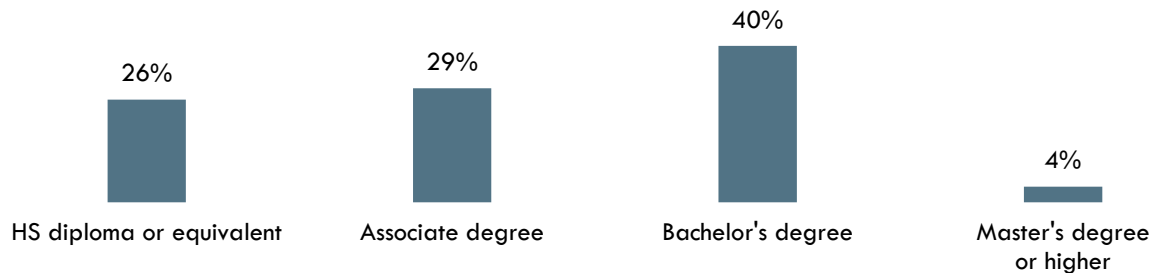
Between January 1, 2023, and December 30, 2023, employers in California advertised hourly wages ranging from \$25.48 to \$34.34 for online job postings in Industrial Automation Occupations requiring less than a bachelor’s degree. For positions requiring a bachelor’s degree, the advertised wages were between \$30.03 and \$36.06 per hour. This suggests a potential increase in entry-level wages for those holding a bachelor’s degree (Exhibit 10).

Exhibit 10: Entry-Level Wages in Online Job Postings for Industrial Automation Occupations by Education Level in California (2023)¹⁷

Minimum Required Education	Range of Advertised Wages at the 25 th Percentile (2023)	
	Low	High
Bachelor’s degree	\$30.89	\$37.29
Below a bachelor’s degree	\$25.48	\$34.34

Based on online job postings between January 1, 2021 and December 31, 2023 in California, employers posted a bachelor’s degree as the minimum educational requirement for Industrial Automation Occupations (Exhibit 11).¹⁸

Exhibit 11: Educational Requirements for Industrial Automation Occupations in California¹⁹



*May not total 100 percent due to rounding

¹⁷ Lightcast; “Job Posting Table.” 2023.

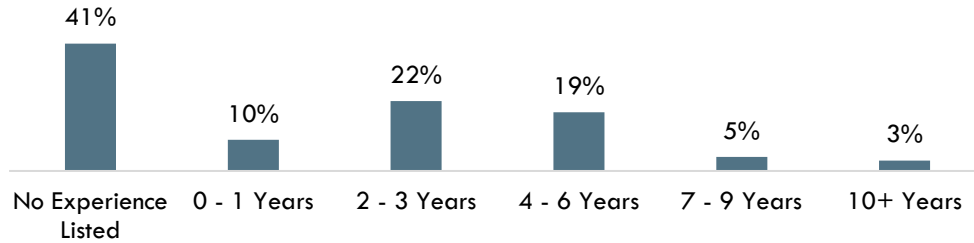
¹⁸ Lightcast; “Job Posting Analytics.” 2021-2023.

¹⁹ Lightcast; “Job Posting Analytics.” 2021-2023.

Work Experience

Based on online job postings, 41 percent of job postings for Industrial Automation Occupations do not list an experience requirement and 22 percent require that candidates have 2-3 years of experience (Exhibit 12).

Exhibit 12: Work Experience Requirement for Industrial Automation Occupations in California²⁰



Top Employers

Between January 1, 2021 and December 31, 2023, the top five employers in San Diego County were NV5, Caliber Collision, Aerotek, Qualcomm, and Cordoba Corporation based on online job postings (Exhibit 13).

Exhibit 13: Top Employers for Industrial Automation Occupations in San Diego County²¹

Top Employers	
<ul style="list-style-type: none">• NV5• Caliber Collision• Aerotek• Qualcomm• Cordoba Corporation	<ul style="list-style-type: none">• Randstad• Stantec• Peraton• Electrical Consultants• Salas O Brien

²⁰ Lightcast; "Job Posting Analytics." 2021-2023.

²¹ Lightcast; "Job Posting Analytics." 2021-2023

Skills and Certifications

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

Exhibit 14: Top Skills for Industrial Automation Occupations in California²²

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none">• Electrical Engineering• Computer-Aided Design• Project Management• Programmable Logic Controllers• Electrical Systems• Automation• Robotics• Control Systems• Electrical Wiring• Construction	<ul style="list-style-type: none">• Communication• Troubleshooting (Problem Solving)• Detail Oriented• Problem Solving• Operations• Planning• Coordinating• Management• Research• Customer Service	<ul style="list-style-type: none">• AutoCAD• Autodesk Revit• Microsoft Office• Microsoft Excel

Exhibit 15 lists the top certification that appeared in online job postings between January 1, 2021 and December 31, 2023.

Exhibit 15: Top Certification for Industrial Automation Occupations in California²³

Top Certification in Online Job Postings
<ol style="list-style-type: none">1. Valid Driver's License2. LEED Accredited Professional (AP)3. Engineer in Training4. Secret Clearance5. Journeyman Lineman6. Professional Engineer (PE) License7. Security Clearance

²² Lightcast; "Job Posting Analytics." 2021-2023. Skills must populate in at least 10% of job postings to be listed.

²³ Lightcast; "Job Posting Analytics." 2021-2023

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