










Engineering Technicians

Labor Market Analysis: San Diego County

August 2023

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
 Proceed with New Program	 	 	<input type="checkbox"/> Doctorate Degree <input type="checkbox"/> Master's Degree <input type="checkbox"/> Bachelor's Degree <input type="checkbox"/> Associate Degree <input type="checkbox"/> Some College or Certificate <input checked="" type="checkbox"/> HS Diploma or Equivalent <input type="checkbox"/> Less than a HS Diploma <input type="checkbox"/> Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
 	HIGH 	HIGH 	

This brief provides labor market information about *Engineering Technicians* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *Engineering Technicians* include “Electrical and Electronic Engineering Technologists and Technicians,” “Electro-Mechanical and Mechatronics Technologists and Technicians,” “Engineering Technologists and Technicians, Except Drafters, All Other,” “Industrial Engineering Technologists and Technicians,” and “Mechanical Engineering Technologists and Technicians.” According to available labor market information, *Engineering Technicians* in San Diego County have a labor market demand of 703 annual job openings (while average demand for a single occupation in San Diego County is 289 annual job openings), and 10 institutions supply 225 awards for these occupations, suggesting that there is a supply gap in the labor market. Entry-level and median wages are above the living wage for these occupations. This brief recommends that the colleges proceed with developing a new program and supports a program modification because 1) there is a supply gap in San Diego County; 2) entry-level wages are above the living wage; and 3) there is a high number of annual job postings. The colleges should also note that **employers typically require a high school diploma or equivalent as the minimum educational requirement for these occupations.**

Introduction

This report provides labor market information in San Diego County for the following occupational codes 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.
- **Engineering Technologists and Technicians, Except Drafters, All Other (SOC 17-3029):** All engineering technologists and technicians, except drafters, not listed separately.
- **Industrial Engineering Technologists and Technicians (SOC 17-3026):** Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.
- **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 *Engineering Technicians*.

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/](https://www.bls.gov/soc/).

Projected Occupational Demand

Between 2022 and 2027, *Engineering Technicians* are projected to increase by 298 net jobs or five percent (Exhibit 1a). Employers in San Diego County will need to hire 703 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

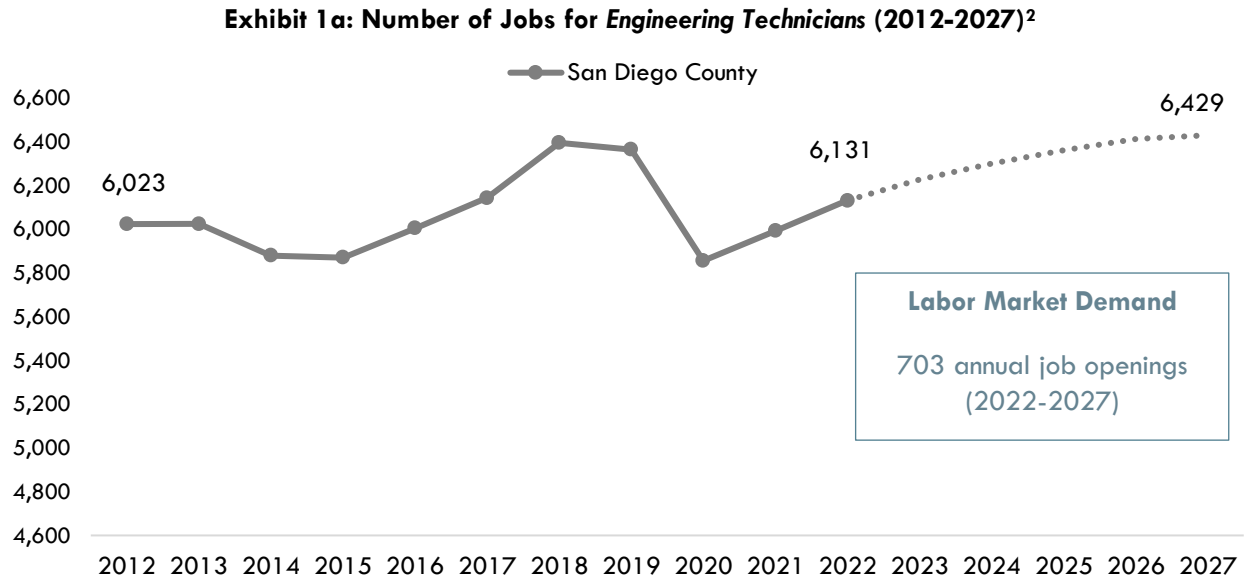


Exhibit 1b disaggregates the projected number of jobs change by occupation. “Electrical and Electronic Engineering Technologists and Technicians” are projected to have the most labor market demand between 2022 and 2027, with 353 annual job openings.

Exhibit 1b: Number of Jobs for Engineering Technicians in San Diego County (2022-2027)³

Occupational Title	2022 Jobs	2027 Jobs	2022 - 2027 Net Jobs Change	2022-2027 % Net Jobs Change	Annual Job Openings (Demand)
Electrical and Electronic Engineering Technologists and Technicians	3,076	3,167	91	3%	353
Engineering Technologists and Technicians, Except Drafters, All Other	1,852	1,948	96	5%	205
Mechanical Engineering Technologists and Technicians	575	630	55	10%	70
Industrial Engineering Technologists and Technicians	476	523	47	10%	58
Electro-Mechanical and Mechatronics Technologists and Technicians	152	161	9	6%	17
Total	6,131	6,429	298	5%	703

² Lightcast 2023.02; QCEW, Non-QCEW, Self-Employed.

³ Lightcast 2023.02; QCEW, Non-QCEW, Self-Employed.

Earnings

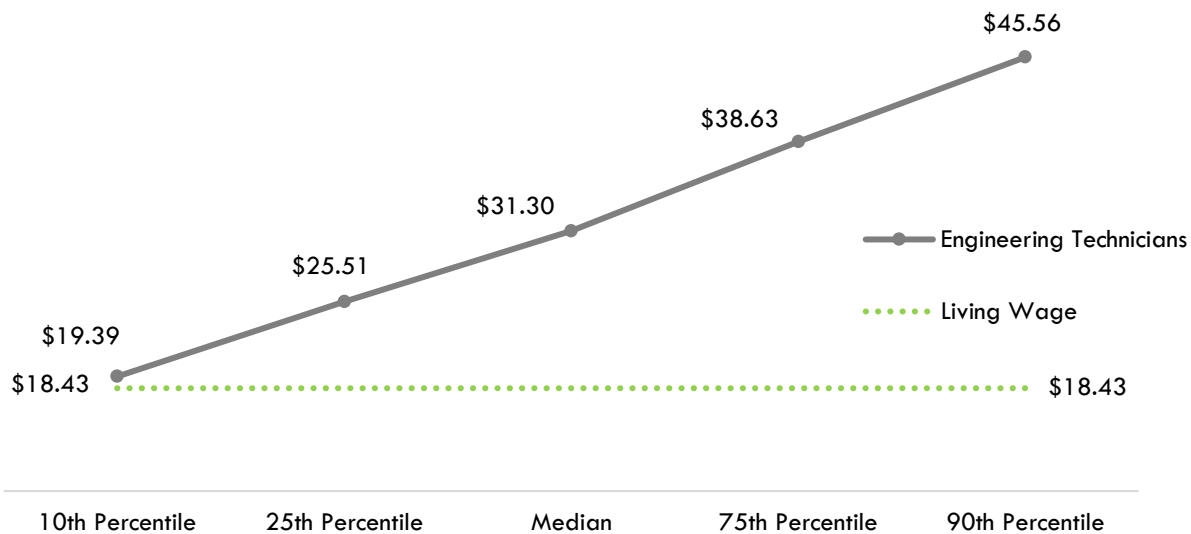
Exhibit 2a disaggregates hourly earnings by occupation. The entry-level hourly earnings for *Engineering Technicians* range from \$22.69 to \$28.99.

Exhibit 2a: Hourly Earnings for *Engineering Technicians* in San Diego County⁴

Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Electrical and Electronic Engineering Technologists and Technicians	\$28.99	\$31.96	\$41.77
Engineering Technologists and Technicians, Except Drafters, All Other	\$28.68	\$37.38	\$46.81
Industrial Engineering Technologists and Technicians	\$23.88	\$29.62	\$37.63
Electro-Mechanical and Mechatronics Technologists and Technicians	\$23.30	\$28.52	\$29.97
Mechanical Engineering Technologists and Technicians	\$22.69	\$29.02	\$36.99

On average, the entry-level hourly earnings for *Engineering Technicians* are \$25.51; this is more than the living wage for a single adult in San Diego County, which is \$18.43 per hour (Exhibit 2b).⁵

Exhibit 2b: Average Hourly Earnings⁶ for *Engineering Technicians* in San Diego County⁷



⁴ Lightcast 2023.02; QCEW, Non-QCEW, Self-Employed.

⁵ "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. insightccd.org/family-needs-calculator/.

⁶ 10th and 25th percentiles could be considered entry-level wages, and 75th and 90th percentiles could be considered experienced wages for individuals who may have been in the occupation longer, received more training than others, etc.

⁷ Lightcast 2023.02; QCEW, Non-QCEW, Self-Employed.

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.⁸ There are 12 TOP codes and 28 CIP codes related to *Engineering Technicians* (Exhibit 3).

Exhibit 3: Related TOP and CIP Codes for *Engineering Technicians*⁹

TOP or CIP Code	TOP or CIP Program Title
TOP 0303.00	Environmental Technology
TOP 0924.00	Engineering Technology, General
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 0935.00	Electro-Mechanical Technology
TOP 0943.00	Instrumentation Technology
TOP 0945.00	Industrial Systems Technology and Maintenance
TOP 0956.00	Manufacturing and Industrial Technology
TOP 0958.00	Water and Wastewater Technology
TOP 0999.00	Other Engineering and Related Industrial Technologies
CIP 15.0000	Engineering Technology, General
CIP 15.0201	Civil Engineering Technology/Technician
CIP 15.0303	Electrical, Electronic and Communications Engineering Technology/Technician
CIP 15.0306	Integrated Circuit Design
CIP 15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other
CIP 15.0403	Electromechanical Technology/Electromechanical Engineering Technology
CIP 15.0404	Instrumentation Technology/Technician
CIP 15.0405	Robotics Technology/Technician
CIP 15.0406	Automation Engineer Technology/Technician
CIP 15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician
CIP 15.0507	Environmental Engineering Technology/Environmental Technology

⁸ TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

⁹ This brief uses a conservative estimate of program supply and only calculates awards from the TOP codes in Exhibit 3.

TOP or CIP Code	TOP or CIP Program Title
CIP 15.0508	Hazardous Materials Management and Waste 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 Engineering/Mechanical Technology/Technician
CIP 15.1201	Computer Engineering Technology/Technician
CIP 15.1203	Computer Hardware Technology/Technician
CIP 15.9999	Engineering Technologies and Engineering-Related Fields, Other
CIP 46.0301	Electrical and Power Transmission Installation/Installer, General
CIP 47.0101	Electrical/Electronics Equipment Installation and Repair, 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 Technology, Other
CIP 47.0303	Industrial Mechanics and Maintenance Technology
CIP 50.0404	Industrial and Product Design

According to TOP data, five community colleges supply the region with awards for these occupations: Cuyamaca College, Palomar College, San Diego City College, San Diego College of Continuing Education, and Southwestern College. According to CIP data, five non-community-college institutions supply the region with awards: California Institute of Arts & Technology, California Institute of Arts & Technology-National City, National University, Newschool of Architecture and Design, and United Education Institute-UEI College San Marcos (Exhibit 4).

**Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions
(Program Year 2019-20 through Program Year 2021-22 Average)**

TOP6 or CIP Code	TOP6 or CIP Program Title	3-YR Annual Average CC Awards (PY19-20 to PY21-22)	Other Educational Institutions 2-YR Annual Average Awards (PY19-20 to PY20-21)	Total Average Supply (PY19-20 to PY21-22)
0303.00	Environmental Technology	20	0	20
	• Cuyamaca	18	0	
	• Southwestern	2	0	
0934.00	Electronics and Electric Technology	71	0	71
	• San Diego City	0	0	
	• San Diego Cont. Ed	71	0	
0934.10	Computer Electronics	3	0	3
	• San Diego City	2	0	
	• Southwestern	1	0	
0934.40	Electrical Systems and Power Transmission	19	0	19
	• San Diego City	19	0	
0935.00	Electro-Mechanical Technology	1	0	1
	• Cuyamaca	1	0	
0945.00	Industrial Systems Technology and Maintenance	0	0	0
	• Southwestern	0	0	
0956.00	Manufacturing and Industrial Technology	1	0	1
	• Palomar	0	0	
	• San Diego City	1	0	

TOP or CIP Code	TOP or CIP Program Title	3-YR Annual Average CC Awards (PY19-20 to PY21-22)	Other Educational Institutions 2-YR Annual Average Awards (PY19-20 to PY20-21)	Total Average Supply (PY19-20 to PY21-22)
0958.00	Water and Wastewater Technology	50	0	50
	• Cuyamaca	18	0	
	• Palomar	32	0	
0999.00	Other Engineering and Related Industrial Technologies	3	0	3
	• San Diego City	3	0	
15.0000	Engineering Technology, General	0	1	1
	• National University	0	1	
15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other	0	13	13
	• National University	0	13	
47.0104	Computer Installation and Repair Technology/Technician	0	37	37
	• California Institute of Arts & Technology	0	14	
	• California Institute of Arts & Technology-National City	0	6	
	• United Education Institute-UEI College San Marcos	0	17	
50.0404	Industrial and Product Design	0	6	6
	• Newschool of Architecture and Design	0	6	
			Total	225

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply¹⁰ suggests that there is a **supply gap** for these occupations in San Diego County, with **703** annual openings and **225** awards. Comparatively, there are **4,827** annual openings in California and **3,693** awards, suggesting that there is also a supply gap across the state¹¹ (Exhibit 5).

Exhibit 5: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or Oversupply
San Diego	703	225	478
California	4,827	3,693	1,134

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.

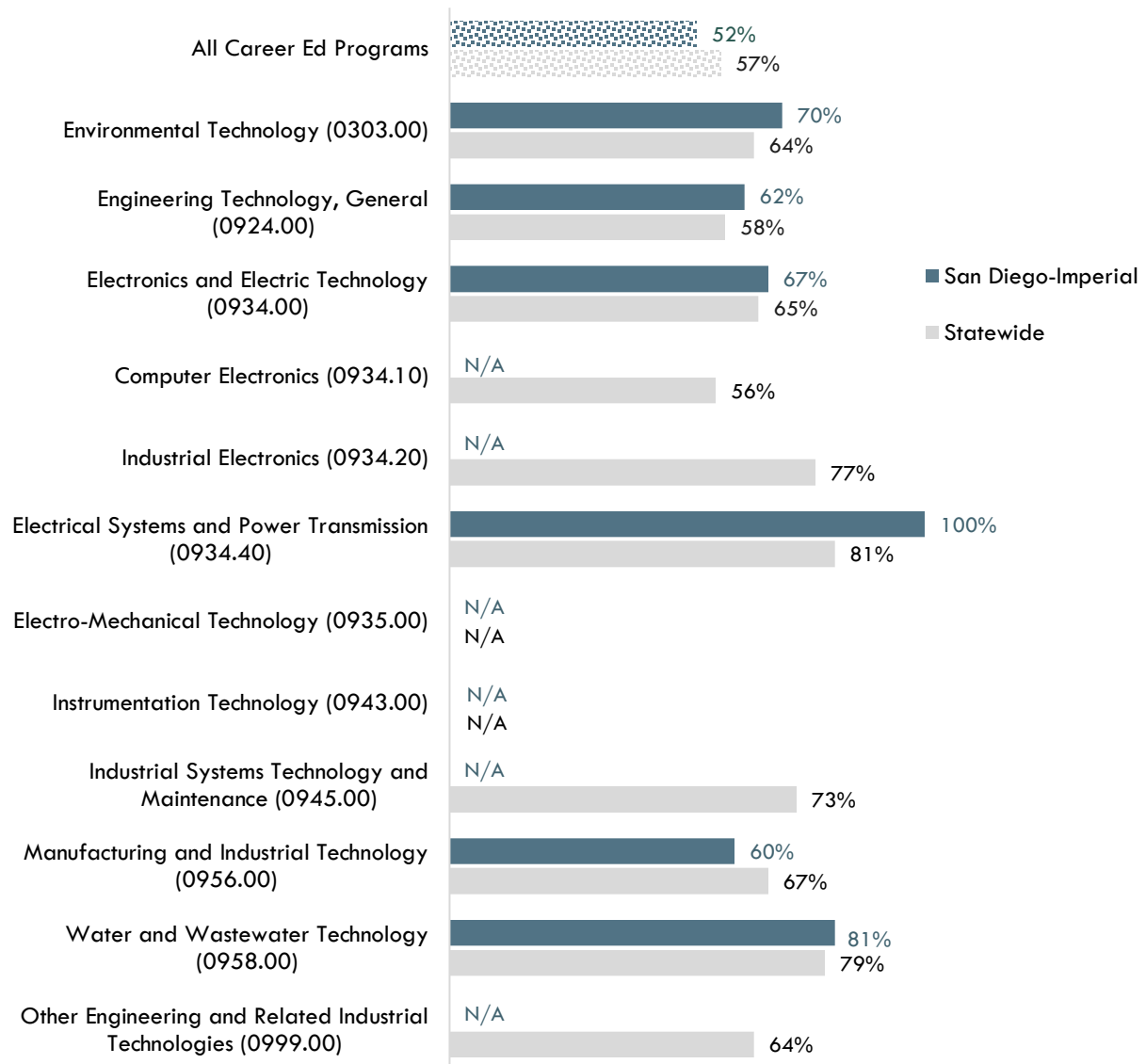
¹⁰ Labor supply can be found from two different sources: Lightcast or the California Community Colleges Chancellor's Office MIS Data Mart. Lightcast uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

¹¹ "Supply and Demand," Centers of Excellence Student Outcomes, <https://coecc.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 *Engineering Technicians*, compared 56 to 81 percent statewide and 57 percent of students in Career Education programs in general across the state (Exhibit 6a).¹²

Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program, PY2020-21¹³



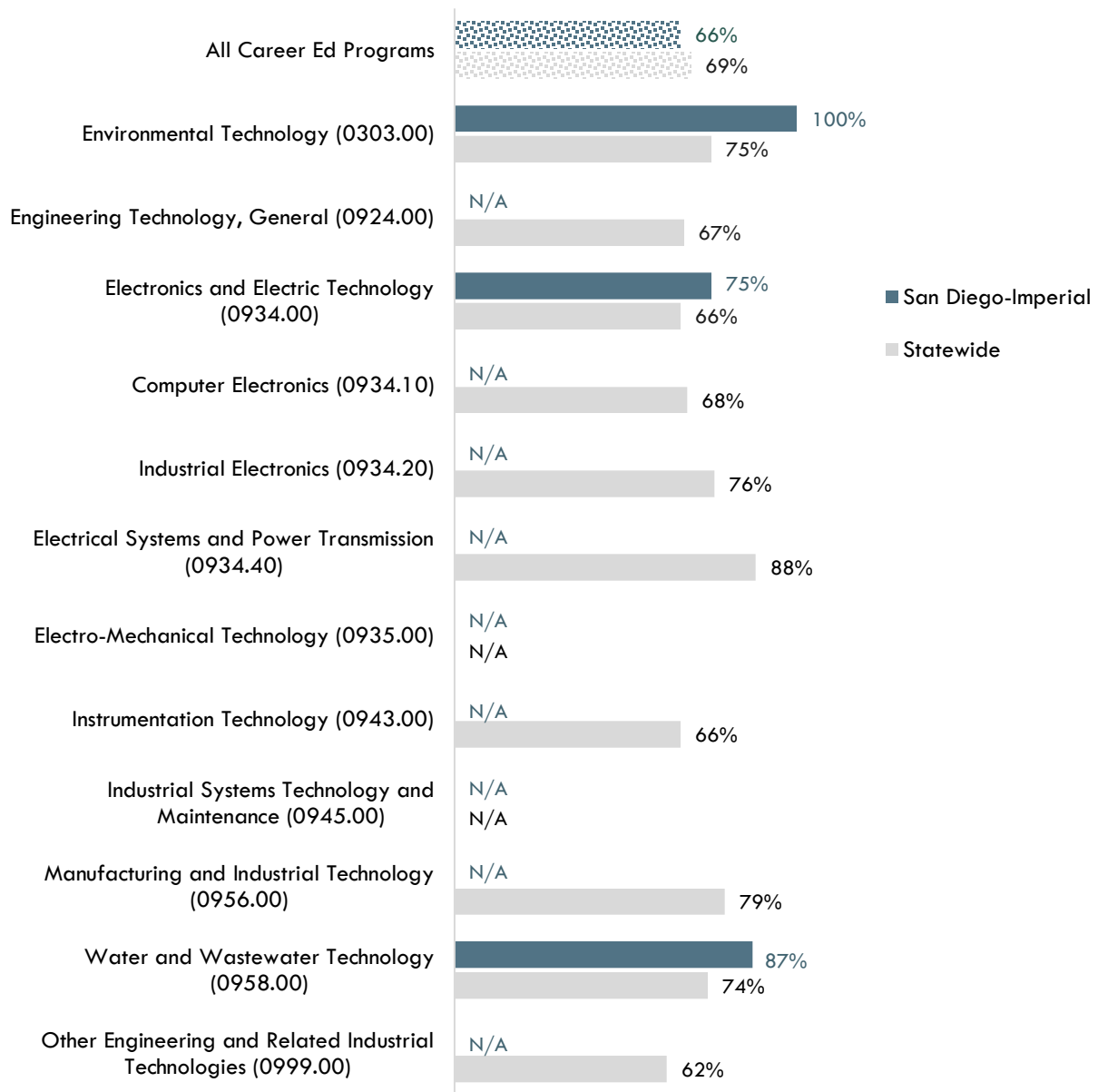
"N/A" indicates insufficient data

¹² "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹³ Most recent year with available data is Program Year 2020-21. Among completers and skills builders who exited, the percentage of students who attained a living wage.

According to the California Community Colleges LaunchBoard, 75 to 100 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 *Engineering Technicians*, compared to 62 to 88 percent statewide and 69 percent of students in Career Education programs in general across the state (Exhibit 6b).¹⁴

Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program, PY2019-20¹⁵



"N/A" indicates insufficient data

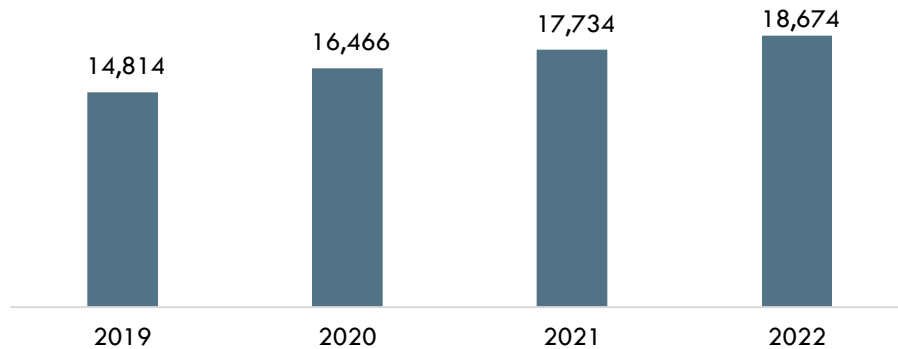
¹⁴ "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹⁵ 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 2019 and 2022, there was an average of 16,922 online job postings per year for *Engineering Technicians* in San Diego County (Exhibit 7). Please note that online job postings do **not** equal labor market demand; demand is represented by annual job openings (see Exhibit 1b). 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 7: Number of Online Job Postings for *Engineering Technicians* in San Diego County (2019-2022)¹⁶



¹⁶ Lightcast; "Job Posting Analytics." 2019-2022.

Top Employers

Between January 1, 2020 and December 31, 2022, the top five employers in San Diego County for *Engineering Technicians* were [Aerotek](#), [General Atomics](#), [Epsilon Systems](#), [Northrop Grumman](#), and [General Dynamics](#) based on online job postings (Exhibit 8).

Exhibit 8: Top Employers for Engineering Technicians in San Diego County¹⁷

Top Employers	
<ul style="list-style-type: none">• Aerotek• General Atomics• Epsilon Systems• Northrop Grumman• General Dynamics	<ul style="list-style-type: none">• Epsilon Systems Solutions• Kelly Services• Volt• Danaher• Randstad

Education, Skills, and Certifications

Engineering Technicians have a national educational attainment of an [associate degree](#) (Exhibit 9a).

Exhibit 9a: National Educational Attainment for Engineering Technicians¹⁸

Occupational Title	Typical Entry-Level Education
Electrical and Electronic Engineering Technologists and Technicians	Associate degree
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate degree
Engineering Technologists and Technicians, Except Drafters, All Other	Associate degree
Industrial Engineering Technologists and Technicians	Associate degree
Mechanical Engineering Technologists and Technicians	Associate degree

¹⁷ Lightcast; "Job Posting Analytics." 2020-2022.

¹⁸ Lightcast 2023.02; QCEW, Non-QCEW, Self-Employed.

Based on online job postings between January 1, 2020 and December 31, 2022 in San Diego County, employers posted a **high school diploma or equivalent** as the most requested educational requirement for *Engineering Technicians* (Exhibit 9b).¹⁹

Exhibit 9b: Educational Requirements for *Engineering Technicians* in San Diego County²⁰

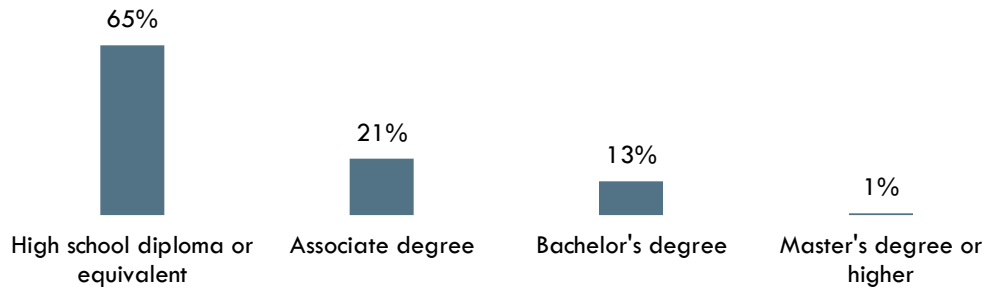


Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2020 and December 31, 2022.

Exhibit 10: Top Skills for *Engineering Technicians* in San Diego County²¹

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Test Equipment • Electronics • Hand Tools • Good Manufacturing Practices • Machinery • Soldering • Oscilloscope • Power Tool Operation • Electromechanics • Calibration • Automation • Preventive Maintenance • Electrical Wiring • Standard Operating Procedure • Blueprinting 	<ul style="list-style-type: none"> • Troubleshooting • Communications • Operations • Detail Oriented • Lifting Ability • Management • Computer Literacy • Problem Solving • English Language • Writing • Packaging And Labeling • Customer Service • Mathematics • Self-Motivation • Verbal Communication Skills 	<ul style="list-style-type: none"> • Microsoft Excel • Microsoft Word • Microsoft Outlook • Microsoft PowerPoint • Operating Systems • SAP Applications • SolidWorks • Spreadsheets • Python • Linux • Disassembler • Inventory Control Systems • LabVIEW • Microsoft Windows • Microsoft Access

¹⁹ Lightcast; "Job Posting Analytics." 2020-2022.

²⁰ "Educational Attainment for Workers 25 Years and Older by Detailed Occupation," Bureau of Labor Statistics, last modified April 9, 2021. bls.gov/emp/tables/educational-attainment.htm.

²¹ Lightcast; "Job Posting Analytics." 2020-2022.

Exhibit 11 lists the top certification that appeared in online job postings between January 1, 2020 and December 31, 2022.

Exhibit 11: Top Certification for *Engineering Technicians* in San Diego County²²

Top Certification in Online Job Postings

1. Secret Clearance
 2. Security Clearance
 3. CompTIA Security+
 4. Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)
 5. CDL Class C License
 6. 10-Hour OSHA General Industry Card
 7. Cardiopulmonary Resuscitation (CPR) Certification
 8. CompTIA A+
 9. Automotive Service Excellence (ASE) Certification
 10. Forklift Certification
 11. Top Secret Clearance
 12. IAT Level II Certification
 13. Microsoft Certified Technology Specialist
 14. EPA Universal Certification
 15. Cisco Certified Network Associate
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²² Lightcast; "Job Posting Analytics." 2020-2022.

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Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.