










# Engineering Technicians

## Labor Market Analysis: San Diego County

September 2021

### Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
 <p><b>Proceed with New Program</b></p>	 	 	<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	
 	<p>HIGH</p> 	<p>HIGH</p> 	

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,” “Environmental Engineering Technologists and Technicians,” “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 372 annual job openings (while average demand for a single occupation in San Diego County is 242 annual job openings), and 11 institutions supply 294 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 most occupations, except “Mechanical Engineering Technologists and Technicians.” This brief recommends proceeding with a new program and supports a program modification because 1) a supply gap exists in the region; 2) entry-level and median earnings for most occupations are above the living wage; and 3) a high number of annual job openings exist.

## Introduction

This report provides labor market information in San Diego County for the following occupational codes in the Standard Occupational Classification (SOC)<sup>1</sup> 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.
- **Environmental Engineering Technologists and Technicians (SOC 17-3025):** Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientists. May assist in the development of environmental remediation devices.
- **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.

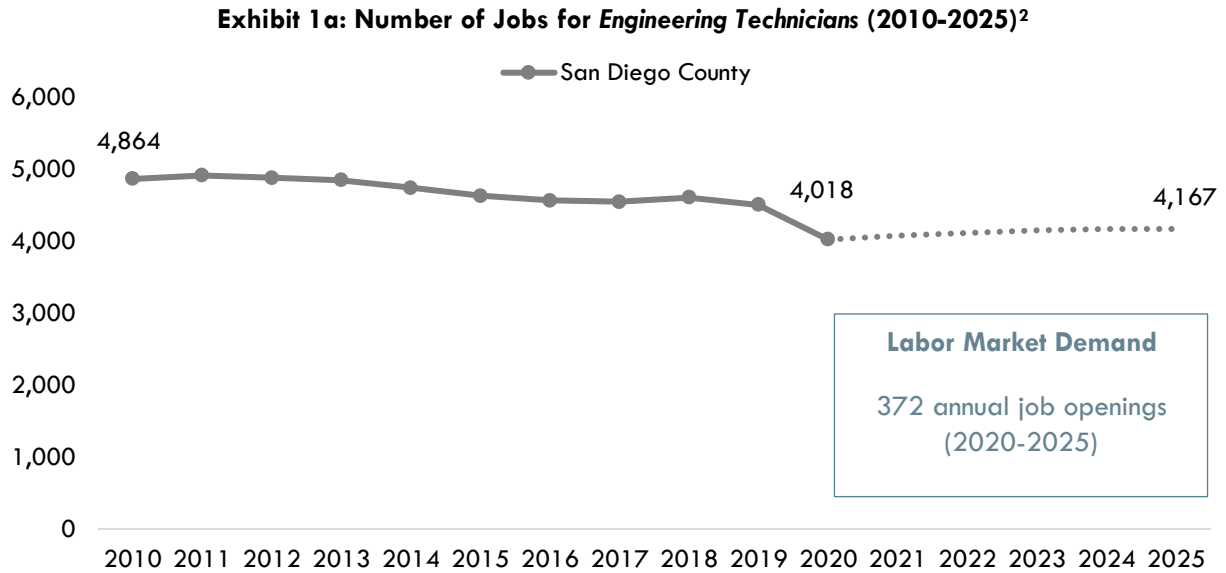
For the purpose of this report, these occupations are referred to as *Engineering Technicians*.

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<sup>1</sup> 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 2020 and 2025, *Engineering Technicians* are projected to increase by 149 net jobs or four percent (Exhibit 1a). Employers in San Diego County will need to hire 372 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.



<sup>2</sup> EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

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 2020 and 2025, with 247 annual job openings.

**Exhibit 1b: Number of Jobs for Engineering Technicians in San Diego County (2020-2025)<sup>3</sup>**

Occupational Title	2020 Jobs	2025 Jobs	2020 - 2025 Net Jobs Change	2020-2025 % Net Jobs Change	Annual Job Openings (Demand)
Electrical and Electronic Engineering Technologists and Technicians	2,815	2,862	47	2%	247
Industrial Engineering Technologists and Technicians	537	578	41	8%	55
Mechanical Engineering Technologists and Technicians	293	326	33	11%	32
Environmental Engineering Technologists and Technicians	225	241	16	7%	23
Electro-Mechanical and Mechatronics Technologists and Technicians	148	160	12	8%	15
Total	4,018	4,167	149	4%	372

<sup>3</sup> EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

## Earnings

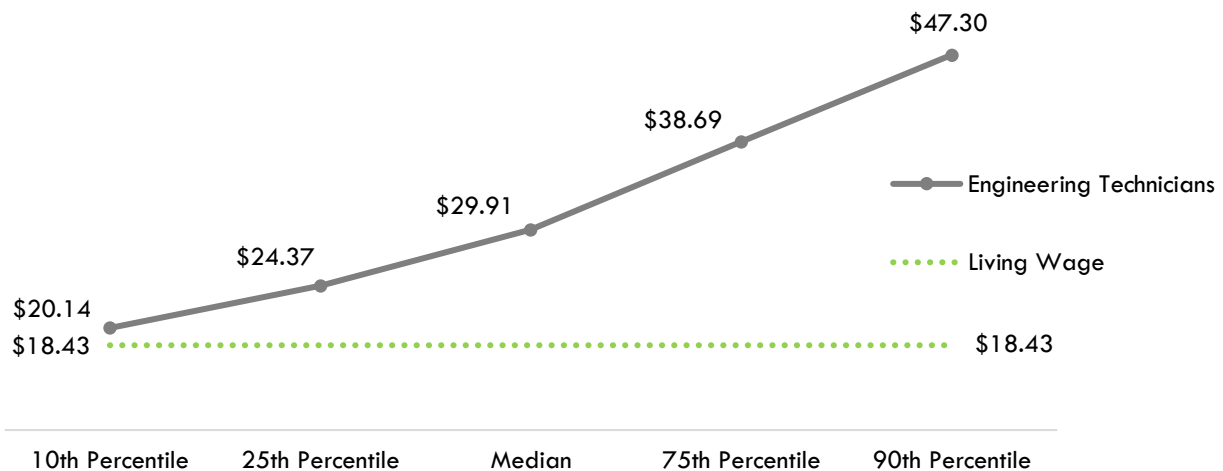
Exhibit 2a disaggregates hourly earnings by occupation. The entry-level hourly earnings for *Engineering Technicians* range from \$17.14 to \$28.26.

**Exhibit 2a: Hourly Earnings for Engineering Technicians in San Diego County<sup>4</sup>**

Occupational Title	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Electrical and Electronic Engineering Technologists and Technicians	\$28.26	\$35.91	\$46.84
Industrial Engineering Technologists and Technicians	\$26.30	\$29.36	\$34.73
Electro-Mechanical and Mechatronics Technologists and Technicians	\$25.17	\$32.30	\$44.21
Environmental Engineering Technologists and Technicians	\$25.00	\$28.74	\$34.08
Mechanical Engineering Technologists and Technicians	\$17.14	\$23.23	\$33.61

On average, the entry-level hourly earnings for *Engineering Technicians* are \$24.37; this is more than the living wage for a single adult in San Diego County, which is \$18.43 per hour (Exhibit 2b).<sup>5</sup>

**Exhibit 2b: Average Hourly Earnings<sup>6</sup> for Engineering Technicians in San Diego County<sup>7</sup>**



<sup>4</sup> EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

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

<sup>6</sup> 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.

<sup>7</sup> EMSI 2021.2; 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.<sup>8</sup> 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***<sup>9</sup>

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

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

<sup>9</sup> This brief uses a conservative estimate of program supply and only calculates awards from the TOP codes in the 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, six non-community-college institutions supply the region with awards: California Institute of Arts & Technology, ICOHS College, National University, Newschool of Architecture and Design, United Education Institute-Chula Vista, and United Education Institute-UEI College San Marcos (Exhibit 4).

**Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions  
(Program Year 2016-17 through PY2019-20 Average)**

TOP or CIP Code	TOP or CIP Program Title	3-Yr Annual Average CC Awards (PY17-18 to PY19-20)	Other Educational Institutions 3-Yr Annual Average Awards (PY16-17 to PY18-19)	3-Yr Total Average Supply (PY16-17 to PY19-20)
0303.00	Environmental Technology	<b>31</b>	<b>0</b>	<b>31</b>
	• Cuyamaca	27	0	
	• Southwestern	4	0	
0934.00	Electronics and Electric Technology	<b>97</b>	<b>0</b>	<b>97</b>
	• San Diego City	5	0	
	• San Diego Cont Ed	92	0	
	• Southwestern	0	0	
0934.10	Computer Electronics	<b>1</b>	<b>0</b>	<b>1</b>
	• San Diego City	1	0	
	• Southwestern	0	0	
0934.40	Electrical Systems and Power Transmission	<b>38</b>	<b>0</b>	<b>38</b>
	• San Diego City	38	0	
0935.00	Electro-Mechanical Technology	<b>1</b>	<b>0</b>	<b>1</b>
	• Cuyamaca	1	0	
0945.00	Industrial Systems Technology and Maintenance	<b>0</b>	<b>0</b>	<b>0</b>
	• Southwestern	0	0	
0956.00	Manufacturing and Industrial Technology	<b>14</b>	<b>0</b>	<b>14</b>
	• San Diego City	14	0	



TOP or CIP Code	TOP or CIP Program Title	3-Yr Annual Average CC Awards (PY17-18 to PY19-20)	Other Educational Institutions 3-Yr Annual Average Awards (PY16-17 to PY18-19)	3-Yr Total Average Supply (PY16-17 to PY19-20)
0958.00	Water and Wastewater Technology	<b>49</b>	<b>0</b>	<b>49</b>
	• Cuyamaca	25	0	
	• Palomar	24	0	
0999.00	Other Engineering and Related Industrial Technologies	<b>4</b>	<b>0</b>	<b>4</b>
	• San Diego City	4	0	
15.0000	Engineering Technology, General	<b>0</b>	<b>2</b>	<b>2</b>
	• National University	0	2	
15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other	<b>0</b>	<b>13</b>	<b>13</b>
	• National University	0	13	
15.0507	Environmental Engineering Technology/Environmental Technology	<b>0</b>	<b>0</b>	<b>0</b>
	• National University	0	0	
15.1203	Computer Hardware Technology/Technician	<b>0</b>	<b>0</b>	<b>0</b>
	• ICOHS College	0	0	
47.0101	Electrical/Electronics Equipment Installation and Repair, General	<b>0</b>	<b>0</b>	<b>0</b>
	• National University	0	0	
47.0104	Computer Installation and Repair Technology/Technician	<b>0</b>	<b>41</b>	<b>41</b>
	• California Institute of Arts & Technology	0	11	
	• United Education Institute-Chula Vista	0	13	
	• United Education Institute-UEI College San Marcos	0	17	
50.0404	Industrial and Product Design	<b>0</b>	<b>3</b>	<b>3</b>
	• Newschool of Architecture and Design	0	3	
			<b>Total</b>	<b>294</b>

## Demand vs. Supply

Comparing labor demand (annual openings) with labor supply<sup>10</sup> suggests that there is a **supply gap** for these occupations in San Diego County, with **372** annual openings and **294** awards. Comparatively, there are **3,031** annual openings in California and **4,564** awards, suggesting that there is an oversupply across the state<sup>11</sup> (Exhibit 5).

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

	<b>Demand</b> (Annual Openings)	<b>Supply</b> (Total Annual Average Supply)	<b>Supply Gap or Oversupply</b>
San Diego	372	294	<b>78</b>
California	3,031	4,564	<b>1,533</b>

**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.

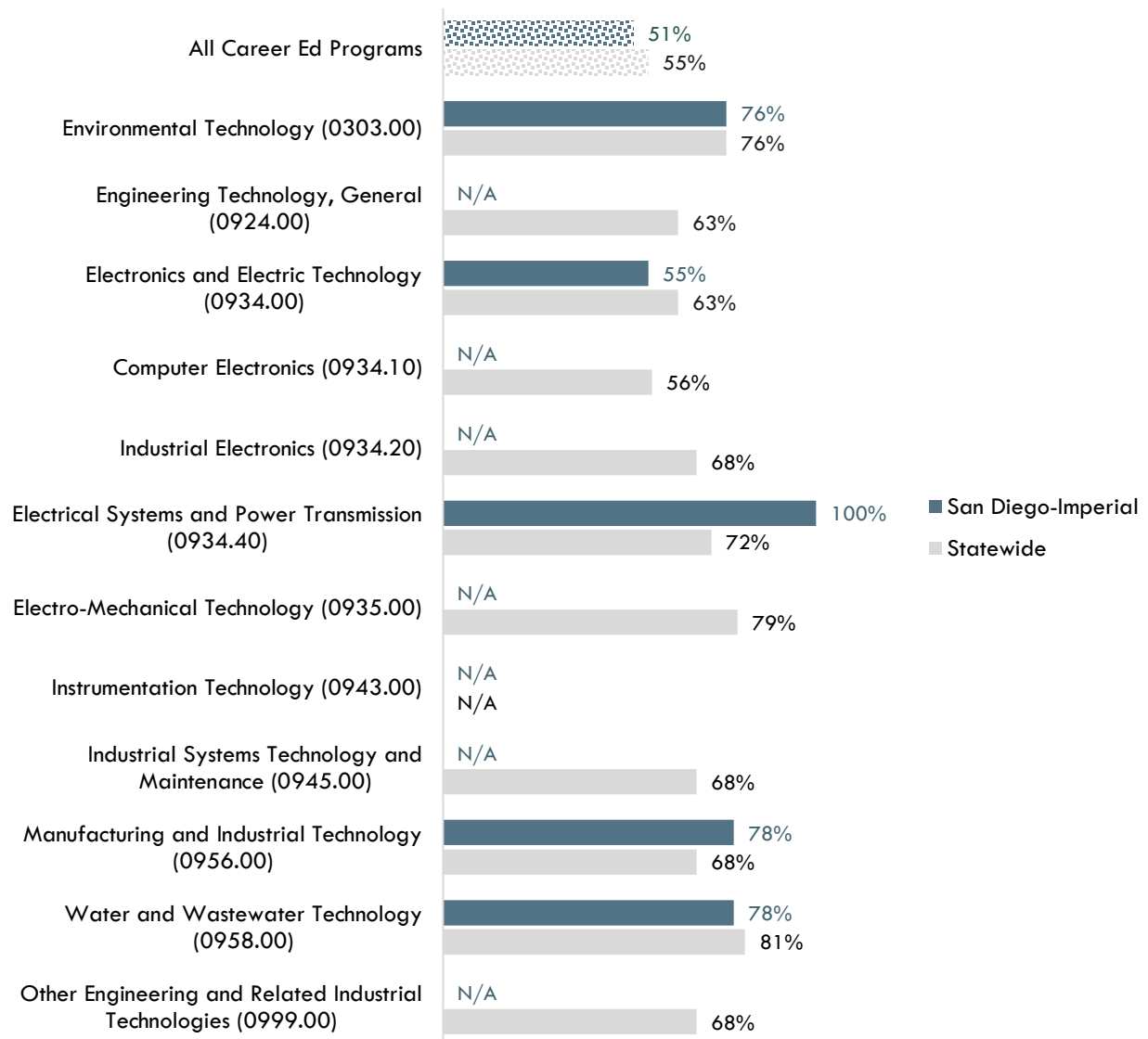
<sup>10</sup> Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

<sup>11</sup> "Supply and Demand," Centers of Excellence Student Outcomes, [coecc.net/Supply-and-Demand.aspx](http://coecc.net/Supply-and-Demand.aspx).

## Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 55 to 100 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *Engineering Technicians*, compared to 56 to 81 percent statewide and 55 percent of students in Career Education programs in general across the state (Exhibit 6a).<sup>12</sup>

**Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program, PY2017-18<sup>13</sup>**



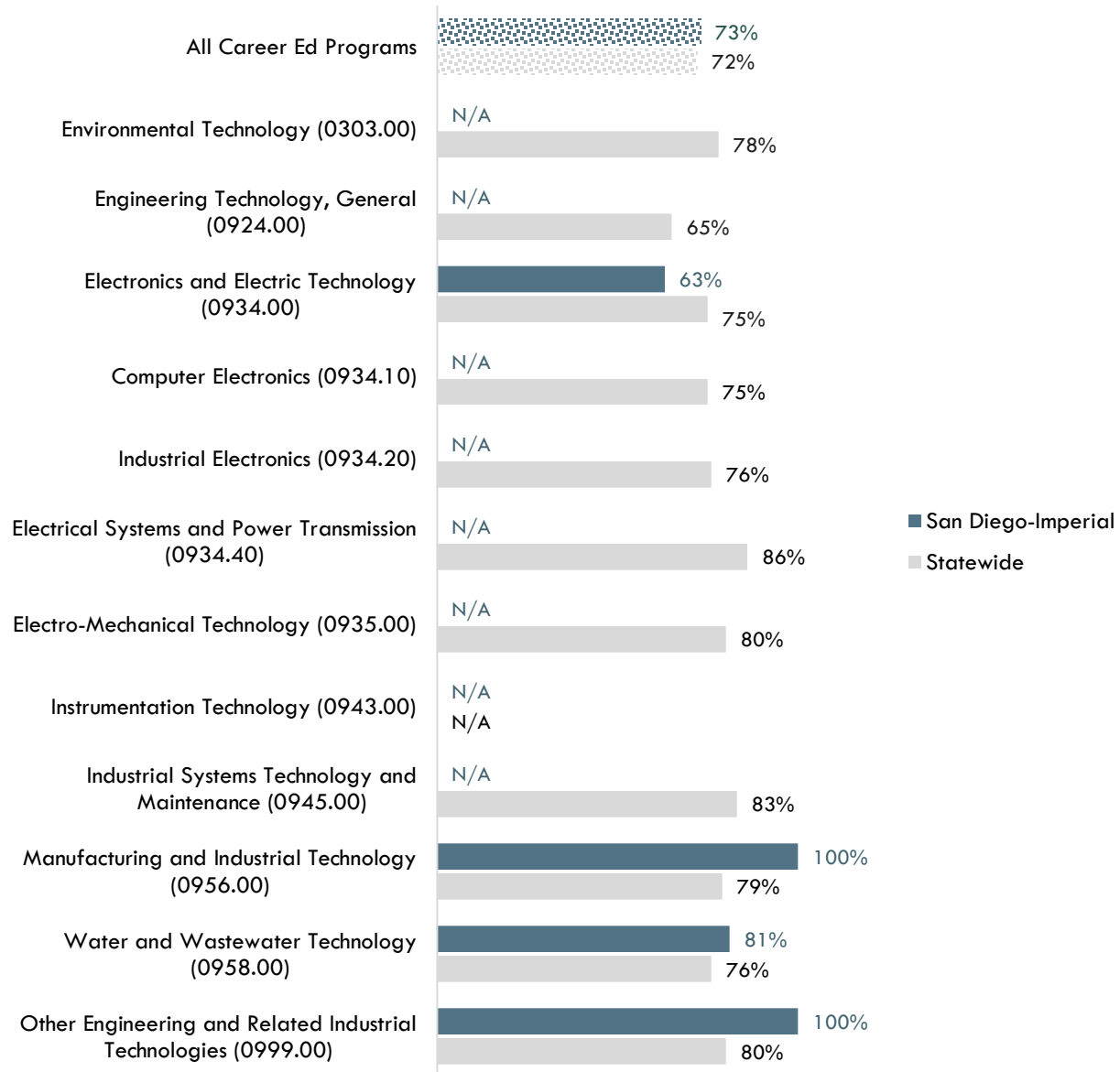
"N/A" indicates insufficient data

<sup>12</sup> "California Community Colleges Strong Workforce Program," California Community Colleges, [calpassplus.org/LaunchBoard/SWP.aspx](http://calpassplus.org/LaunchBoard/SWP.aspx).

<sup>13</sup> Among completers and skills builders who exited, the proportion of students who attained a living wage.

According to the California Community Colleges LaunchBoard, 63 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 65 to 86 percent statewide and 72 percent of students in Career Education programs in general across the state (Exhibit 6b).<sup>14</sup>

**Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program, PY2016-17<sup>15</sup>**



"N/A" indicates insufficient data

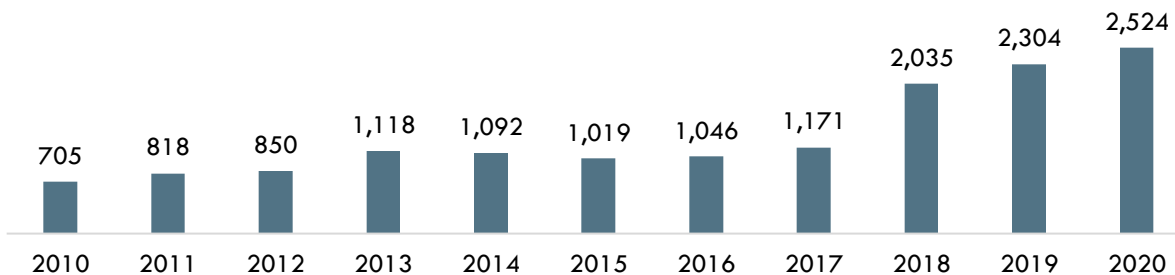
<sup>14</sup> "California Community Colleges Strong Workforce Program," California Community Colleges, [calpassplus.org/LaunchBoard/SWP.aspx](http://calpassplus.org/LaunchBoard/SWP.aspx).

<sup>15</sup> Most recent year with available data is Program Year 2016-17. 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 2010 and 2020, there was an average of 1,335 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). Employers may post a position multiple times for various reasons, such as increasing the pool of applicants, for example.

**Exhibit 7: Number of Online Job Postings for *Engineering Technicians* in San Diego County (2010-2020)<sup>16</sup>**



## Top Employers

Between January 1, 2018 and December 31, 2020, the top five employers in San Diego County for *Engineering Technicians* were *General Atomics*, *General Dynamics*, *Education America*, *University Of California San Diego*, and *Viasat* based on online job postings (Exhibit 8).

**Exhibit 8: Top Employers for *Engineering Technicians* in San Diego County<sup>17</sup>**

Top Employers	
<ul style="list-style-type: none"><li>• General Atomics</li><li>• General Dynamics</li><li>• Education America</li><li>• University Of California San Diego</li><li>• Viasat</li></ul>	<ul style="list-style-type: none"><li>• Northrop Grumman</li><li>• Afognak Native Corporation</li><li>• SAIC</li><li>• Cobham</li><li>• Epsilon Systems, Inc.</li></ul>

<sup>16</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2020.

<sup>17</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

## Education, Skills, and Certifications

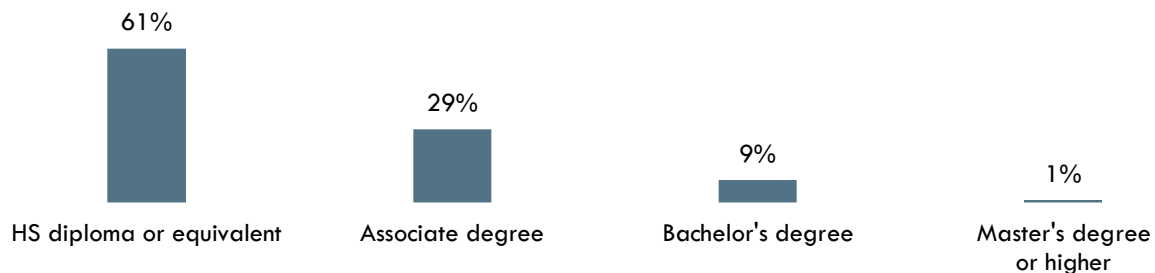
*Engineering Technicians* have a national educational attainment of an [associate degree](#) (Exhibit 9a).

**Exhibit 9a: National Educational Attainment for *Engineering Technicians*<sup>18</sup>**

Occupational Title	Typical Entry-Level Education
Electrical and Electronic Engineering Technologists and Technicians	Associate degree
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate degree
Environmental Engineering Technologists and Technicians	Associate degree
Industrial Engineering Technologists and Technicians	Associate degree
Mechanical Engineering Technologists and Technicians	Associate degree

Based on online job postings between January 1, 2018 and December 31, 2020 in San Diego County, employers posted a [high school diploma or equivalent](#) as the educational requirement for *Engineering Technicians* (Exhibit 9b).<sup>19</sup>

**Exhibit 9b: Educational Requirements for *Engineering Technicians* in San Diego County<sup>20</sup>**



<sup>18</sup> EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

<sup>19</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

<sup>20</sup> "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](https://bls.gov/emp/tables/educational-attainment.htm).

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2018 and December 31, 2020.

**Exhibit 10: Top Skills for *Engineering Technicians* in San Diego County<sup>21</sup>**

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> <li>• Repair</li> <li>• Test Equipment</li> <li>• Schematic Diagrams</li> <li>• Hand Tools</li> <li>• Calibration</li> <li>• Soldering</li> <li>• Oscilloscopes</li> <li>• Wiring</li> <li>• Predictive / Preventative Maintenance</li> <li>• Electronics Industry Knowledge</li> <li>• Power Tools</li> <li>• Machinery</li> <li>• Scheduling</li> <li>• Customer Service</li> <li>• Welding</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Communication Skills</li> <li>• Physical Abilities</li> <li>• Preventive Maintenance</li> <li>• Computer Literacy</li> <li>• Detail-Oriented</li> <li>• Organizational Skills</li> <li>• Problem Solving</li> <li>• Teamwork / Collaboration</li> <li>• English</li> <li>• Writing</li> <li>• Research</li> <li>• Planning</li> <li>• Multi-Tasking</li> <li>• Written Communication</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Excel</li> <li>• Microsoft Word</li> <li>• Microsoft PowerPoint</li> <li>• SAP</li> <li>• Enterprise Resource Planning</li> <li>• Function generator</li> <li>• Microsoft Outlook</li> <li>• Debugging</li> <li>• Linux</li> <li>• SolidWorks</li> <li>• Firmware</li> <li>• Word Processing</li> <li>• LabVIEW</li> <li>• Python</li> <li>• Microsoft Operating Systems</li> </ul>

<sup>21</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Exhibit 11 lists the top certification that appeared in online job postings between January 1, 2018 and December 31, 2020.

**Exhibit 11: Top Certification for *Engineering Technicians* in San Diego County<sup>22</sup>**

Top Certification in Online Job Postings

1. Security Clearance
  2. IPC Certification
  3. CompTIA Security+
  4. Competent Person Certification
  5. CDL Class C
  6. Occupational Safety and Health Administration Certification
  7. First Aid CPR Aed
  8. OSHA Forklift Certification
  9. Electronic Technician Certification
  10. Soldering Certification
  11. Automotive Service Excellence (ASE) Certification
  12. Certified Non-Destructive Testing
  13. Microsoft Certified Technology Specialist (MCTS)
  14. The American Society For Nondestructive Testing (ASNT) Certification
  15. Electrician Certification
- 

<sup>22</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.



Prepared by:

Tina Ngo Bartel, Director ([tngobartel@miracosta.edu](mailto:tngobartel@miracosta.edu))

John Edwards, Research Analyst ([jedwards@miracosta.edu](mailto:jedwards@miracosta.edu))

Priscilla Fernandez, Research Analyst ([pfernandez@miracosta.edu](mailto:pfernandez@miracosta.edu))

San Diego-Imperial Center of Excellence for Labor Market Research



### 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.

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.