

# Computer Electronic Occupations

## Labor Market Analysis: San Diego County

January 2021

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### Summary



The brief provides labor market information about *Computer Electronic Occupations* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *Computer Electronic Occupations* include “Electrical and Electronic Engineering Technologists and Technicians,” “Electrical and Electronics Repairers, Commercial and Industrial Equipment,” and “Computer, Automated Teller, and Office Machine Repairers.” According to available labor market information, *Computer Electronic Occupations* in San Diego County have a labor market demand of 529 annual job openings (while average demand for a single occupation in San Diego County is 277 annual job openings), and six educational institutions in San Diego County supply 256 awards for these occupations, suggesting that there is a supply gap in the labor market. Entry-level wages are above the living wage for all occupations except “Computer, Automated Teller, and Office Machine Repairers” and median wages for all occupations are above the living wage. This brief recommends proceeding with developing a new program because 1) most of these occupations’ entry-level and median earnings are above the living wage; 2) employers typically require an associate degree as the minimum educational requirement for these occupations.; and 3) a supply gap exists for these positions.

## 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.
- **Computer, Automated Teller, and Office Machine Repairers (SOC 49-2011):** Repair, maintain, or install computers, word processing systems, automated teller machines, and electronic office machines, such as duplicating and fax machines.
- **Electrical and Electronics Repairers, Commercial and Industrial Equipment (SOC 49-2094):** Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.

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

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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 2019 and 2024, *Computer Electronic Occupations* are projected to increase by 39 net jobs or one percent (Exhibit 1a). During this period, employers in San Diego County are projected to hire 529 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

**Exhibit 1a: Number of Jobs for Computer Electronic Occupations (2009-2024)<sup>2</sup>**

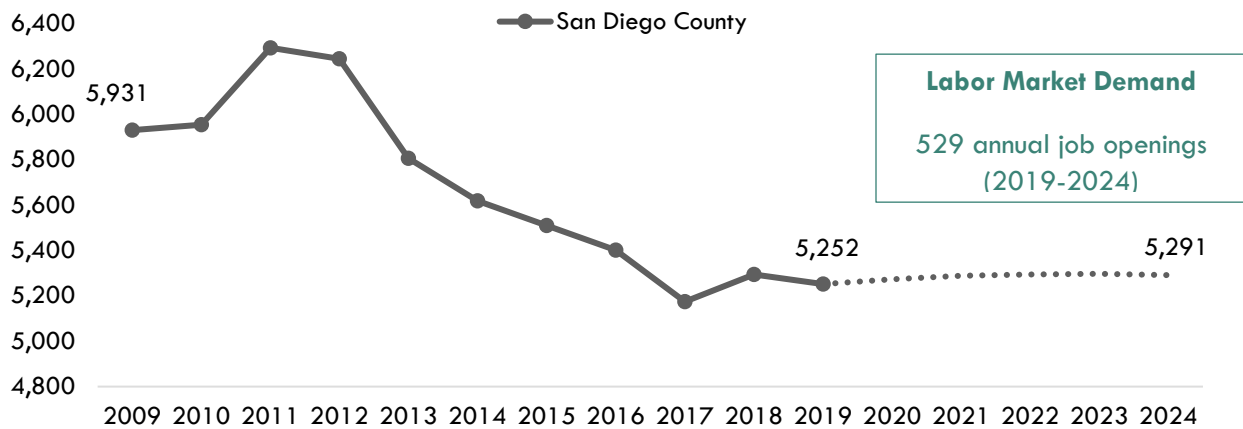


Exhibit 1b breaks down the projected number of annual job openings by occupation more specifically: *Electrical and Electronic Engineering Technologists and Technicians* are projected to have the most labor market demand between 2019 and 2024, with 317 annual job openings.

**Exhibit 1b: Number of Jobs for Computer Electronic Occupations in San Diego County (2019-2024)<sup>3</sup>**

Occupational Title	2019 Jobs	2024 Jobs	2019 - 2024 Net Jobs Change	2019-2024 % Net Jobs Change	Annual Job Openings (Demand)
Electrical and Electronic Engineering Technologists and Technicians	3,104	3,173	69	2%	317
Computer, Automated Teller, and Office Machine Repairers	1,170	1,118	-52	-4%	121
Electrical and Electronics Repairers, Commercial and Industrial Equipment	978	1,000	22	2%	91
<b>Total</b>	<b>5,252</b>	<b>5,291</b>	<b>39</b>	<b>1%</b>	<b>529</b>

## Earnings

Entry-level hourly earnings for *Computer Electronic Occupations* range from \$14.53 to \$26.40 (Exhibit 2a).

<sup>2</sup> EMSI 2020.04; QCEW, Non-QCEW, Self-Employed.

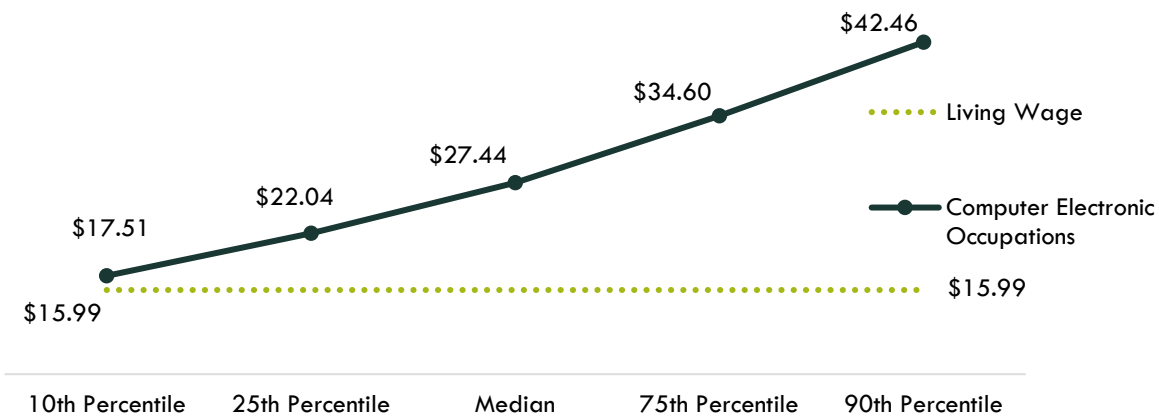
<sup>3</sup> EMSI 2020.04; QCEW, Non-QCEW, Self-Employed

**Exhibit 2a: Hourly Earnings for Computer Electronic Occupations 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	\$26.40	\$33.83	\$42.99
Electrical and Electronics Repairers, Commercial and Industrial Equipment	\$25.20	\$30.53	\$36.48
Computer, Automated Teller, and Office Machine Repairers	\$14.53	\$17.96	\$24.32

On average, entry-level hourly earnings for *Computer Electronic Occupations* are **\$22.04**; this is more than the living wage for a single adult in San Diego County, which is **\$15.99** per hour (Exhibit 2b).<sup>5</sup>

**Exhibit 2b: Average Hourly Earnings<sup>6</sup> for Computer Electronic Occupations in San Diego County<sup>7</sup>**



## 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 **seven** TOP codes and **20** CIP codes related to *Computer Electronic Occupations* (Exhibit 3).

**Exhibit 3: Related TOP and CIP Codes for Computer Electronic Occupations**

<sup>4</sup> EMSI 2020.04; QCEW, Non-QCEW, Self-Employed

<sup>5</sup> "California Family Needs Calculator (formerly the Self-Sufficiency Standard)," Insight: Center for Community Economic Development, last updated 2018. insightcced.org/2018-self-sufficiency-standard.

<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 2020.04; QCEW, Non-QCEW, Self-Employed.

<sup>8</sup> 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).

*Computer Electronic Occupations*

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

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 15.0404: 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 15.0803: 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 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

*Computer Electronic Occupations*

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, [two](#) community colleges supply the region with awards for this occupation: [San Diego City College](#) and [San Diego Continuing Education](#). According to CIP data, [four](#) non-community colleges supply the region with awards, [California Institute of Arts & Technology](#), [United Education](#)

Institute-Chula Vista, United Education Institute-UEI College San Marcos, and NewSchool of Architecture and Design (Exhibit 4).

**Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions  
(Program Year 2014-15 through PY2018-19 Average)**

TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY15-16 to PY17-18)	Other Educational Institutions 3-Yr Annual Average Awards (PY14-15 to PY16-17)	3-Yr Total Average Supply (PY14-15 to PY17-18)
0934.00	Electronics and Electric Technology	<b>137</b>	<b>0</b>	<b>137</b>
	• San Diego City	5	0	
	• San Diego Cont. Ed.	132	0	
0934.10	Computer Electronics	<b>1</b>	<b>0</b>	<b>1</b>
	• San Diego City	0	0	
	• San Diego Cont. Ed.	1	0	
0934.40	Electrical Systems and Power Transmission	<b>39</b>	<b>0</b>	<b>39</b>
	• San Diego City	39	0	
0956.00	Manufacturing and Industrial Technology	<b>14</b>	<b>0</b>	<b>14</b>
	• San Diego City	14	0	
	• San Diego Cont. Ed.	0	0	
47.0104	Computer Installation and Repair Technology/Technician	<b>0</b>	<b>64</b>	<b>64</b>
	• California Institute of Arts & Technology	0	4	
	• United Education Institute-Chula Vista	0	31	
TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY15-16 to PY17-18)	Other Educational Institutions 3-Yr Annual Average Awards (PY14-15 to PY16-17)	3-Yr Total Average Supply (PY14-15 to PY17-18)
	• United Education Institute-UEI College San Marcos	0	29	
50.0404	Industrial and Product Design	<b>0</b>	<b>1</b>	<b>1</b>
	• NewSchool of Architecture and Design	0	1	

Total	<b>256</b>
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### Demand vs. Supply

Comparing labor demand (annual openings) with labor supply<sup>9</sup> suggests that there is a **supply gap** for these occupations in San Diego County, with **529** annual openings and **256** awards. Comparatively, there are **4,436** annual openings in California and **2,511** awards, suggesting that there is a supply gap across the state<sup>10</sup> (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	529	256	<b>273</b>
California	4,436	2,511	<b>1,925</b>

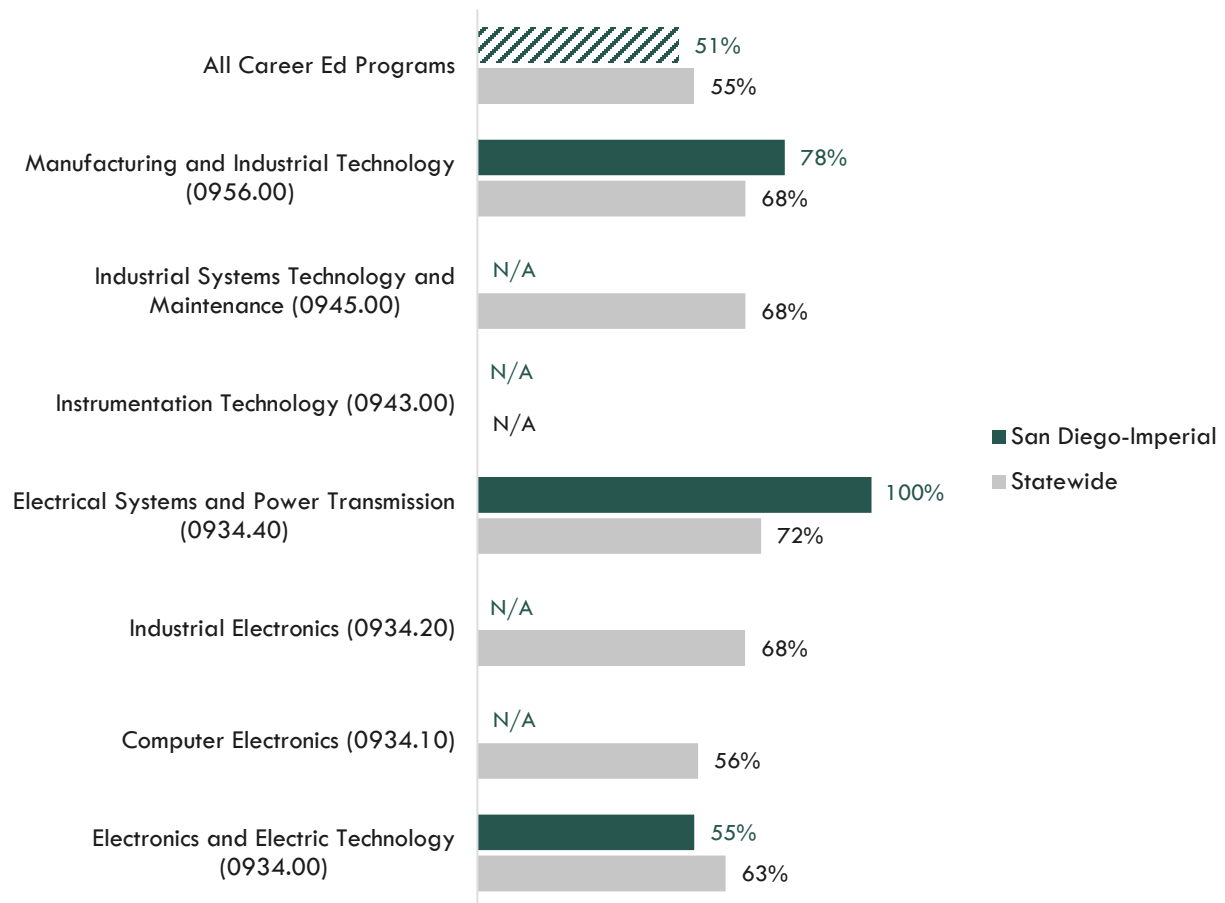
**Please note:** This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers;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

<sup>9</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>10</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, between 55 and 100 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *Computer Electronic Occupations*, compared to 56 to 72 percent statewide and 55 percent of students in Career Education programs in general across the state (Exhibit 6a).

**Exhibit 6a: Proportion of Students Who Earned a Living Wage, PY2017-18<sup>11</sup>**



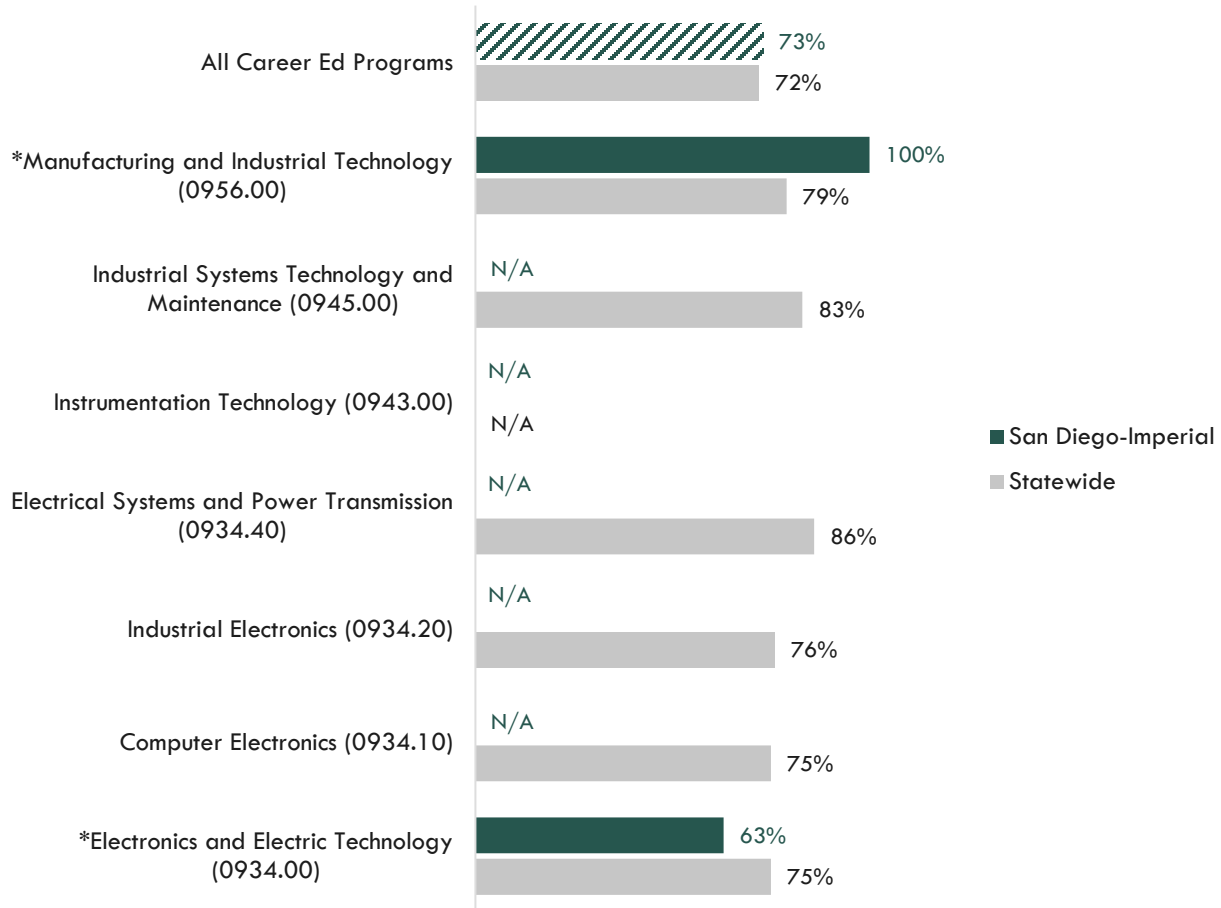
"N/A" indicates insufficient data

<sup>11</sup> Among completers and skills builders who exited, the proportion of students who attained a living wage.



According to the California Community Colleges LaunchBoard, between 63 and 100 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a related program, compared to 75 to 86 percent statewide and 72 percent of students in Career Education programs in general across the state (Exhibit 6b).

**Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study, PY2016-17<sup>12</sup>**



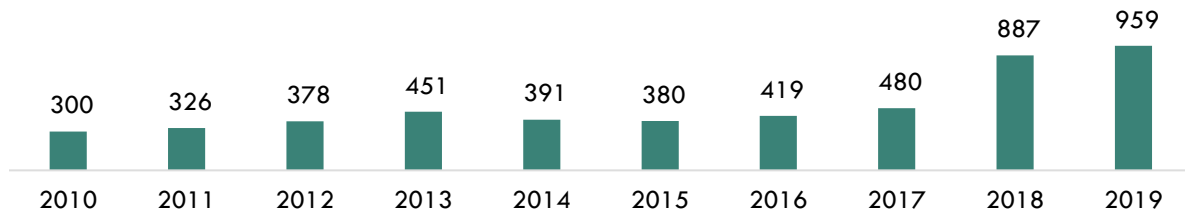
\*sample size had fewer than 10 students  
 "N/A" indicates insufficient data

<sup>12</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 data (traditional labor market information or LMI), 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 2019, there was an average of 497 online job postings per year in San Diego County for *Computer Electronic Occupations* (Exhibit 7). Please note that online job postings do not equal labor market demand; demand is represented by annual job openings (see Exhibit 1b above). 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 *Computer Electronic Occupations* in San Diego County (2010-2019)<sup>13</sup>**



## Top Employers

Between January 1, 2017 and December 31, 2019, the top five employers in San Diego County for these occupations were *General Atomics, Epsilon Systems Solutions, General Dynamics, WIS International, and Qualcomm* (Exhibit 8).

**Exhibit 8: Top Employers in San Diego County for *Computer Electronic Occupations*<sup>14</sup>**

Top Employers	
<ul style="list-style-type: none"> <li>• General Atomics</li> <li>• Epsilon Systems Solutions Incorporated</li> <li>• General Dynamics</li> <li>• WIS International</li> <li>• Qualcomm</li> </ul>	<ul style="list-style-type: none"> <li>• U.S. Government</li> <li>• Thermo Fisher Scientific Inc.</li> <li>• L3 Technologies</li> <li>• Cobham</li> <li>• Viasat</li> </ul>

<sup>13</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2019.

<sup>14</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2017-2019.

## Education, Skills and Certifications

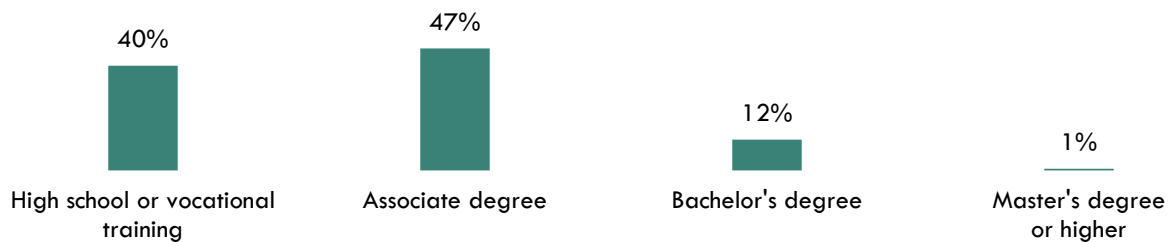
*Computer Electronic Occupations* have a national educational attainment ranging from a [some college, no degree](#) to an [associate degree](#) (Exhibit 9a).

**Exhibit 9a: National Educational Attainment for *Computer Electronic Occupations*** <sup>15</sup>

Occupational Title	Typical Entry-Level Education
Electrical and Electronic Engineering Technologists and Technicians	Associate degree
Electrical and Electronics Repairers, Commercial and Industrial Equipment	Postsecondary non-degree award
Computer, Automated Teller, and Office Machine Repairers	Some college, no degree

Based on online job postings between January 1, 2017 and December 31, 2019 in San Diego County, the top listed educational requirement for *Computer Electronic Occupations* is an [associate degree](#) (Exhibit 9b).<sup>16</sup>

**Exhibit 9b: Educational Requirements for *Computer Electronic Occupations* in San Diego County**<sup>17</sup>



\*May not add to 100% due to rounding

<sup>15</sup> EMSI 2020.04; QCEW, Non-QCEW, Self-Employed.

<sup>16</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2017-2019.

<sup>17</sup> "Educational Attainment for Workers 25 Years and Older by Detailed Occupation," Bureau of Labor Statistics, last modified September 4, 2019. [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, 2017 and December 31, 2019.

**Exhibit 10: Top Skills for Computer Electronic Occupations in San Diego County<sup>18</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>• Oscilloscopes</li> <li>• Electronics Industry Knowledge</li> <li>• Calibration</li> <li>• Soldering</li> <li>• Hand Tools</li> <li>• Wiring</li> <li>• Scheduling</li> <li>• Spectrum Analyzer</li> <li>• Technical Support</li> <li>• Machinery</li> <li>• Manual Dexterity</li> <li>• Technical Training</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Communication Skills</li> <li>• Computer Literacy</li> <li>• Physical Abilities</li> <li>• Detail-Oriented</li> <li>• Problem Solving</li> <li>• Writing</li> <li>• English</li> <li>• Organizational Skills</li> <li>• Research</li> <li>• Teamwork / Collaboration</li> <li>• Preventive Maintenance</li> <li>• Time Management</li> <li>• Planning</li> <li>• Written Communication</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Excel</li> <li>• SAP</li> <li>• Function generator</li> <li>• LabVIEW</li> <li>• Microsoft Word</li> <li>• Debugging</li> <li>• Linux</li> <li>• Active Server Pages (ASP)</li> <li>• Software Testing</li> <li>• SolidWorks</li> <li>• Firmware</li> <li>• Python</li> <li>• SQL</li> <li>• Altium</li> <li>• Microsoft PowerPoint</li> </ul>

<sup>18</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2017-2019.

Exhibit 11 lists the top certifications that appeared in online job postings between January 1, 2017 and December 31, 2019.

**Exhibit 11: Top 15 Certifications for Computer Electronic Occupations in San Diego County<sup>19</sup>**

Top Certifications in Online Job Postings

1. Security Clearance
2. IPC Certification
3. Certified Gunsmith
4. Electronic Technician Certification
5. Electronic Engineering Certification
6. Computer Engineering Certificate
7. CompTIA Security+
8. Soldering Certification
9. Occupational Safety and Health Administration Certification
10. OSHA Forklift Certification
11. Microsoft Certified Solutions Expert (MCSE)
12. First Aid CPR AED
13. Environmental Protection Agency Certification
14. Electrician Certification
15. CompTIA Network+

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<sup>19</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2017-2019.

### **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.