

# Industrial Automation and Robotics Occupations

# Labor Market Information Report

# Diablo Valley College

## Prepared by the San Francisco Bay Center of Excellence for Labor Market Research

**January 2021**

## Recommendation

Based on all available data, there appears to be an “undersupply” of Industrial Automation and Robotics workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda and Contra Costa counties). There is a projected annual gap of about 2,531 students in the Bay region and 600 students in the East Bay Sub-Region.

## Introduction

This report provides student outcomes data on employment and earnings for TOP 0956.00 - Manufacturing and Industrial Technology programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Diablo Valley College and in the region.

This report profiles Industrial Automation and Robotics Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Diablo Valley College.

* **Data Scientists and Mathematical Science Occupations, All Other (15-2098):** Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets. Visualize, interpret, and report data findings. May create dynamic data reports.
  Entry-Level Educational Requirement: Bachelor’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 10%
* **Industrial Engineers (17-2112):** Design, develop, test, and evaluate integrated systems for managing industrial production processes, including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination. Excludes “Health and Safety Engineers, Except Mining Safety Engineers and Inspectors” (17-2111).
  Entry-Level Educational Requirement: Bachelor’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 18%
* **Electrical and Electronic Engineering Technologists and Technicians (17-3023):** Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, calibrate, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions. Excludes “Broadcast Technicians” (27-4012).
  Entry-Level Educational Requirement: Associate’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 61%
* **Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024):** Operate, test, maintain, or calibrate unmanned, automated, servo-mechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment at worksites, such as oil rigs, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.
  Entry-Level Educational Requirement: Associate’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 51%
* **Industrial Machinery Mechanics (49-9041):** Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems. Excludes “Millwrights” (49-9044), “Mobile Heavy Equipment Mechanics, Except Engines” (49-3042), and “Maintenance Workers, Machinery” (49-9043).
  Entry-Level Educational Requirement: High school diploma or equivalent
  Training Requirement: Long-term on-the-job training
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 42%

## Occupational Demand

**Table 1. Employment Outlook for Industrial Automation and Robotics Occupations in Bay Region**

| **Occupation** | **2019 Jobs** | **2024 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Data Scientists and Mathematical Science Occupations, All Other | 2,183 | 2,313 | 130 | 6% | 998 | 200 | $50.71 | $65.67 |
| Industrial Engineers | 8,668 | 9,210 | 542 | 6% | 3,579 | 716 | $41.09 | $53.30 |
| Electrical and Electronic Engineering Technologists and Technicians | 9,625 | 9,537 | -88 | -1% | 4,800 | 960 | $25.03 | $32.23 |
| Electro-Mechanical and Mechatronics Technologists and Technicians | 781 | 784 | 3 | 0% | 408 | 82 | $20.38 | $26.68 |
| Industrial Machinery Mechanics | 5,372 | 5,741 | 369 | 7% | 2,916 | 583 | $25.83 | $33.74 |
| **Total** | **26,629** | **27,585** | **956** | **4%** | **12,701** | **2,541** | **$32.39** | **$41.97** |
| Source: EMSI 2020.4 |

**Bay Region includes:** Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

**Table 2. Employment Outlook for Industrial Automation and Robotics Occupations in East Bay Sub-region**

| **Occupation** | **2019 Jobs** | **2024 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Data Scientists and Mathematical Science Occupations, All Other | 473 | 477 | 4 | 1% | 190 | 38 | $47.59 | $59.42 |
| Industrial Engineers | 1,771 | 1,992 | 221 | 12% | 853 | 171 | $36.78 | $47.72 |
| Electrical and Electronic Engineering Technologists and Technicians | 2,069 | 2,064 | -5 | -0% | 1,017 | 203 | $22.34 | $28.46 |
| Electro-Mechanical and Mechatronics Technologists and Technicians | 133 | 141 | 8 | 6% | 74 | 15 | $18.07 | $24.92 |
| Industrial Machinery Mechanics | 1,604 | 1,714 | 110 | 7% | 870 | 174 | $27.25 | $34.86 |
| **Total** | **6,050** | **6,388** | **338** | **6%** | **3,004** | **601** | **$29.75** | **$38.14** |
| Source: EMSI 2020.4 |

**East Bay Sub-Region includes:** Alameda, Contra Costa Counties

### Job Postings in Bay Region and East Bay Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (Dec 2019-Nov 2020)**

| **Occupation** | **Bay Region** | **East Bay** |
| --- | --- | --- |
| Electronics Engineering Technicians | 1,683 | 613 |
| Industrial Engineers | 1,617 | 421 |
| Industrial Machinery Mechanics | 869 | 298 |
| Electro-Mechanical Technicians | 616 | 234 |
| Human Factors Engineers and Ergonomists | 118 | 10 |
| Electrical Engineering Technicians | 66 | 38 |
| Source: Burning Glass |

**Table 4a. Top Job Titles for Industrial Automation and Robotics Occupations for latest 12 months (Dec 2019-Nov 2020) Bay Region**

| **Title** | **Bay** | **Title** | **Bay** |
| --- | --- | --- | --- |
| Test Technician | 214 | Low Voltage Technician | 52 |
| Maintenance Mechanic | 198 | Calibration Technician | 50 |
| Supplier Quality Engineer | 104 | Instrumentation Technician | 44 |
| Electrical Technician | 97 | Electronic Technician | 43 |
| Electromechanical Technician | 95 | Draft Beer Technician | 39 |
| Mechanic | 89 | Outside Plant Technician | 38 |
| Electronics Technician | 75 | Automation Technician | 35 |
| Industrial Engineer | 54 | Production Engineer | 30 |
| Packaging Engineer | 53 | Engineering Technician | 29 |
| Source: Burning Glass |

**Table 4b. Top Job Titles for Industrial Automation and Robotics Occupations for latest 12 months (Dec 2019-Nov 2020) East Bay Sub-Region**

| **Title** | **East Bay** | **Title** | **East Bay** |
| --- | --- | --- | --- |
| Electromechanical Technician | 66 | Calibration Technician | 17 |
| Maintenance Mechanic | 65 | Draft Beer Technician | 16 |
| Test Technician | 61 | Packaging Engineer | 15 |
| Electrical Technician | 56 | Instrumentation Technician | 15 |
| Supplier Quality Engineer | 41 | Master Mechanic | 14 |
| Mechanic | 32 | Automation Technician | 14 |
| Electronics Technician | 31 | Production Engineer | 12 |
| Electronic Technician | 20 | Outside Plant Technician | 12 |
| Industrial Engineer | 19 | Low Voltage Technician | 12 |
| Source: Burning Glass |

## Industry Concentration

**Table 5. Industries hiring Industrial Automation and Robotics Workers in Bay Region**

| **Industry – 6 Digit NAICS (No. American Industry Classification) Codes** | **Jobs in Industry (2019)** | **Jobs in Industry (2024)** | **% Change (2019-24)** | **% Occupation Group in Industry (2019)** |
| --- | --- | --- | --- | --- |
| Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance | 48,734 | 51,504 | 6% | 6% |
| Engineering Services | 32,464 | 36,358 | 12% | 4% |
| Industrial Machinery and Equipment Merchant Wholesalers | 22,605 | 22,911 | 1% | 3% |
| Corporate, Subsidiary, and Regional Managing Offices | 20,495 | 21,715 | 6% | 2% |
| Semiconductor and Related Device Manufacturing | 17,117 | 17,179 | 0% | 2% |
| Aircraft Manufacturing | 15,654 | 16,738 | 7% | 2% |
| Federal Government, Civilian, Excluding Postal Service | 15,522 | 16,027 | 3% | 2% |
| Temporary Help Services | 13,412 | 13,810 | 3% | 2% |
| All Other Plastics Product Manufacturing | 12,528 | 13,100 | 5% | 1% |
| Local Government, Excluding Education and Hospitals | 11,837 | 12,274 | 4% | 1% |
| Source: EMSI 2020.4 |

**Table 6. Top Employers Posting Industrial Automation and Robotics Occupations in Bay Region and East Bay Sub-Region (Dec 2019-Nov 2020)**

| **Employer** | **Bay** | **Employer** | **East Bay** |
| --- | --- | --- | --- |
| Apple Inc. | 78 | Tesla | 50 |
| Tesla | 68 | Lawrence Livermore National Laboratory | 32 |
| Genentech | 35 | Lucid Motors Inc | 26 |
| Facebook | 34 | Phillips 66 | 25 |
| Lawrence Livermore National Laboratory | 32 | Tesla Energy Operations | 16 |
| Phillips 66 | 31 | Tesla Motors | 14 |
| Amazon | 31 | Metabyte Incorporated | 14 |
| Hupp Draft Services | 30 | Hupp Draft Services | 14 |
| Danaher Corporation | 27 | Tm Engineering | 11 |
| Lucid Motors Inc | 26 | PepsiCo Inc. | 11 |
| Allied Universal | 26 | Lam Research Corporation | 11 |
| Jones Lang Lasalle Incorporated | 24 | Koch Industries, Incorporated | 11 |
| Applied Materials | 24 | Facebook | 11 |
| Northrop Grumman | 22 | Fresenius | 10 |
| Source: Burning Glass |

## Educational Supply

There are four (4) community colleges in the Bay Region issuing 10 awards on average annually (last 3 years ending 2018-19) on TOP 0956.00 - Manufacturing and Industrial Technology. In the East Bay Sub-Region, there is one (1) community college that issued one (1) award on average annually (last 3 years) on this TOP code.

**Table 7. Community College Awards on TOP 0956.00 - Manufacturing and Industrial Technology in Bay Region**

| **College** | **Subregion** | **Associate** | **Certificate Low** | **Total** |
| --- | --- | --- | --- | --- |
| De Anza | Silicon Valley | 3 | 2 | 5 |
| Diablo Valley | East Bay | 1 | 0 | 1 |
| San Francisco | Mid-Peninsula | 0 | 3 | 3 |
| Solano | North Bay | 0 | 1 | 1 |
| **Total** |  | **4** | **6** | **10** |
| Source: Data Mart*Note: The annual average for awards is 2016-17 to 2018-19.* |

## Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 2,541 annual openings for the Industrial Automation and Robotics occupational cluster and 10 annual (3-year average) awards for an annual undersupply of 2,531 students. In the East Bay Sub-Region, there is also a gap with 601 annual openings and one (1) annual (3-year average) award for an annual undersupply of 600 students.

## Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0956.00 - Manufacturing and Industrial Technology**

| **2017-18** | **Bay** **All CTE Program** | **Diablo Valley** **All CTE Program** | **State 0956.00** | **Bay 0956.00** | **East Bay 0956.00** | **Diablo Valley 0956.00** |
| --- | --- | --- | --- | --- | --- | --- |
| % Employed Four Quarters After Exit | 67% | 60% | 71% | 79% | 85% | 73% |
| Median Quarterly Earning Two Quarters After Exit | $11,466 | $8,979 | $10,601 | $13,075 | $12,656 | $16,005 |
| Median % Change in Earning | 31% | 35% | 36% | 39% | 67% |  NA |
| % of Students Earning a Living Wage | 53% | 39% | 68% | 67% | 64% | 75% |
| Source: Launchboard Pipeline (version available on August 2020) |

## Skills, Certifications and Education

**Table 9. Top Skills for Industrial Automation and Robotics Occupations in Bay Region (Dec 2019-Nov 2020)**

| **Skill** | **Posting** | **Skill** | **Posting** |
| --- | --- | --- | --- |
| Repair | 1,807 | Electronics Industry Knowledge | 344 |
| Schematic Diagrams | 641 | Industrial Engineering Industry Expertise | 342 |
| Test Equipment | 628 | Welding | 317 |
| Quality Assurance and Control | 627 | Power Tools | 315 |
| Hand Tools | 580 | Process Improvement | 307 |
| Soldering | 536 | Oscilloscopes | 297 |
| Packaging | 515 | Manufacturing Processes | 279 |
| Calibration | 509 | Python | 278 |
| Scheduling | 479 | Customer Service | 269 |
| Predictive / Preventative Maintenance | 450 | Product Development | 269 |
| Wiring | 418 | Electrical Diagrams / Schematics | 245 |
| Machinery | 400 | Electrical Engineering | 240 |
| Project Management | 369 | Six Sigma | 230 |
| Quality Management | 365 | Occupational Health and Safety | 228 |
| Source: Burning Glass |

**Table 10. Certifications for Industrial Automation and Robotics Occupations in Bay Region (Dec 2019-Nov 2020)**

| **Certification** | **Posting** | **Certification** | **Posting** |
| --- | --- | --- | --- |
| Driver's License | 576 | OSHA Forklift Certification | 29 |
| Security Clearance | 111 | Six Sigma Green Belt Certification | 23 |
| Certified Quality Engineer (CQE) | 72 | Six Sigma Black Belt Certification | 23 |
| American Society For Quality (ASQ) Certification | 56 | Project Management Professional (PMP) | 22 |
| IPC Certification | 54 | Auditor Certification | 22 |
| Six Sigma Certification | 43 | Cdl Class C | 21 |
| Automotive Service Excellence (ASE) Certification | 39 | Welding Certification | 20 |
| CDL Class A | 35 | Electrician Certification | 19 |
| Certified Quality Auditor (CQA) | 32 | Basic Life Saving (BLS) | 18 |
| Project Management Certification | 29 | Basic Cardiac Life Support Certification | 17 |
| Source: Burning Glass |

*Note: 78% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.*

**Table 11. Education Requirements for Industrial Automation and Robotics Occupations in Bay Region**

| **Education (minimum advertised)** | **Latest 12 Mos. Postings** | **Percent 12 Mos. Postings** |
| --- | --- | --- |
| High school or vocational training | 1,101 | 36% |
| Associate's degree | 412 | 14% |
| Bachelor's degree | 1,400 | 46% |
| Master's degree | 91 | 3% |
| Doctoral degree | 34 | 1% |
| Source: Burning Glass |

## Methodology

Occupations for this report were identified by use of skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCO Data Mart.

## Sources

O\*Net Online
Labor Insight/Jobs (Burning Glass)
Economic Modeling Specialists International (EMSI)
CTE LaunchBoard www.calpassplus.org/Launchboard/
Statewide CTE Outcomes Survey
Employment Development Department Unemployment Insurance Dataset
Living Insight Center for Community Economic Development
Chancellor’s Office MIS system

## Contacts

For more information, please contact:

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