**** **Robotics and** **Mechatronics Controls Occupations**

**Labor Market Information Report**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

May 2018

# Recommendation

Based on all available data, there appears to be an undersupply of Robotics and Mechatronics Controls 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). The gap is 583 students annually in the Bay region and 186 annually in the East Bay.

This report also provides student outcomes data on employment and earnings for programs on TOP 0934.20 - Industrial Electronics in the state and region. It is recommended that this 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 Laney College and in the region.

# Introduction

This report profiles Robotics and Mechatronics Controls Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Laney College.

|  |
| --- |
| * **Electro-Mechanical Technicians (SOC 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: High school diploma or equivalent* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 54%* |
|  |
| * **Electric Motor, Power Tool, and** **Related Repairers (SOC 49-2092):** Repair, maintain, or install electric motors, wiring, or switches.
 |
| *Entry-Level Educational Requirement: High school diploma or equivalent* |
| *Training Requirement: Moderate-term on-the-job training* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 46%* |
|  |
| * **Motorcycle Mechanics (SOC 49-3052):** Diagnose, adjust, repair, or overhaul motorcycles, scooters, mopeds, dirt bikes, or similar motorized vehicles.
 |
| *Entry-Level Educational Requirement: Postsecondary nondegree award* |
| *Training Requirement: Short-term on-the-job training* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 36%* |
|  |
| * **Maintenance Workers, Machinery (SOC 49-9043):** Lubricate machinery, change parts, or perform other routine machinery maintenance.
 |
| *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: 39%* |
|  |
| * **Computer-Controlled Machine Tool Operators, Metal and Plastic (SOC 51-4011):** Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.
 |
| *Entry-Level Educational Requirement: High school diploma or equivalent* |
| *Training Requirement: Moderate-term on-the-job training* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 45%* |

# Occupational Demand

**Table 1. Employment Outlook for Robotics and Mechatronics Controls Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Electro-Mechanical Technicians | 971 | 980 | 8  | 1% | 437 | 87 | $18.90  | $27.14  |
| Electric Motor, Power Tool, and Related Repairers | 448 | 477 | 29  | 6% | 241 | 48 | $14.39  | $23.11  |
| Motorcycle Mechanics | 353 | 318 | (35) |  (10%) | 179 | 36 | $12.49  | $19.25  |
| Maintenance Workers, Machinery | 1,539 | 1,719 | 180  | 12% | 992 | 198 | $13.72  | $25.69  |
| Computer-Controlled Machine Tool Operators, Metal and Plastic | 1,856 | 2,110 | 254  | 14% | 1,235 | 247 | $11.72  | $19.20  |
| **Total** | **5,166** | **5,603** | **437** | **8%** | **3,083** | **617** | **$13.95**  | **$22.97**  |

*Source: EMSI 2018.2*

**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 Robotics and Mechatronics Controls Occupations in East Bay Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Electro-Mechanical Technicians | 413 | 411 | (3) |  (1%) | 178 | 36 | $17.88  | $25.44  |
| Electric Motor, Power Tool, and Related Repairers | 259 | 278 | 19  | 7% | 142 | 28 | $13.15  | $24.21  |
| Motorcycle Mechanics | 117 | 90 | (27) |  (23%) | 53 | 11 | $12.78  | $17.75  |
| Maintenance Workers, Machinery | 506 | 571 | 66  | 13% | 334 | 67 | $14.10  | $27.53  |
| Computer-Controlled Machine Tool Operators, Metal and Plastic | 528 | 638 | 110  | 21% | 393 | 79 | $11.41  | $17.88  |
| **TOTAL** | **1,823** | **1,988** | **165**  | **9%** | **1,100** | **220** | **$13.96**  | **$23.16**  |

*Source: EMSI 2018.2*

**East Bay Sub-Region** includes Alameda and 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 (May 2017 - April 2018)**

|  |  |  |
| --- | --- | --- |
| Occupation | Bay Region | East Bay |
| Electro-Mechanical Technicians (17-3024.00) | 315 | 103 |
| Computer-Controlled Machine Tool Operators, Metal and Plastic (51-4011.00) | 225 | 112 |
| Robotics Technicians (17-3024.01) | 74 | 35 |
| Maintenance Workers, Machinery (49-9043.00) | 25 | 10 |
| Electric Motor, Power Tool, and Related Repairers (49-2092.00) | 15 | 5 |
| Motorcycle Mechanics (49-3052.00) | 2 | 1 |
| **Total** | **656** | **266** |

*Source: Burning Glass*

**Table 4. Top Job Titles for Robotics and Mechatronics Controls Occupations (May 2017 - April 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Common Title | Bay | East Bay | Common Title | Bay | East Bay |
| Instrumentation Technician | 96 | 30 | Mechanical Technician | 26 | 12 |
| CNC Operator | 89 | 60 | CNC Machine Operator | 25 | 7 |
| Electronics Technician | 77 | 25 | Technician | 17 | 8 |
| Machine Operator | 65 | 30 | ElectroMechanical Assembler | 13 | 2 |
| Calibration Technician | 46 | 10 | Test Technician | 11 | 1 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Robotics and Mechatronics Controls Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Industry – 3 Digit NAICS (No. American Industry Classification) Codes** | **Jobs in Industry (2017)** | **Jobs in Industry (2022)** | **% Change (2017-22)** | **% in Industry (2017)** |
| Computer and Electronic Product Manufacturing (334) | 1,040 | 1,044 | 0% | 20.1% |
| Fabricated Metal Product Manufacturing (332) | 788 | 915 | 16% | 15.3% |
| Machinery Manufacturing (333) | 410 | 471 | 15% | 7.9% |
| Merchant Wholesalers, Durable Goods (423) | 301 | 324 | 8% | 5.8% |
| Professional, Scientific, and Technical Services (541) | 292 | 323 | 11% | 5.6% |
| Repair and Maintenance (811) | 255 | 263 | 3% | 4.9% |
| Motor Vehicle and Parts Dealers (441) | 255 | 219 |  (14%) | 4.9% |
| Transportation Equipment Manufacturing (336) | 182 | 207 | 14% | 3.5% |
| Miscellaneous Manufacturing (339) | 149 | 156 | 5% | 2.9% |
| Food Manufacturing (311) | 137 | 154 | 12% | 2.6% |
| Electrical Equipment, Appliance, and Component Manufacturing (335) | 131 | 160 | 22% | 2.5% |
| Beverage and Tobacco Product Manufacturing (312) | 110 | 127 | 15% | 2.1% |
| Local Government (903) | 102 | 110 | 8% | 2.0% |
| Administrative and Support Services (561) | 92 | 106 | 15% | 1.8% |
| Chemical Manufacturing (325) | 78 | 93 | 19% | 1.5% |
| Primary Metal Manufacturing (331) | 69 | 65 |  (6%) | 1.3% |
| Specialty Trade Contractors (238) | 65 | 73 | 12% | 1.3% |
| Plastics and Rubber Products Manufacturing (326) | 60 | 66 | 10% | 1.2% |

*Source: EMSI 2018.2*

**Table 6. Top Employers Posting Robotics and Mechatronics Controls Occupations in Bay Region and East Bay (May 2017 - April 2018)**

Note: 46% of records have been excluded because they do not include an employer. As a result, the chart below may not be representative of the full sample.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Employer** | **Bay** | **Employer** | **Bay** | **Employer** | **East Bay** |
| Department of Veterans Affairs | 12 | AECOM Technology Corp | 7 | Tesla Motors | 7 |
| Dignity Health | 10 | Tesla Motors | 7 | Ametek Incorporated | 6 |
| Jones Lang Lasalle Inc | 10 | Ametek Incorporated | 6 | Jones Lang Lasalle Inc | 6 |
| Simco Electronics | 8 | First American Corp | 6 | SF Bay Area Rapid Transit District | 6 |

*Source: Burning Glass*

# Educational Supply

There is one community college in the Bay Region issuing 34 awards annually on TOP 0934.20 - Industrial Electronics. Los Medanos College is in the East Bay sub-region so the supply for the Bay region and sub-region is the same.

**Table 7. Awards on TOP 0934.20 - Industrial Electronics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| College | Sub-Region | Headcount | Associates | Certificates | Total |
| Chabot | East Bay | 115 | 0 | 0 | 0 |
| Laney | East Bay | 27 | 0 | 0 | 0 |
| Los Medanos | East Bay | on another TOP | 14 | 20 | 34 |
| San Mateo | Mid-Peninsula | 56 | 0 | 0 | 0 |
| **Total Bay Region** | **227** | **14** | **20** | **34** |
| **Total East Bay Sub-Region** | **171** | **14** | **20** | **34** |

# *Source: IPEDS, Data Mart and Launchboard*

NOTE: Headcount of students who took one or more courses is for 2016-17. The annual average for awards is 2014-17 unless there are only awards in 2016-17.

# Gap Analysis

Based on the data included in this report, there is a labor market gap in the Bay region with 617 annual openings for the Robotics and Mechatronics Controls occupational cluster and 34 annual awards for an annual undersupply of 583. In the East Bay, there is also a gap with 220 annual openings and 34 annual awards for an annual undersupply of 186.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0934.20 - Industrial Electronics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2015-16** | **Bay (All CTE Programs)** | **Laney****(All CTE Programs)** | **State (093420)** | **Bay (093420)** | **East Bay (093420)** | **Top College on 093420 in the region** |
| % Employed Four Quarters After Exit | 74% | 67% | 76% | 86% | 84% | San Mateo | 94%(17 students) |
| Median Earnings Two Quarters After Exit | $10,310 | $9,960 | $11,220 | $13,575 | $13,330 | San Mateo | $13,815(no of students n/a) |
| Median % Change in Earnings | 46% | 46% | 58% | 61% | 66% | San Mateo | 56%(no of students n/a) |
| % of Students Earning a Living Wage | 63% | 61% | 62% | 72% | 72% | Chabot | 71%(31 students) |

*Source: Launchboard Pipeline (version available on 5/14/18)*

# Skills, Certificates and Education

**Table 9. Top Skills for Robotics and Mechatronics Controls Occupations in Bay Region (May 2017 - April 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Skill** | **Postings** | **Skill** | **Postings** | **Skill** | **Postings** |
| Repair | 228 | Schematic Diagrams | 77 | Wiring | 51 |
| Computer Numerical Control (CNC) | 227 | Robotics | 74 | Micrometers | 49 |
| Calibration | 125 | Lathes | 68 | Basic Mathematics | 47 |
| Machining | 113 | Hand Tools | 67 | Electronics Industry Knowledge | 47 |
| Machine Operation | 104 | CNC Machine | 60 | Power Tools | 47 |
| Test Equipment | 101 | Soldering | 58 | Oscilloscopes | 45 |
| Scheduling | 84 | Predictive/Preventative Maintenance | 54 | Machinery | 40 |
| Teamwork/Collaboration | 80 | Calipers | 53 | Quality Assurance & Control | 36 |

*Source: Burning Glass*

**Table 10. Certifications for Robotics and Mechatronics Controls Occupations in the Bay Region (May 2017 - April 2018)**

Note: 83% of records have been excluded because they do not include a certification. As a result, the chart has not been included in this report.

**Table 11. Education Requirements for Robotics and Mechatronics Controls Occupations in Bay Region**

Note: 53% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

|  |  |
| --- | --- |
| **Education (minimum advertised)** | **Latest 12 Mos. Postings** |
| High school or vocational training | 185 (61%) |
| Associate Degree | 65 (21%) |
| Bachelor’s Degree or Higher | 56 (18%) |

*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/](http://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

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