** Engineering Technology Occupations**

**Labor Market Information Report**

**Las Positas College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

January 2020

# Recommendation

Based on all available data, there appears to be an undersupply of Engineering Technology 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 1,357 students in the Bay region and 300 students in the East Bay Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0924.00 - Engineering Technology, General (requires Trigonometry) 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 Las Positas College and in the region.

# Introduction

This report profiles Engineering Technology Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Las Positas College.

|  |
| --- |
| * **Electrical and Electronics Engineering Technicians (SOC 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: 53% |
| * **Engineering Technicians, Except Drafters, All Other (SOC 17-3029):** All engineering technicians, except drafters, not listed separately. |
| Entry-Level Educational Requirement: Associate's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 53*%* |
| * **Industrial Engineering 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. |
| Entry-Level Educational Requirement: Associate's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 53*%* |
| * **Mechanical Engineering Technicians (SOC 17-3027):** Apply theory and principles of mechanical engineering to modify, develop, test, or calibrate machinery and equipment under direction of engineering staff or physical scientists. |
| Entry-Level Educational Requirement: Associate's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 53*%* |

# Occupational Demand

**Table 1. Employment Outlook for Engineering Technology Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2018 Jobs | 2023 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Electrical and Electronics Engineering Technicians | 9,311 | 9,480 | 169 | 2% | 4,238 | 848 | $23.14 | $30.69 |
| Engineering Technicians, Except Drafters, All Other | 3,006 | 3,181 | 175 | 6% | 1,486 | 297 | $25.71 | $33.49 |
| Industrial Engineering Technicians | 1,073 | 1,202 | 129 | 12% | 611 | 122 | $20.97 | $28.58 |
| Mechanical Engineering Technicians | 993 | 1,091 | 98 | 10% | 539 | 108 | $22.05 | $28.55 |
| **Total** | **14,383** | **14,953** | **570** | **4%** | **6,874** | **1,375** | **$23.44** | **$30.97** |

*Source: EMSI 2019.3*

**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 Engineering Technology Occupations in East Bay Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2018 Jobs | 2023 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Electrical and Electronics Engineering Technicians | 1,774 | 1,830 | 55 | 3% | 824 | 165 | $21.28 | $28.26 |
| Engineering Technicians, Except Drafters, All Other | 756 | 806 | 50 | 7% | 380 | 76 | $25.08 | $32.57 |
| Industrial Engineering Technicians | 284 | 325 | 40 | 14% | 169 | 34 | $16.79 | $25.89 |
| Mechanical Engineering Technicians | 290 | 326 | 35 | 12% | 165 | 33 | $21.49 | $25.89 |
| **TOTAL** | **3,105** | **3,286** | **181** | **6%** | **1,538** | **308** | **$21.81** | **$28.87** |

*Source: EMSI 2019.3*

**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 (January 2019 - December 2019)**

| Occupation | Bay Region | East Bay |
| --- | --- | --- |
| Engineering Technicians, Except Drafters, All Other | 2,571 | 556 |
| Manufacturing Production Technicians | 2,324 | 910 |
| Industrial Engineering Technicians | 2,193 | 852 |
| Electronics Engineering Technicians | 1,664 | 572 |
| Mechanical Engineering Technicians | 488 | 180 |
| Mechanical Engineering Technologists | 144 | 32 |
| Electrical Engineering Technicians | 94 | 46 |
| Non-Destructive Testing Specialists | 78 | 18 |
| Photonics Technicians | 73 | 27 |
| Industrial Engineering Technologists | 64 | 9 |
| Electronics Engineering Technologists | 44 | 38 |
| Nanotechnology Engineering Technicians | 36 | 19 |
| Electrical Engineering Technologists | 13 | 0 |
| Manufacturing Engineering Technologists | 8 | 6 |
| **Total** | **9,794** | **3,265** |

*Source: Burning Glass*

**Table 4a. Top Job Titles for Engineering Technology Occupations for latest 12 months (January 2019 - December 2019) Bay Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | Bay | Common Title | Bay |
| Manufacturing Technician | 1,184 | Test Operator | 93 |
| Maintenance Technician | 1,116 | Mechanical Inspector | 93 |
| Engineering Technician | 874 | Electromechanical Technician | 82 |
| Production Technician | 492 | Technician | 78 |
| Test Technician | 416 | Technical Solutions Engineer | 73 |
| Maintenance Worker | 305 | Manufacturing Specialist | 64 |
| Engineer | 292 | Maintenance Sanitation Team Member, Retail Industry | 64 |
| Electronics Technician | 268 | Cable Technician | 44 |
| Electrical Technician | 243 | Laboratory Technician | 42 |
| Mechanical Technician | 231 | Low Voltage Technician | 38 |
| Operations Technician | 163 | Systems Engineer | 37 |
| Process Technician | 151 | Engineering Analyst | 37 |
| Maintenance Engineer | 132 | Automation Technician | 37 |
| Senior Engineer | 102 | Lead Engineer | 35 |

**Table 4b. Top Job Titles for Engineering Technology Occupations for latest 12 months (January 2019 - December 2019) East Bay Sub-Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | East Bay | Common Title | East Bay |
| Manufacturing Technician | 509 | Test Operator | 36 |
| Maintenance Technician | 475 | Operations Technician | 36 |
| Engineering Technician | 264 | Technician | 26 |
| Production Technician | 192 | Manufacturing Specialist | 23 |
| Electrical Technician | 125 | Automation Technician | 18 |
| Electronics Technician | 91 | Low Voltage Technician | 17 |
| Maintenance Worker | 89 | Maintenance Mechanic | 16 |
| Test Technician | 84 | Cleanroom Technician | 16 |
| Engineer | 82 | Cable Technician | 15 |
| Process Technician | 75 | Senior Engineer | 14 |
| Mechanical Technician | 70 | Industrial Technician | 14 |
| Mechanical Inspector | 41 | Mechanic | 13 |
| Maintenance Engineer | 41 | Maintenance Sanitation Team Member, Retail Industry | 13 |
| Electromechanical Technician | 37 | Electronics Technologist | 13 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Engineering Technology Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry – 6 Digit NAICS (No. American Industry Classification) Codes | Jobs in Industry (2018) | Jobs in Industry (2022) | % Change (2018-22) | % in Industry (2018) |
| Semiconductor and Related Device Manufacturing (334413) | 2,194 | 2,053 | -6% | 15% |
| Electronic Computer Manufacturing (334111) | 1,475 | 1,616 | 10% | 10% |
| Engineering Services (541330) | 1,043 | 1,138 | 9% | 7% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715) | 734 | 808 | 10% | 5% |
| Custom Computer Programming Services (541511) | 486 | 560 | 15% | 3% |
| Other Electronic Component Manufacturing (334419) | 449 | 375 | -16% | 3% |
| Research and Development in Biotechnology (except Nanobiotechnology) (541714) | 432 | 591 | 37% | 3% |
| Testing Laboratories (541380) | 413 | 420 | 2% | 3% |
| Printed Circuit Assembly (Electronic Assembly) Manufacturing (334418) | 408 | 479 | 17% | 3% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 328 | 322 | -2% | 2% |
| Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals (334515) | 327 | 310 | -5% | 2% |
| Bare Printed Circuit Board Manufacturing (334412) | 300 | 248 | -17% | 2% |
| Computer Systems Design Services (541512) | 289 | 319 | 10% | 2% |
| Local Government, Excluding Education and Hospitals (903999) | 231 | 243 | 5% | 2% |
| Temporary Help Services (561320) | 229 | 244 | 7% | 2% |
| Analytical Laboratory Instrument Manufacturing (334516) | 212 | 204 | -4% | 1% |
| Electromedical and Electrotherapeutic Apparatus Manufacturing (334510) | 201 | 240 | 19% | 1% |
| Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing (334220) | 204 | 165 | -19% | 1% |
| US Postal Service (901149) | 185 | 155 | -16% | 1% |
| Semiconductor Machinery Manufacturing (333242) | 172 | 194 | 13% | 1% |
| Corporate, Subsidiary, and Regional Managing Offices (551114) | 175 | 182 | 4% | 1% |
| Other Measuring and Controlling Device Manufacturing (334519) | 153 | 182 | 19% | 1% |

*Source: EMSI 2019.3*

**Table 6. Top Employers Posting Engineering Technology Occupations in Bay Region and East Bay Sub-Region (January 2019 - December 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | Bay | Employer | East Bay |
| Western Digital | 123 | Intel Corporation | 26 | Tesla | 64 |
| Whole Foods Market, Inc. | 116 | Formfactor, Inc | 26 | Lawrence Livermore National Laboratory | 52 |
| Tesla | 90 | Integrated Resources Incorporated | 24 | Whole Foods Market, Inc. | 31 |
| Google Inc. | 75 | Deloitte | 24 | Tesla Motors | 24 |
| Apple Inc. | 70 | Varian Medical Systems | 23 | Finisar Corporation | 24 |
| Applied Materials | 62 | Tekberry | 23 | Western Digital | 22 |
| Lawrence Livermore National Laboratory | 52 | General Dynamics | 23 | Formfactor, Inc | 20 |
| Thermo Fisher Scientific Inc | 51 | Facebook | 23 | Valassis | 19 |
| Genentech | 43 | Tellus Solutions | 22 | Nana Regional Corporation | 19 |
| Cisco Systems Incorporated | 42 | Milestone Technologies Incorporated | 22 | Intarcia Therapeutics, Inc. | 19 |
| Outsource | 38 | Army National Guard | 22 | Sandia Corporation | 18 |
| Tesla Motors | 37 | Joby Aviation | 20 | Boehringer Ingelheim | 18 |
| Nvidia Corporation | 29 | Enterprise Rent-A-Car | 20 | PepsiCo Inc. | 17 |
| Finisar Corporation | 28 | Valassis | 19 | Thermo Fisher Scientific Inc | 16 |
| Sanmina Corporation | 27 | Nana Regional Corporation | 19 | Outsource | 16 |
| Pacific Gas and Electric Company | 27 | KLA-Tencor | 19 | Lucid Motors Inc | 16 |
| Jones Lang Lasalle Incorporated | 26 | Intarcia Therapeutics, Inc. | 19 | Integrated Resources Incorporated | 16 |

*Source: Burning Glass*

# Educational Supply

There are three (3) community colleges in the Bay Region issuing 18 awards on average annually (last 3 years) on TOP 0924.00 - Engineering Technology, General (requires Trigonometry). There is one college (Las Positas) in the East Bay Sub-Region issuing 8 awards on average annually (last 3 years) on this TOP code.

**Table 7. Awards on TOP 0924.00 - Engineering Technology, General (requires Trigonometry) in Bay Region**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| College | Sub-Region | Associates | Certificate 18+ units | Certificate Low unit | Total |
| Cabrillo College | Santa Cruz - Monterey | 1 | 1 | 7 | 9 |
| City College of San Francisco | Mid-Peninsula | 1 |  |  | 1 |
| Las Positas College | East Bay | 8 |  |  | 8 |
| **Total Bay Region** | | **10** | **1** | **7** | **18** |
| **Total East Bay Sub-Region** | | **8** | **0** | **0** | **8** |

# *Source: Data Mart*

Note: The annual average for awards is 2015-16 to 2017-18.

# Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 1,375 annual openings for the Engineering Technology occupational cluster and 18 annual (3-year average) awards for an annual undersupply of 1,357 students. In the East Bay Sub-Region, there is also a gap with 308 annual openings and 8 annual (3-year average) awards for an annual undersupply of 300 students.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0924.00 - Engineering Technology, General (requires Trigonometry)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2015-16 | Bay  (All CTE Programs) | Las Positas College (All CTE Programs) | State (0924.00) | Bay (0924.00) | East Bay (0924.00) | Las Positas College (0924.00) |
| % Employed Four Quarters After Exit | 74% | 75% | 52% | 63% | n/a | n/a |
| Median Quarterly Earnings Two Quarters After Exit | $10,550 | $10,000 | $8,130 | $8,190 | n/a | n/a |
| Median % Change in Earnings | 46% | 28% | 69% | 59% | n/a | n/a |
| % of Students Earning a Living Wage | 63% | 64% | 52% | 53% | n/a | n/a |

*Source: Launchboard Pipeline (version available on 1/13/20)*

# Skills, Certifications and Education

**Table 9. Top Skills for Engineering Technology Occupations in Bay Region (January 2019 - December 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Repair | 2,966 | Manufacturing Processes | 564 | Current Good Manufacturing Practices (CGMP) | 361 |
| Test Equipment | 1,087 | Lifting Ability | 563 | Manual Dexterity | 359 |
| Hand Tools | 987 | Wiring | 556 | Biotechnology | 346 |
| Predictive / Preventative Maintenance | 928 | Python | 492 | Forklift Operation | 325 |
| Scheduling | 898 | Linux | 485 | Occupational Health and Safety | 313 |
| Schematic Diagrams | 808 | Electronics Industry Knowledge | 484 | Electrical Diagrams / Schematics | 310 |
| Cleaning | 776 | Packaging | 477 | Calculation | 302 |
| Technical Support | 748 | Good Manufacturing Practices (GMP) | 476 | Robotics | 291 |
| Quality Assurance & Control | 711 | Microscope | 434 | Spreadsheets | 291 |
| Soldering | 666 | Welding | 424 | Debugging | 287 |
| Customer Service | 659 | Project Management | 406 | Process Improvement | 283 |
| Machinery | 649 | Data Entry | 403 | SAP | 277 |
| Calibration | 636 | Basic Mathematics | 382 | Power Supplies | 268 |
| Power Tools | 615 | Experiments | 367 | 5S Methodology | 267 |
| Oscilloscopes | 568 | Equipment Maintenance | 365 | Customer Contact | 262 |

*Source: Burning Glass*

**Table 10. Certifications for Engineering Technology Occupations in Bay Region (January 2019 - December 2019)**

Note: 80% 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.

|  |  |  |  |
| --- | --- | --- | --- |
| Certification | Postings | Certification | Postings |
| Driver's License | 1,168 | IT Infrastructure Library (ITIL) Certification | 28 |
| Security Clearance | 140 | Certified Meeting Planner | 28 |
| Forklift Operator Certification | 73 | CDL Class A | 27 |
| CDL Class C | 63 | IPC Certification | 24 |
| Biotechnology Certificate | 54 | Leadership In Energy And Environmental Design (LEED) Certified | 22 |
| Automotive Service Excellence (ASE) Certification | 46 | The American Society For Nondestructive Testing (ASNT) Certification | 21 |
| Cisco Certified Network Professional (CCNP) | 40 | Soldering Certification | 20 |
| Cisco Certified Network Associate (CCNA) | 40 | Certified Information Systems Security Professional (CISSP) | 20 |
| Cisco Certified Internetwork Expert (CCIE) | 37 | Licensed Professional Engineer | 19 |
| Certified A+ Technician | 37 | ITIL Certification | 19 |
| Welding Certification | 32 | Electrician Certification | 17 |
| Airframe and Powerplant (A and P) Certification | 31 | Certified Electronics Technician Associate | 17 |

*Source: Burning Glass*

**Table 11. Education Requirements for Engineering Technology Occupations in Bay Region**

Note: 43% 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 | Percent 12 Mos. Postings |
| High school or vocational training | 2,728 | 49% |
| Associate Degree | 939 | 17% |
| Bachelor’s Degree or Higher | 1,670 | 34% |

*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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