** Design and Engineering Occupations**

**Labor Market Information Report**

**Laney College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

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# Recommendation

Based on all available data, there appears to be a significant undersupply of Design and Engineering 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 4,802 students in the Bay region and 1,255 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 Laney College and in the region.

# Introduction

This report profiles Design and Engineering Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new Digital Fabrication Technology-Design and Engineering program at Laney College. Labor market information (LMI) is not available at the eight-digit SOC Code level for Manufacturing Production Technicians (17-3029.09), therefore, the data shown in Tables 1 and 2 is for Engineering Technicians, Except Drafters, All Other (at the six digit SOC level) and likely overstates demand for Manufacturing Production Technicians. Tables 3, 4, 6, 9, 10 and 11 use job postings data from Burning Glass at the eight-digit SOC Code level for Manufacturing Production Technicians (17-3029.09).

|  |
| --- |
| * **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% |
| * **Commercial and Industrial Designers (SOC 27-1021):** Develop and design manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.
 |
| Entry-Level Educational Requirement: Bachelor's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 29*%* |
| * **Maintenance and Repair Workers, General (SOC 49-9071):** Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs. Excludes “Maintenance Workers, Machinery" (49-9043).
 |
| 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: 37*%* |
| * **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*%* |
|  |
| * **Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic (SOC 51-4012):** Develop programs to control machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.
 |
| Entry-Level Educational Requirement: Postsecondary *nondegree award* |
| 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 Design and Engineering** **Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2018 Jobs | 2023 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 25% Hourly Wage | Median Hourly Wage |
| Engineering Technicians, Except Drafters, All Other |  3,006  |  3,181  | 175 | 6% |  1,486  |  297  | $25.71 | $33.49 |
| Commercial and Industrial Designers |  1,890  |  1,942  | 52 | 3% |  939  |  188  | $22.01 | $33.77 |
| Maintenance and Repair Workers, General |  35,110  |  37,744  | 2,634 | 8% |  20,025  |  4,005  | $17.71 | $23.42 |
| Computer-Controlled Machine Tool Operators, Metal and Plastic |  2,178  |  2,306  | 128 | 6% |  1,227  |  245  | $15.95 | $20.36 |
| Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic |  720  |  777  | 57 | 8% |  422  |  84  | $26.39 | $34.68 |
| **Total** |  **42,904**  |  **45,950**  | **3,046** | **7%** |  **24,099**  |  **4,820**  | **$18.52** | **$24.62** |

*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 Design and Engineering** **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 | 25% Hourly Wage | Median Hourly Wage |
| Engineering Technicians, Except Drafters, All Other |  756  |  806  | 50 | 7% |  380  |  76  | $25.08 | $32.57 |
| Commercial and Industrial Designers |  630  |  654  | 24 | 4% |  318  |  64  | $23.85 | $32.42 |
| Maintenance and Repair Workers, General |  9,134  |  9,784  | 650 | 7% |  5,159  |  1,032  | $16.07 | $21.95 |
| Computer-Controlled Machine Tool Operators, Metal and Plastic |  633  |  675  | 42 | 7% |  361  |  72  | $15.28 | $18.89 |
| Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic |  159  |  175  | 16 | 10% |  97  |  19  | $26.10 | $36.77 |
| **TOTAL** |  **11,313**  |  **12,094**  | **781** | **7%** |  **6,315**  |  **1,263**  | **$17.20** | **$23.28** |

*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 (November 2018 - December 2019)**

| Occupation | Bay Region | East Bay |
| --- | --- | --- |
|  Maintenance and Repair Workers, General | 14,767 | 1,592 |
|  Commercial and Industrial Designers | 5,211 | 685 |
|  Manufacturing Production Technicians | 2,339 | 157 |
|  Computer-Controlled Machine Tool Operators, Metal and Plastic | 367 | 20 |
|  Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic | 211 | 6 |
|  **Total** | **22,895** | **2,460** |

*Source: Burning Glass*

**Table 4a. Top Job Titles for Design and Engineering** **Occupations for latest 12 months (November 2018 - December 2019) Bay Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | Bay | Common Title | Bay |
| Maintenance Technician | 3,816 | Product Design Engineer | 272 |
| Product Designer | 3,079 | Product Development Engineer | 259 |
| Service Technician | 1,514 | Product Engineer | 250 |
| Manufacturing Technician | 1,124 | Maintenance Mechanic | 200 |
| Field Service Technician | 1,096 | Maintenance | 199 |
| Facilities Technician | 649 | Facilities Assistant | 176 |
| Production Technician | 490 | CNC Operator | 175 |
| Maintenance Worker | 413 | Field Service Representative | 156 |
| Building Engineer | 346 | Apartment Maintenance Worker | 156 |
| Field Service Engineer | 342 | Process Technician | 151 |
| Maintenance Engineer | 331 | Operations Technician | 148 |
| Technician | 329 | CNC Programmer | 148 |
| Repair Technician | 325 | User Interface (UX)/User Experience (UX) Designer | 145 |
| Equipment Technician | 321 | Facilities Maintenance Technician | 145 |

**Table 4b. Top Job Titles for Design and Engineering** **Occupations for latest 12 months (November 2018 - December 2019) East Bay Sub-Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | East Bay | Common Title | East Bay |
| Product Designer | 457 | Repair Technician | 28 |
| Maintenance Technician | 439 | Maintenance Mechanic | 27 |
| Service Technician | 145 | Facilities Maintenance Technician | 23 |
| Facilities Technician | 97 | Engineer | 23 |
| Manufacturing Technician | 84 | Facilities Assistant | 22 |
| Maintenance Engineer | 73 | Industrial Designer | 21 |
| Field Service Technician | 71 | Apartment Maintenance Worker | 20 |
| Maintenance Worker | 65 | Field Service Representative | 19 |
| Technician | 39 | Field Service Engineer | 19 |
| Product Development Engineer | 38 | Porter | 18 |
| Maintenance | 32 | Operations Technician | 16 |
| Equipment Technician | 32 | Services Technician | 15 |
| User Interface (UX)/User Experience (UX) Designer | 30 | Production Technician | 14 |
| Building Engineer | 29 | Installation Technician | 14 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Design and Engineering** **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) |
| Architectural Services (541310) | 3,308 | 3,677 | 11% | 7% |
| Local Government, Excluding Education and Hospitals (903999) | 3,241 | 3,408 | 5% | 7% |
| Hotels (except Casino Hotels) and Motels (721110) | 2,595 | 2,750 | 6% | 6% |
| Residential Property Managers (531311) | 2,414 | 2,660 | 10% | 5% |
| Offices of Real Estate Agents and Brokers (531210) | 1,894 | 2,141 | 13% | 4% |
| Colleges, Universities, and Professional Schools (State Government) (902612) | 1,466 | 1,647 | 12% | 3% |
| Lessors of Residential Buildings and Dwellings (531110) | 1,322 | 1,319 | 0% | 3% |
| Engineering Services (541330) | 1,054 | 1,098 | 4% | 2% |
| Religious Organizations (813110) | 991 | 1,017 | 3% | 2% |
| Machine Shops (332710) | 938 | 925 | -1% | 2% |
| Colleges, Universities, and Professional Schools (611310) | 880 | 983 | 12% | 2% |
| Nonresidential Property Managers (531312) | 780 | 847 | 9% | 2% |
| Lessors of Nonresidential Buildings (except Miniwarehouses) (531120) | 643 | 784 | 22% | 2% |
| Elementary and Secondary Schools (Local Government) (903611) | 685 | 711 | 4% | 1% |
| Landscape Architectural Services (541320) | 685 | 685 | 0% | 1% |
| Corporate, Subsidiary, and Regional Managing Offices (551114) | 583 | 606 | 4% | 1% |
| Temporary Help Services (561320) | 458 | 476 | 4% | 1% |

*Source: EMSI 2019.3*

**Table 6. Top Employers Posting Design and Engineering** **Occupations in Bay Region and East Bay Sub-Region (November 2018 - December 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | Bay | Employer | East Bay |
| Marriott International Inc | 544 | Cushman & Wakefield | 64 | Facebook | 74 |
| cbre | 149 | Visa | 63 | Marriott International Inc | 65 |
| Apple Inc. | 123 | Prometheus | 62 | Visa | 39 |
| The Home Depot Incorporated | 111 | Intel Corporation | 59 | AIMCO | 33 |
| McDonald's | 101 | Greystar | 59 | Walmart / Sam's | 27 |
| Fpi Management | 101 | Google Inc. | 59 | Genentech | 25 |
| Equity Residential | 97 | Comcast | 58 | Equity Residential | 24 |
| Essex Property Trust | 91 | Alliance Residential Co | 58 | Essex Property Trust | 20 |
| Avalonbay Communities Inc | 89 | Tesla | 55 | cbre | 17 |
| Facebook | 87 | Roto Rooter | 54 | Hilton Hotel Corporation | 17 |
| Intuit | 80 | Heery International Inc | 53 | Comcast | 16 |
| Western Digital | 78 | Genentech | 53 | Avalonbay Communities Inc | 13 |
| John Stewart Company | 78 | Essex Property Trust Inc | 53 | Atria Senior Living | 13 |
| Jones Lang Lasalle Inc | 75 | University California | 47 | Sares Regis Group | 12 |
| Eden Housing Incorporated | 74 | Emcor Group | 47 | Ritz Carlton | 11 |
| Thermo Fisher Scientific Inc | 66 | Asurion | 47 | McDonald's | 11 |
| Fpi Management Inc | 64 | Veolia North America | 46 | Thermo Fisher Scientific Inc | 10 |

*Source: Burning Glass*

# Educational Supply

There are three 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 4,820 annual openings for the Design and Engineering occupational cluster and 18 annual (3-year average) awards for an annual undersupply of 4,802 students. In the East Bay Sub-Region, there is also a gap with 1,263 annual openings and 8 annual (3-year average) awards for an annual undersupply of 1,255 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) | Laney College (All CTE Programs) | State (0924.00) | Bay (0924.00) | East Bay (0924.00) | Laney College (0924.00) |
| % Employed Four Quarters After Exit | 74% | 66% | 52% | 63% | n/a | n/a |
| Median Quarterly Earnings Two Quarters After Exit | $10,550 | $9,865 | $8,140 | $8,190 | n/a | n/a |
| Median % Change in Earnings | 46% | 45% | 69% | 59% | n/a | n/a |
| % of Students Earning a Living Wage | 63% | 61% | 52% | 53% | n/a | n/a |

*Source: Launchboard Pipeline (version available on 1/28/19)*

# Skills, Certifications and Education

**Table 9. Top Skills for Design and Engineering** **Occupations in Bay Region (November 2018 - December 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Repair | 10,328 | Product Development | 1,423 | Test Equipment | 857 |
| Plumbing | 6,252 | Facility Maintenance | 1,402 | Technical Support | 852 |
| HVAC | 4,200 | Occupational Health & Safety | 1,348 | Electrical Systems | 815 |
| Painting | 4,078 | Machinery | 1,302 | Apartment Maintenance | 806 |
| Carpentry | 3,412 | Interaction Design | 1,271 | Quality Assurance and Control | 803 |
| Cleaning | 3,003 | Customer Contact | 1,178 | Project Management | 795 |
| Preventative Maintenance | 2,951 | User Research | 1,114 | Adobe Indesign | 745 |
| Customer Service | 2,927 | Adobe Photoshop | 1,087 | Schematic Diagrams | 722 |
| Scheduling | 2,406 | Property Management | 1,060 | Adobe Acrobat | 718 |
| Product Design | 2,285 | Drywall | 1,052 | Safety Training | 717 |
| Hand Tools | 1,723 | Welding | 1,007 | Appliance Repair | 697 |
| Lifting Ability | 1,705 | Process Design | 977 | Adobe Creative Suite | 693 |
| Prototyping | 1,648 | UX Wireframes | 950 | Manufacturing Processes | 691 |
| Power Tools | 1,548 | Sales | 939 | Computer Numerical Control | 685 |
| Visual Design | 1,496 | Product Management | 866 | Adobe Illustrator | 660 |

*Source: Burning Glass*

**Table 10. Certifications for Design and Engineering** **Occupations in Bay Region (November 2018 - December 2019)**

Note: 71% 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 | 5,269 | Biotechnology Certificate | 55 |
| EPA CFC/HCFC Certification | 403 | Occupational Safety and Health Administration Certification | 49 |
| Environmental Protection Agency Certification | 280 | First Aid CPR AED | 47 |
| Forklift Operator Certification | 130 | Maintenance Certification | 46 |
| Certified A+ Technician | 100 | CDL Class B | 45 |
| CDL Class C | 86 | CDL Class A | 41 |
| Project Management Certification | 78 | CompTIA Network+ | 37 |
| EPA 608 | 73 | Microsoft Certified Professional (MCP) | 35 |
| Certified Pool/Spa Operator | 73 | ITIL Certification | 33 |
| IT Infrastructure Library (ITIL) Certification | 72 | Electrician Certification | 30 |
| Automotive Service Excellence (ASE) Certification | 71 | Commercial Food Equipment Service Association (CFESA) | 30 |
| Security Clearance | 59 | Cisco Certified Network Associate (CCNA) | 29 |

*Source: Burning Glass*

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

Note: 52% 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 | 7,391 | 67% |
| Associate Degree | 799 | 7% |
| Bachelor’s Degree or Higher | 2,472 | 26% |

*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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