

**Labor Market Analysis for Program Recommendation**

**Engineering Design Occupations**

**Chabot College**

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

## September 2023

## Recommendation

Based on all available data, there appears to be an “undersupply” of Engineering Design workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda, Contra Costa counties). There is a projected annual gap of about 555 students in the Bay region and 151 students in the East Bay Sub-Region.

## Introduction

This report provides student outcomes data on employment and earnings for TOP 0901.00 - Engineering, General (requires Calculus) (Transfer) 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 Chabot College and in the region.

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

* **Architectural and Civil Drafters (17-3011):** Prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Use knowledge of building materials, engineering practices, and mathematics to complete drawings.
  Entry-Level Educational Requirement: Associate’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 52%
* **Electrical and Electronics Drafters (17-3012):** Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment.
  Entry-Level Educational Requirement: Associate’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 58%
* **Mechanical Drafters (17-3013):** Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.
  Entry-Level Educational Requirement: Associate’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 58%
* **Drafters, All Other (17-3019):** All drafters not listed separately.
  Entry-Level Educational Requirement: Associate’s degree
  Training Requirement: None
  Percentage of Community College Award Holders or Some Postsecondary Coursework: 58%
* **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%

## Occupational Demand

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

| **Occupation** | **2021 Jobs** | **2026 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Architectural and Civil Drafters | 3,652 | 3,796 | 144 | 4% | 2,277 | 455 | $29 | $34 |
| Electrical and Electronics Drafters | 884 | 967 | 83 | 9% | 512 | 102 | $31 | $39 |
| Mechanical Drafters | 1,164 | 1,212 | 47 | 4% | 602 | 120 | $28 | $39 |
| Drafters, All Other | 431 | 424 | -7 | -2% | 204 | 41 | $26 | $31 |
| Electro-Mechanical and Mechatronics Technologists and Technicians | 481 | 509 | 28 | 6% | 278 | 56 | $21 | $30 |
| **Total** | **6,612** | **6,908** | **296** | **4%** | **3,873** | **774** |  |  |
| Source: Lightcast 2022.3 |
| **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 Design Occupations in East Bay Sub-region**

| **Occupation** | **2021 Jobs** | **2026 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Architectural and Civil Drafters | 1,174 | 1,228 | 55 | 5% | 740 | 148 | $26 | $33 |
| Electrical and Electronics Drafters | 164 | 181 | 17 | 11% | 96 | 19 | $29 | $32 |
| Mechanical Drafters | 287 | 316 | 29 | 10% | 169 | 34 | $25 | $34 |
| Drafters, All Other | 157 | 159 | 2 | 1% | 76 | 15 | $24 | $30 |
| Electro-Mechanical and Mechatronics Technologists and Technicians | 155 | 163 | 8 | 5% | 88 | 18 | $16 | $26 |
| **Total** | **1,937** | **2,047** | **110** | **6%** | **1,169** | **234** |  |  |
| Source: Lightcast 2022.3 |
| **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 (Sept. 2022 - Aug. 2023)**

| **Occupation** | **Bay Region** | **East Bay** |
| --- | --- | --- |
| Electro-Mechanical and Mechatronics Technologists and Technicians | 969 | 393 |
| Electrical and Electronics Drafters | 839 | 100 |
| Drafters, All Other | 800 | 294 |
| Mechanical Drafters | 372 | 148 |
| Architectural and Civil Drafters | 155 | 65 |
| Source: Lightcast |

**Table 4a. Top Job Titles for Engineering Design Occupations for latest 12 months (Sept. 2022 - Aug. 2023) Bay Region**

| **Title** | **Bay** | **Title** | **Bay** |
| --- | --- | --- | --- |
| Calibration Technicians | 117 | CAD Designers | 58 |
| Analog Design Engineers | 111 | Robotics Technicians | 51 |
| CAD Engineers | 110 | Analog IC Design Engineers | 50 |
| Instrument Technicians | 94 | Electromechanical Assemblers | 49 |
| Electronics Technicians | 89 | Instrumentation Technicians | 49 |
| Mechanical Designers | 76 | PCB Designers | 41 |
| CAD Drafters | 74 | Methodologists | 31 |
| Electrical Designers | 68 | Electromechanical Technicians | 29 |
| Drafters | 66 | Rework Technicians | 29 |
| Source: Lightcast |

**Table 4b. Top Job Titles for Engineering Design Occupations for latest 12 months (Sept. 2022 - Aug. 2023) East Bay Sub-Region**

| **Title** | **East Bay** | **Title** | **East Bay** |
| --- | --- | --- | --- |
| Electromechanical Assemblers | 39 | Instrumentation Technicians | 19 |
| Calibration Technicians | 38 | Automation Technicians | 15 |
| Electronics Technicians | 34 | Electromechanical Technicians | 15 |
| Drafters | 33 | Piping Designers | 15 |
| CAD Drafters | 31 | Electrical Designers | 14 |
| Mechanical Designers | 30 | CAD Technicians | 13 |
| Instrument Technicians | 26 | Designers/Drafters | 12 |
| Robotics Technicians | 25 | Rework Operators | 12 |
| CAD Designers | 23 | Detailers | 11 |
| Source: Lightcast |

## Industry Concentration

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

| **Industry - 6 Digit NAICS (No. American Industry Classification) Codes** | **Jobs in Industry (2021)** | **Jobs in Industry (2026)** | **% Change (2021-26)** | **% Occupation Group in Industry (2022)** |
| --- | --- | --- | --- | --- |
| Engineering Services | 1,618 | 1,738 | 7% | 23% |
| Architectural Services | 1,217 | 1,120 | -8% | 15% |
| Landscape Architectural Services | 262 | 242 | -7% | 3% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) | 149 | 236 | 58% | 3% |
| Plumbing, Heating, and Air-Conditioning Contractors | 161 | 191 | 18% | 3% |
| Semiconductor Machinery Manufacturing | 146 | 164 | 12% | 2% |
| Electrical Contractors and Other Wiring Installation Contractors | 149 | 165 | 11% | 2% |
| Research and Development in Biotechnology (except Nanobiotechnology) | 97 | 178 | 83% | 2% |
| Semiconductor and Related Device Manufacturing | 137 | 146 | 6% | 2% |
| Electronic Computer Manufacturing | 147 | 153 | 4% | 2% |
| Source: Lightcast 2022.3 |

**Table 6. Top Employers Posting Engineering Design Occupations in Bay Region and East Bay Sub-Region (Sept. 2022 - Aug. 2023)**

| **Employer** | **Bay** | **Employer** | **East Bay** |
| --- | --- | --- | --- |
| Apple | 98 | Randstad | 33 |
| Actalent | 70 | Actalent | 27 |
| Randstad | 64 | Tesla | 26 |
| GPAC | 52 | Lawrence Livermore National Laboratory | 21 |
| Tesla | 37 | GPAC | 17 |
| Synopsys | 25 | Hargrove Engineers + Constructors | 17 |
| Source: Lightcast |

## Educational Supply

There are 20 community colleges in the Bay Region issuing 219 awards on average annually (last 3 years ending 2021-22) on TOP 0901.00 - Engineering, General (requires Calculus) (Transfer). In the East Bay Sub-Region, there are six (6) community colleges that issued 83 awards on average annually (last 3 years) on this TOP code.

**Table 7. Community College Awards on TOP 0901.00 - Engineering, General (requires Calculus) (Transfer) in Bay Region**

| **College** | **Subregion** | **Associate Degree** | **High unit Certificate** | **Low unit Certificate** | **Total** |
| --- | --- | --- | --- | --- | --- |
| Cabrillo | SC-Monterey | 24 | 0 | 0 | 24 |
| Canada | Mid-Peninsula | 9 | 2 | 0 | 11 |
| Chabot | East Bay | 8 | 0 | 3 | 11 |
| Contra Costa | East Bay | 3 | 0 | 4 | 7 |
| Diablo Valley | East Bay | 18 | 0 | 0 | 18 |
| Evergreen Valley | Silicon Valley | 1 | 0 | 0 | 1 |
| Foothill | Silicon Valley | 9 | 0 | 0 | 9 |
| Gavilan | Silicon Valley | 3 | 0 | 0 | 3 |
| Hartnell | SC-Monterey | 13 | 0 | 3 | 16 |
| Las Positas | East Bay | 3 | 0 | 0 | 3 |
| Los Medanos | East Bay | 8 | 0 | 0 | 8 |
| Mission | Silicon Valley | 13 | 0 | 0 | 13 |
| Monterey | SC-Monterey | 7 | 2 | 1 | 10 |
| Ohlone | East Bay | 3 | 0 | 33 | 36 |
| San Francisco | Mid-Peninsula | 6 | 0 | 0 | 6 |
| San Mateo | Mid-Peninsula | 10 | 0 | 0 | 10 |
| Santa Rosa | North Bay | 21 | 0 | 0 | 21 |
| Skyline | Mid-Peninsula | 3 | 0 | 0 | 3 |
| Solano | North Bay | 7 | 0 | 0 | 7 |
| West Valley | Silicon Valley | 2 | 0 | 0 | 2 |
| **Total** |  | **171** | **4** | **44** | **219** |
| Source: Data Mart |
| Note: The annual average for awards is 2019-20 to 2021-22. |

## Gap Analysis

Based on the data included in this report, there is a labor market gap in the Bay region with 774 annual openings for the Engineering Design occupational cluster and 219 annual (3-year average) awards for an annual undersupply of 555 students. In the East Bay Sub-Region, there is also a gap with 234 annual openings and 83 annual (3-year average) awards for an annual undersupply of 151 students.

## Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0901.00 - Engineering, General (requires Calculus) (Transfer)**

| **Metric Outcomes** | **Bay All CTE Programs** | **Chabot All CTE Programs** | **State 0901.00** | **Bay 0901.00** | **East Bay 0901.00** | **Chabot 0901.00** |
| --- | --- | --- | --- | --- | --- | --- |
| Students with a Job Closely Related to Their Field of Study | 74% | 75% | 69% | 67% | 75% | N/A |
| Median Annual Earnings for Exiting Students | $53,090 | $48,800 | $31,334 | $35,912 | $36,712 | $38,142 |
| Median Change in Earnings for Exiting Students | 24% | 34% | 44% | 48% | 36% | 64% |
| Exiting Students Who Attained the Living Wage | 54% | 56% | 39% | 35% | 42% | 47% |
| Source: CCCCO Launchboard (2018-19 – 2019-20) |

## Skills, Certifications and Education

**Table 9. Top Skills for Engineering Design Occupations in Bay Region (Sept. 2022 - Aug. 2023)**

| **Skill** | **Posting** | **Skill** | **Posting** |
| --- | --- | --- | --- |
| Computer-Aided Design | 782 | Electromechanics | 250 |
| AutoCAD | 615 | Simulations | 240 |
| Electrical Engineering | 443 | Printed Circuit Board | 235 |
| Automation | 310 | Mechanical Engineering | 229 |
| Debugging | 310 | 3D Modeling | 220 |
| Project Management | 306 | Calibration | 213 |
| Python (Programming Language) | 297 | Scripting | 206 |
| Autodesk Revit | 268 | Instrumentation | 199 |
| Test Equipment | 263 | Circuit Design | 197 |
| Electronics | 259 | Oscilloscope | 197 |
| Source: Lightcast |

**Table 10. Certifications for Engineering Design Occupations in Bay Region (Sept. 2022 - Aug. 2023)**

| **Certification** | **Posting** | **Certification** | **Posting** |
| --- | --- | --- | --- |
| Valid Driver's License | 216 | Transportation Worker Identification Credential (TWIC) Card | 20 |
| Enterprise Desktop Administrator (Microsoft Certified IT Professional) | 180 | CDL Class C License | 17 |
| Security Clearance | 87 | LEED Accredited Professional (AP) | 16 |
| Engineer in Training | 20 | Secret Clearance | 15 |
| Certified Loss Control Specialist | 20 | Professional Engineer (PE) License | 13 |
| Source: Lightcast |

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

| **Education Level** | **Job Postings** | **% of Total** |
| --- | --- | --- |
| High school or GED | 418 | 16% |
| Associate degree | 568 | 22% |
| Bachelor's degree & higher | 1,619 | 62% |
| Source: Lightcast |
| Note: 41% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample. |

## Methodology

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

## Sources

O\*Net Online
Lightcast
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

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