**Information Technology Occupations**

**Labor Market Information Report**

**Contra Costa College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

April 2020

# Recommendation

Based on all available data, there appears to be a significant undersupply of Information 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 9,827 students in the Bay region and 1,486 students in the East Bay Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0701.00 - Information Technology, General 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 Contra Costa College and in the region.

# Introduction

This report profiles Information Technology Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Contra Costa College.

|  |
| --- |
| * **Computer User Support Specialists (SOC 15-1151):** Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems. Excludes “Network and Computer Systems Administrators” (15-1142).
 |
| Entry-Level Educational Requirement: Some *college, no degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 41*%* |
| * **Computer Network Support Specialists (SOC 15-1152):** Analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption. Excludes “Network and Computer Systems Administrators” (15-1142) and “Computer Network Architects” (15-1143).
 |
| Entry-Level Educational Requirement: Associate's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders *or Some Postsecondary Coursework: 41%* |
| * **Network and Computer Systems Administrators (SOC 15-1142):** Install, configure, and support an organization’s local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software.
 |
| *Entry-Level Educational Requirement: Bachelor's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 38%* |
|  |
| * **Information Security Analysts (SOC 15-1122):** Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses. Excludes “Computer Network Architects” (15-1143).
 |
| *Entry-Level Educational Requirement: Bachelor's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 27%* |
|  |
| * **Computer Occupations, All Other (SOC 15-1199):** All computer occupations not listed separately. Excludes “Computer and Information Systems Managers” (11-3021), “Computer Hardware Engineers” (17-2061), “Electrical and Electronics Engineers” (17-2070), “Computer Science Teachers, Postsecondary” (25-1021), “Multimedia Artists and Animators” (27-1014), “Graphic Designers” (27-1024), “Computer Operators” (43-9011), and “Computer, Automated Teller, and Office Machine Repairs” (49-2011).
 |
| *Entry-Level Educational Requirement: Bachelor's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 35%* |

# Occupational Demand

**Table 1. Employment Outlook for Information Technology 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 |
| Computer User Support Specialists |  31,385  |  36,602  | 5,217 | 17% |  19,022  |  3,804  | $26.71 | $34.78 |
| Computer Network Support Specialists |  6,532  |  7,574  | 1,042 | 16% |  3,912  |  782  | $29.32 | $38.94 |
| Network and Computer Systems Administrators |  14,170  |  16,034  | 1,865 | 13% |  7,108  |  1,422  | $38.27 | $49.05 |
| Information Security Analysts |  3,308  |  4,372  | 1,064 | 32% |  2,394  |  479  | $41.35 | $55.30 |
| Computer Occupations, All Other |  34,304  |  38,084  | 3,780 | 11% |  16,918  |  3,384  | $40.92 | $55.80 |
| **Total** |  **89,699**  |  **102,666**  | **12,967** | **14%** |  **49,354**  |  **9,871**  | **$34.70** | **$46.13** |

*Source: EMSI 2019.4*

**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 Information 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 | 25% Hourly Wage | Median Hourly Wage |
| Information Security Analysts |  655  |  775  | 121 | 18% |  371  |  74  | $39.57 | $50.81 |
| Network and Computer Systems Administrators |  2,752  |  2,862  | 110 | 4% |  1,092  |  218  | $34.49 | $43.30 |
| Computer User Support Specialists |  5,642  |  6,032  | 390 | 7% |  2,778  |  556  | $24.20 | $30.71 |
| Computer Network Support Specialists |  1,394  |  1,479  | 85 | 6% |  677  |  135  | $27.98 | $35.59 |
| Computer Occupations, All Other |  6,632  |  6,755  | 124 | 2% |  2,576  |  515  | $35.25 | $46.51 |
| **TOTAL** |  **17,074**  |  **17,903**  | **829** | **5%** |  **7,494**  |  **1,499**  | **$31.05** | **$40.04** |

*Source: EMSI 2019.4*

**East Bay Sub-Region** includes Alameda and Contra Costa Counties

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

**Table 3. Top 15 - Number of Job Postings by Occupation for latest 12 months (March 2019 - February 2020)**

| Occupation | Bay Region | East Bay |
| --- | --- | --- |
|  Computer Systems Engineers/Architects | 25,185 | 3,488 |
|  Information Technology Project Managers | 17,091 | 3,034 |
|  Computer User Support Specialists | 16,936 | 3,510 |
|  Software Quality Assurance Engineers and Testers | 14,217 | 2,314 |
|  Business Intelligence Analysts | 14,059 | 2,073 |
|  Information Security Analysts | 9,382 | 1,539 |
|  Network and Computer Systems Administrators | 7,927 | 1,632 |
|  Database Architects | 3,752 | 702 |
|  Computer Occupations, All Other | 2,692 | 236 |
|  Data Warehousing Specialists | 2,497 | 442 |
|  Document Management Specialists | 1,554 | 390 |
|  Computer Network Support Specialists | 1,303 | 212 |
|  Video Game Designers | 1,284 | 153 |
|  Search Marketing Strategists | 1,177 | 133 |
|  Geospatial Information Scientists and Technologists | 805 | 248 |

*Source: Burning Glass*

The chart below displays the most recent 30 days of job postings activity to show near-term trends for the SOC Codes listed above, for the past 30 days from EMSI.



**Table 4a. Top Job Titles for Information Technology Occupations for latest 12 months (March 2019 - February 2020) Bay Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | Bay | Common Title | Bay |
| Data Analyst | 5,121 | Information Technology Manager | 1,065 |
| Systems Engineer | 4,204 | Project Manager | 1,049 |
| Solutions Architect | 3,592 | Machine Learning Engineer | 1,041 |
| Quality Assurance Engineer | 3,192 | Technical Support Engineer | 893 |
| Software Development Engineer | 2,346 | Business Intelligence Analyst | 788 |
| Security Engineer | 2,280 | Quality Assurance Analyst | 761 |
| Systems Administrator | 1,813 | Security Analyst | 754 |
| Senior Systems Engineer | 1,426 | Software Quality Assurance Engineer | 715 |
| Firmware Engineer | 1,308 | Quality Assurance Tester | 693 |
| Technical Project Manager | 1,238 | Software Test Engineer | 652 |
| Information Technology Project Manager | 1,200 | Information Technology Specialist | 601 |
| Data Architect | 1,167 | Information Technology Support Specialist | 582 |
| Desktop Support | 1,125 | Architect | 570 |
| Sap Consultant | 1,094 | Desktop Support Technician | 567 |

**Table 4b. Top Job Titles for Information Technology Occupations for latest 12 months (March 2019 - February 2020) East Bay Sub-Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | East Bay | Common Title | East Bay |
| Data Analyst | 812 | Quality Assurance Analyst | 158 |
| Systems Engineer | 746 | Information Technology Specialist | 150 |
| Quality Assurance Engineer | 553 | Desktop Support Technician | 148 |
| Solutions Architect | 428 | Technical Support Specialist | 131 |
| Systems Administrator | 391 | Information Technology Technician | 128 |
| Security Engineer | 314 | Software Development Engineer | 123 |
| Information Technology Project Manager | 266 | Business Intelligence Analyst | 123 |
| Senior Systems Engineer | 250 | Scrum Master | 122 |
| Technical Project Manager | 240 | Quality Assurance Tester | 121 |
| Data Architect | 220 | Technical Support Engineer | 109 |
| Information Technology Manager | 212 | Business Analyst | 109 |
| Desktop Support | 188 | Software Quality Assurance Engineer | 107 |
| Security Analyst | 174 | Sap Consultant | 106 |
| Project Manager | 172 | Senior Systems Administrator | 105 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Information 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) |
| Custom Computer Programming Services (541511) | 17,195 | 21,089 | 23% | 20% |
| Computer Systems Design Services (541512) | 10,334 | 11,913 | 15% | 11% |
| Software Publishers (511210) | 5,605 | 7,551 | 35% | 7% |
| Internet Publishing and Broadcasting and Web Search Portals (519130) | 5,482 | 6,988 | 27% | 6% |
| Data Processing, Hosting, and Related Services (518210) | 4,240 | 5,812 | 37% | 5% |
| Corporate, Subsidiary, and Regional Managing Offices (551114) | 3,413 | 3,541 | 4% | 4% |
| Electronic Computer Manufacturing (334111) | 3,132 | 3,430 | 10% | 4% |
| Other Computer Related Services (541519) | 2,439 | 3,089 | 27% | 3% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 2,124 | 2,062 | -3% | 2% |
| Colleges, Universities, and Professional Schools (State Government) (902612) | 1,973 | 2,145 | 9% | 2% |
| Colleges, Universities, and Professional Schools (611310) | 1,706 | 1,890 | 11% | 2% |
| Local Government, Excluding Education and Hospitals (903999) | 1,534 | 1,598 | 4% | 2% |
| Temporary Help Services (561320) | 1,434 | 1,469 | 2% | 2% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715) | 1,174 | 1,286 | 10% | 1% |
| Elementary and Secondary Schools (Local Government) (903611) | 886 | 910 | 3% | 1% |

*Source: EMSI 2019.4*

**Table 6. Top Employers Posting Information Technology Occupations in Bay Region and East Bay Sub-Region (March 2019 - February 2020)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | Bay | Employer | East Bay |
| Apple Inc. | 1,450 | Lockheed Martin Corp | 261 | Anthem Blue Cross | 236 |
| Deloitte | 1,393 | Workday, Inc | 258 | Workday, Inc | 204 |
| Cisco Systems Incorporated | 964 | Splunk, Inc | 250 | Wells Fargo | 192 |
| Google Inc. | 723 | Walmart / Sam's | 224 | Kaiser Permanente | 166 |
| Anthem Blue Cross | 637 | Adobe Systems | 222 | University Of California Berkeley | 137 |
| Wells Fargo | 635 | Best Buy | 214 | Facebook | 116 |
| Amazon | 630 | IDC Technologies | 213 | Lawrence Livermore National Laboratory | 97 |
| Facebook | 612 | Intelliswift Software | 211 | Tesla | 92 |
| IBM | 532 | Milestone Technologies Inc | 210 | Bank of the West | 88 |
| Accenture | 506 | SAP | 208 | Albertsons | 88 |
| Vmware Incorporated | 431 | Palo Alto Networks | 206 | Bio-Rad Laboratories | 82 |
| Infosys | 425 | Splunk | 202 | The Save Mart Co | 80 |
| Wipro | 423 | Oracle | 202 | Tesla Motors | 79 |
| Microsoft Corporation | 411 | Uber | 192 | Lucid Motors Inc | 78 |
| Nvidia Corporation | 403 | Hewlett-Packard | 190 | Uc San Diego | 74 |
| Salesforce | 298 | PricewaterhouseCoopers | 187 | Best Buy | 72 |
| Visa | 280 | Kaiser Permanente | 187 | University California | 63 |

*Source: Burning Glass*

# Educational Supply

There are seven (7) community colleges in the Bay Region issuing 44 awards on average annually (last 3 years) on TOP 0701.00 - Information Technology, General. There are three colleges in the East Bay Sub-Region issuing 13 awards on average annually (last 3 years) on this TOP code.

**Table 7. Awards on TOP 0701.00 - Information Technology, General in Bay Region**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| College | Sub-Region | Associates | Certificate 18+ units | Certificate Low unit | Total |
| City College of San Francisco  | Mid-Peninsula |  |  |  11  |  11  |
| Las Positas College  | East Bay |  2  |  |  |  2  |
| Los Medanos College  | East Bay |  |  |  10  |  10  |
| Monterey Peninsula College  | Santa Cruz-Monterey |  3  |   |   |  3  |
| Ohlone College  | East Bay |   |  1 |  |  1  |
| Santa Rosa Junior College  | North Bay |  |  |  6  |  6  |
| City College of San Francisco  | Mid-Peninsula |  |  |  11  |  11  |
| **Total Bay Region** |  **5**  |  **1** |  **38**  |  **44**  |
| **Total East Bay Sub-Region** | **2** | **1** | **10** | **13** |

# *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 9,871 annual openings for the Information Technology occupational cluster and 44 annual (3-year average) awards for an annual undersupply of 9,827 students. In the East Bay Sub-Region, there is also a gap with 1,499 annual openings and 13 annual (3-year average) awards for an annual undersupply of 1,486 students.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0701.00 - Information Technology, General**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2015-16 | Bay (All CTE Programs) | Contra Costa College (All CTE Programs) | State (0701.00) | Bay (0701.00) | East Bay (0701.00) | Contra Costa College (0701.00) |
| % Employed Four Quarters After Exit | 74% | 71% | 65% | 71% | 70% | n/a |
| Median Quarterly Earnings Two Quarters After Exit | $10,550 | $7,693 | $8,013 | $9,231 | $9,472 | n/a |
| Median % Change in Earnings | 46% | 70% | 50% | 61% | 62% | n/a |
| % of Students Earning a Living Wage | 63% | 49% | 53% | 57% | 63% | n/a |

*Source: Launchboard Pipeline (version available on 3/27/20)*

# Skills, Certifications and Education

**Table 9. Top Skills for Information Technology Occupations in Bay Region (March 2019 - February 2020)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Python | 23,120 | Business Process | 7,716 | Tableau | 5,528 |
| SQL | 20,240 | Scheduling | 7,501 | Salesforce | 5,353 |
| Project Management | 19,599 | Atlassian JIRA | 7,499 | Customer Contact | 5,347 |
| Linux | 16,351 | JavaScript | 7,176 | Virtualization | 5,316 |
| Java | 15,674 | UNIX | 7,143 | Software as a Service (SaaS) | 5,288 |
| Quality Assurance and Control | 13,787 | System Administration | 6,960 | Project Planning and Development Skills | 5,156 |
| Software Development | 13,334 | C++ | 6,817 | Big Data | 5,138 |
| Customer Service | 13,187 | Systems Engineering | 6,713 | Product Management | 5,056 |
| Technical Support | 12,719 | Information Systems | 6,499 | Machine Learning | 5,055 |
| Data Analysis | 10,230 | Information Security | 6,294 | Extraction Transformation and Loading (ETL) | 4,881 |
| SAP | 9,387 | Microsoft Active Directory | 6,250 | Data Warehousing | 4,863 |
| Software Engineering | 9,215 | Debugging | 6,230 | Product Development | 4,749 |
| Oracle | 9,084 | VMware | 6,014 | Transmission Control Protocol / Internet Protocol (TCP / IP) | 4,708 |
| Budgeting | 7,894 | DevOps | 5,965 | Repair | 4,680 |
| Scrum | 7,723 | Cisco | 5,528 | Domain Name System (DNS) | 4,627 |

*Source: Burning Glass*

**Table 10. Certifications for Information Technology Occupations in Bay Region (March 2019 - February 2020)**

Note: 84% 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 |
| Python | 23,120 | Business Process | 7,716 |
| SQL | 20,240 | Scheduling | 7,501 |
| Project Management | 19,599 | Atlassian JIRA | 7,499 |
| Linux | 16,351 | JavaScript | 7,176 |
| Java | 15,674 | UNIX | 7,143 |
| Quality Assurance and Control | 13,787 | System Administration | 6,960 |
| Software Development | 13,334 | C++ | 6,817 |
| Customer Service | 13,187 | Systems Engineering | 6,713 |
| Technical Support | 12,719 | Information Systems | 6,499 |
| Data Analysis | 10,230 | Information Security | 6,294 |
| SAP | 9,387 | Microsoft Active Directory | 6,250 |
| Software Engineering | 9,215 | Debugging | 6,230 |

*Source: Burning Glass*

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

Note: 46% 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 | 3,766 | 6% |
| Associate Degree | 2,017 | 3% |
| Bachelor’s Degree or Higher | 54,668 | 91% |

*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

For more information, please contact:

* Doreen O’Donovan, Research Analyst, for Bay Area Community College Consortium (BACCC) and Centers of Excellence (CoE), doreen@baccc.net or (831) 479-6481
* John Carrese, Director, San Francisco Bay Center of Excellence for Labor Market Research, jcarrese@ccsf.edu or (415) 267-6544