

Cybersecurity Occupations Labor Market Information Report Merritt 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 an undersupply of Cybersecurity 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 3,190 students in the Bay region and 312 students in the East Bay Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0702.00 - Computer Information Systems 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 Merritt College and in the region.

Introduction

This report profiles Cybersecurity Occupations in the 12 county Bay region and in the East Bay sub-region for a series of Cybersecurity program at Merritt College. This labor market information (LMI) report can be used for the following programs when submitting to the BACCC Program Recommendation process because all programs use the same TOP code and same SOC codes:

- Cybersecurity -Information Security: CodePath.
- Cybersecurity - Ethical Hacking
- Application Security – both for Certificate of Achievement and A.S. Degree
- Infrastructure Security – both for Certificate of Achievement and A.S. Degree

- **Computer Systems Analysts (SOC 15-1121):** Analyze science, engineering, business, and other data processing problems to implement and improve computer systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations. May analyze or recommend commercially available software.
Entry-Level Educational Requirement: Bachelor's degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%

- **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%

Occupational Demand

Table 1. Employment Outlook for Cybersecurity Occupations in Bay Region

Occupation	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Openings	Average Annual Openings	25% Hourly Wage	Median Hourly Wage
Computer Systems Analysts	29,020	33,519	4,499	16%	15,622	3,124	\$43.91	\$55.80
Information Security Analysts	3,308	4,372	1,064	32%	2,394	479	\$41.35	\$55.30
TOTAL	32,328	37,891	5,563	17%	18,016	3,603	\$43.65	\$55.75

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 Cybersecurity Occupations in East Bay Sub-Region

Occupation	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Openings	Average Annual Openings	25% Hourly Wage	Median Hourly Wage
Computer Systems Analysts	5,089	5,283	194	4%	1,831	366	\$33.61	\$49.77
Information Security Analysts	661	765	104	16%	339	68	\$27.59	\$50.76
TOTAL	5,750	6,048	298	5%	2,169	434	\$32.92	\$49.88

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. Number of Job Postings by Occupation for latest 12 months (March 2019 - February 2020)

Occupation	Bay Region	East Bay
Computer Systems Analysts	18,877	3,449
Information Security Analysts	9,382	1,539
Informatics Nurse Specialists	9	2
TOTAL	28,268	4,990

Source: Burning Glass

Table 4a. Top Job Titles for Cybersecurity Occupations for latest 12 months (March 2019 - February 2020)

Bay Region

Common Title	Bay	Common Title	Bay
Business Systems Analyst	3,364	Information Security Engineer	319
Security Engineer	2,149	Oracle Consultant	298
Developer	1,350	Information Technology Consultant	295
Systems Analyst	1,022	Security Consultant	292
Security Analyst	753	Network Security Engineer	255
Technical Consultant	623	Aem Developer	248
Software Development Engineer	539	Mulesoft Developer	240
Security Architect	453	Oracle Functional Consultant	213
Information Technology Analyst	397	Information Security Manager	190
Security Manager	367	Information Technology Auditor	163
Information Security Analyst	359	Team Lead	162
Technical Analyst	349	Cyber Security Engineer	155
Business Analyst	345	Sap Fico	153
Information Technology Business Analyst	331	Information Technology Security Analyst	150

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

Common Title	East Bay	Common Title	East Bay
Business Systems Analyst	649	Security Architect	51
Security Engineer	295	Hybris Developer	49
Systems Analyst	235	Cyber Security Engineer	49
Developer	228	Business Analyst	49
Security Analyst	173	Technical Business Analyst	47
Technical Consultant	108	Mulesoft Developer	46
Information Technology Business Analyst	84	Information Technology Auditor	45
Technical Analyst	83	Oracle Consultant	44
Information Security Analyst	78	Team Lead	42
Information Technology Consultant	70	Information Technology Security Analyst	42
Information Technology Analyst	68	Network Security Engineer	39
Information Security Engineer	64	Security Manager	36
Cyber Security Threat Analyst	55	Security Consultant	35
Aem Developer	54	Systems Engineer	32

Source: Burning Glass

Industry Concentration

Table 5. Industries hiring Cybersecurity 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)	8,163	10,220	25%	26%
Computer Systems Design Services (541512)	4,980	5,868	18%	15%
Internet Publishing and Broadcasting and Web Search Portals (519130)	1,837	2,345	28%	6%
Corporate, Subsidiary, and Regional Managing Offices (551114)	1,762	1,818	3%	5%
Data Processing, Hosting, and Related Services (518210)	1,406	1,999	42%	4%
Electronic Computer Manufacturing (334111)	1,381	1,498	8%	4%
Software Publishers (511210)	1,174	1,605	37%	4%
Other Computer Related Services (541519)	1,136	1,469	29%	4%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715)	565	627	11%	2%
Local Government, Excluding Education and Hospitals (903999)	495	511	3%	1%
Temporary Help Services (561320)	389	399	3%	1%
General Medical and Surgical Hospitals (622110)	376	362	-4%	1%
Commercial Banking (522110)	324	349	8%	1%
Administrative Management and General Management Consulting Services (541611)	342	418	22%	1%

Source: EMSI 2019.4

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

Employer	Bay	Employer	Bay	Employer	East Bay
Deloitte	252	Workday, Inc	80	Kaiser Permanente	85
Wells Fargo	238	UC Berkeley	73	UC Berkeley	73
Google Inc.	219	Vmware Incorporated	67	Workday, Inc	70
Accenture	200	NTT Data	67	Wells Fargo	60
Apple Inc.	180	Genentech	67	Pacific Gas and Electric	36
Cisco Systems Incorporated	174	KPMG	66	NTT Data	29
Wipro	125	Xoriant Incorporated	64	UC Office Of The President	27

Facebook	125	University California	63	Lawrence Livermore National Laboratory	26
Splunk, Inc	111	Uber	63	University California	24
Infosys	104	Intelliswift Software	63	Ellie Mae	24
Kaiser Permanente	98	Splunk	62	Bank of the West	23
Pacific Gas and Electric	96	Target	61	Bio-Rad Laboratories	22
Palo Alto Networks	91	Lucile Packard Childrens Hospital	58	Target	21
Lockheed Martin Corporation	91	Adobe Systems	56	Delta Dental	21
IBM	91	Microsoft Corporation	55	Albertsons	20
Visa	89	Republic Bancorp	53	Tesla Motors	16
Salesforce	89	Blue Cross Blue Shield of CA	52	Tesla	16

Source: Burning Glass

Educational Supply

There are 24 community colleges in the Bay Region issuing 413 awards on average annually (last 3 years) on the following four TOP codes: Computer Information Systems- TOP 0702.00, Computer Infrastructure and Support- TOP 0708.00, Computer Networking- TOP 0708.10, and Computer Support- TOP 0708.20. There are nine (9) colleges in the East Bay Sub-Region issuing 122 awards on average annually (last 3 years) on these TOP codes.

Table 7. Awards on TOP 0702.00, TOP 0708.00, TOP 0708.10 and TOP 0708.20 in Bay Region

TOP Code	College	Sub-Region	Associates	Certificate 18+	Certificate Low	Total
070800	City College of San Francisco	Mid-Peninsula	44		14	58
070800	College of San Mateo	Mid-Peninsula	1		1	2
070800	Los Medanos College	East Bay	6	4	3	13
070800	Ohlone College	East Bay			1	1
070810	Cabrillo College	Santa Cruz-Monterey	3			3
070810	City College of San Francisco	Mid-Peninsula		1	48	49
070810	Contra Costa College	East Bay	3		13	16
070810	De Anza College	Silicon Valley	13	3	8	24
070810	Diablo Valley College	East Bay	7	2		9
070810	Foothill College	Silicon Valley	1			1
070810	Gavilan College	Santa Cruz-Monterey	4	2		6
070810	Las Positas College	East Bay	4	1		5
070810	Los Medanos College	East Bay	8	5	3	16
070810	Mission College	Silicon Valley	14	6	9	29
070810	Monterey Peninsula College	Santa Cruz-Monterey		1	1	2
070810	Ohlone College	East Bay	3	4	12	19
070810	San Jose City College	Silicon Valley	8	6	2	16
070810	Santa Rosa Junior College	North Bay			23	23
070810	Skyline College	Mid-Peninsula	7	1		8
070820	Cabrillo College	Santa Cruz-Monterey	4	3	6	13
070820	City College of San Francisco	Mid-Peninsula		10	15	25
070820	Contra Costa College	East Bay			4	4
070820	Diablo Valley College	East Bay	6	3	2	11
070820	Hartnell College	Santa Cruz-Monterey	2	1		3
070820	Ohlone College	East Bay	2		1	3
070820	Santa Rosa Junior College	North Bay			8	8
070200	Berkeley City College	East Bay	1			1
070200	Chabot College	East Bay	2			2
070200	College of Alameda	East Bay	6	3		9
070200	College of Marin	North Bay		1		1
070200	Evergreen Valley College	Silicon Valley	1			1
070200	Gavilan College	Santa Cruz-Monterey	1			1

070200	Las Positas College	East Bay	3		3
070200	Los Medanos College	East Bay		1	1
070200	Merritt College	East Bay	4	5	9
070200	Mission College	Silicon Valley	10	1	11
070200	Napa Valley College	North Bay	3		3
070200	Skyline College	Mid-Peninsula	3	1	4
Total Bay Region			174	65	174
Total East Bay Sub-Region			55	28	122

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 3,603 annual openings for the Cybersecurity occupational cluster and 413 annual (3-year average) awards for an annual undersupply of 3,190 students. In the East Bay Sub-Region, there is also a gap with 434 annual openings and 122 annual (3-year average) awards for an annual undersupply of 312 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0702.00 - Computer Information Systems

2015-16	Bay (All CTE Programs)	Merritt College (All CTE Programs)	State (0702.00)	Bay (0702.00)	East Bay (0702.00)	Merritt College (0702.00)
% Employed Four Quarters After Exit	74%	71%	66%	67%	63%	66%
Median Quarterly Earnings Two Quarters After Exit	\$10,550	\$9,306	\$7,865	\$9,919	\$7,941	\$10,000
Median % Change in Earnings	46%	43%	38%	35%	37%	27%
% of Students Earning a Living Wage	63%	60%	51%	62%	55%	57%

Source: Launchboard Pipeline (version available on 3/10/20)

Skills, Certifications and Education

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

Skill	Postings	Skill	Postings	Skill	Postings
SQL	4,748	SAP	2,522	DevOps	1,324
Information Security	4,481	Customer Service	2,461	UNIX	1,302
Project Management	4,428	Enterprise Resource Planning	1,933	Authentication	1,301
Business Process	4,373	Software Engineering	1,844	Penetration Testing	1,258
Python	4,116	Salesforce	1,827	Systems Development Life Cycle (SDLC)	1,227
Oracle	4,039	Network Security	1,733	C++	1,153
Java	4,025	Quality Assurance and Control	1,701	Project Planning and Development Skills	1,152
Business Systems Analysis	3,782	Cryptography	1,634	Web Application Development	1,095
Business Systems	3,649	Budgeting	1,551	Atlassian JIRA	1,094
Software Development	3,487	Software as a Service (SaaS)	1,540	Extensible Markup Language (XML)	1,066
Systems Analysis	2,962	Data Analysis	1,503	Technical Writing / Editing	1,066
Information Systems	2,941	Technical Support	1,368	Customer Contact	1,025
Linux	2,723	Change Management	1,351	Transmission Control Protocol / Internet Protocol	1,022
Business Analysis	2,708	Scheduling	1,336	Security Operations	1,018

JavaScript	2,663	Scrum	1,332	Product Management	1,004
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Source: Burning Glass

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

Note: 82% 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
Certified Information Systems Security Professional (CISSP)	2,491	Cisco Certified Security Professional	286
Certified Information Systems Auditor (CISA)	1,273	Driver's License	274
SANS/GIAC Certification	1,065	Cisco Certified Network Professional (CCNP)	221
Certified Information Security Manager (CISM)	989	GIAC Security Essentials (GSEC)	203
Information Systems Certification	512	GIAC Certified Intrusion Analyst	198
IT Infrastructure Library (ITIL) Certification	510	Project Management Professional (PMP)	180
Project Management Certification	420	Cisco Certified Internetwork Expert (CCIE)	126
Certified in Risk and Information Systems Control	415	ITIL Certification	125
Security Clearance	404	Systems Security Certified Practitioner (SSCP)	115
CompTIA Security+	326	Certified Ethical Hacker (CEH)	109
Cisco Certified Network Associate (CCNA)	312	GIAC Certified Forensic Analyst	104
GIAC Certified Incident Handler (GCIH)	291	SAP Certification	101

Source: Burning Glass

Table 11. Education Requirements for Cybersecurity Occupations in Bay Region

Note: 47% 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	571	4%
Associate Degree	306	2%
Bachelor's Degree or Higher	13,200	94%

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 CCCCCO Data Mart.

Sources

O*Net Online
 Labor Insight/Jobs (Burning Glass)
 Economic Modeling Specialists International (EMSI)
 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

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