

Process of Approval for Programs Subject to Academic Senate Purview

New Certificate: **CNT: Information (Cyber) Security Analyst**

1. Support for the program on campus. I am working with CTE, Admin, District on this apprenticeship in conjunction with Robert Half, see documentation (page 3) **Division of Apprenticeship Standards (DAS) Apprenticeship Program Summary Sheet.**
2. Anticipated resources/costs: None required. All classes are currently developed classes that are scheduled each semester (online, on-campus, or hybrid). No classified or admin support required
3. Need or demand, see LMI data, see documentation (page 4-13)
4. Mission Appropriateness: Relevant to: *offers educational opportunities and support for completion of students' career-technical goals*

Curriculum required: **Information (Cyber) Security analyst**

CNT 51	CompTIA's A+ Certification Computer Technician	4
CNT 52 or CIS 66	Networking Fundamentals	3
CNT 69	Network Security; CompTIA Security + Certification	3
CNT 7401 or CS 41	Red Hat Linux Administration I	3
CNT 68	Digital Forensics Fundamentals	3
CNT 8002	Cisco CCNA2/3 Switching, Routing, and Wireless Essentials	3
		19

5. FTES/FTEF required: none required. All the above classes are regularly scheduled in Fall and Spring semesters
6. Implementation Schedule: Start Fall 2022

3 semesters:

Fall	Spring	Fall
CNT51	CNT69	CNT68
CNT52	CNT7401	CNT8002

(68 and 8002 are only fall offerings)

For 2 semesters only, would have to have a spring start:

Spring	Fall
CNT51	CNT68
CNT52	CNT69
CNT7401	CNT8002

7. Outcomes: success will be measured by the number of students who are employed during/after the apprenticeship

8. Program Map

Information (Cyber) Security Analyst

Program Mapping Template (Program: [Section Break (Continuous)])

Column Break

□ AA → ■ AS → □ AA-T → □ AS-T → X COA → □ CC

This is an example course sequence. All plans can be modified to fit the needs of part-time students by adding more semesters. Students must meet with a counselor to complete an individualized educational plan.

SEMESTER 1 - FALL

Courses	Units	Semesters Offered	Prereq?	Advisory Notes
CNT51	4	F/S	○	
CNT52	3	F/S	■	
■	■	*■	■	
○	○	○	○	
SEMESTER-TOTAL	7	○		

SEMESTER 2 - SPRING

Courses	Units	Semesters Offered	Prereq?	Advisory Notes
CNT69	3	F/S	**■	
CNT7401	3	F/S	**■	
■	■	■	**■	
○	○	○	○	
SEMESTER-TOTAL	6	○		

SEMESTER 3 - FALL

Courses	Units	Semesters Offered	Prereq?	Advisory Notes
CNT68	3	F	^■	
CNT8002	3	F	○	
○	○	○	○	
SEMESTER-TOTAL	6	○		
Total Major Coursework	19			
Total Units Required	19			

Division of Apprenticeship Standards (DAS) Apprenticeship Program Summary Sheet

To: Eric Rood, Chief

From: Adriana Salmoran and Tsegay Arefaine

CC: Program Planning and Review

Date:

Program Name: The Robert Half Workforce and Innovation Program

Industry: Information Technology

DAS File No.:

CAI Grant Awardee: No

Actions:

- Proposed new apprentice program
- Existing apprenticeship program adding new occupations
- Existing apprenticeship program expanding area of operations
- Existing apprenticeship program changing work processes on approved occupations.

Labor Organizations Representing Any of the Apprentices:

None

Disclaimer of Interest in the Building Trades and Dispatch Restriction:

The Robert Half Workforce and Innovation Program is not intended to train in the building and construction trades and is not eligible to dispatch apprentices to projects with public works, prevailing wage or skilled and trained workforce requirements within the meaning of Labor Code sections 1720 and 3075 and will not train or dispatch apprentices in the building and construction trades or firefighters occupations.

Comments:

According to Cyberseek, a nationally recognized data-driven cybersecurity workforce dashboard, the State of California has approximately 72,000 cybersecurity vacancies across the state. This represents a 56% vacancy rate across the Inland Empire region, which Cyberseek has designated a deficient supply of skilled cyber professionals to fill these critical roles. The Robert Half Workforce and Innovation Program is looking to addressing the need to create highly qualified cybersecurity professionals through their apprenticeship program.

The Robert Half Workforce and Innovation Program will also be addressing the need for accounting professionals through their professional accounting track. The Robert Half Workforce and Innovation Program will oversee the apprenticeship program herein and seeks approval from the Department of Industrial Relations, Division of Apprenticeship Standards for the following items:

Cybersecurity Analyst Occupations Labor Market Information Report Las Positas College

Prepared by the San Francisco Bay Center of Excellence
for Labor Market Research
November 2020

Recommendation

Based on all available data, there appears to be an undersupply of Cybersecurity Analyst 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 3,848 students in the Bay region and 543 students in the East Bay Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0708.00-Computer Infrastructure and Support 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.

This report profiles Cybersecurity Analyst Occupations in the 12 county Bay region and in the East Bay sub-region for a non-credit vocational program at Las Positas College.

- **Computer Network Architects (Old SOC 15-1143/New SOC 15-1143):** Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning. May also design network and computer security measures. May research and recommend network and data communications hardware and software. Excludes “Information Security Analysts” (15-1122), “Network and Computer Systems Administrators” (15-1142), and “Computer Network Support Specialists” (15-1152).
Entry-Level Educational Requirement: Bachelor's degree
Training Requirement: Bachelor's degree
Percentage of Community College Award Holders or Some Postsecondary Coursework: 35%
- **Computer Network Support Specialists (Old SOC 15-1152/New 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%

- Database Administrators/ Database Administrators and Architects (Old SOC 15-1141/New SOC 15-1141):** Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases. Excludes “Information Security Analysts” (15-1122).

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%
- Information Security Analysts (Old SOC 15-1122/New 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%
- Network and Computer Systems Administrators (Old SOC 15-1142/New 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. May supervise computer user support specialists and computer network support specialists. May administer network security measures. Excludes “Information Security Analysts”(15-1122), “Computer User Support Specialists” (15-1151), and “Computer Network Support Specialists” (15-1152).

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 38%

Occupational Demand

Table 1. Employment Outlook for Cybersecurity Analyst Occupations in Bay Region

Occupation	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	5-Yr Openings	Average Annual Openings	25% Hourly Wage	Median Hourly Wage
Computer Network Architects	7,937	8,959	1,022	13%	4,007	801	\$48.55	\$64.75
Computer Network Support Specialists	6,791	7,801	1,010	15%	4,002	800	\$29.32	\$38.94
Database Administrators	4,794	5,502	708	15%	2,535	507	\$34.91	\$51.95
Information Security Analysts	3,552	4,611	1,059	30%	2,493	499	\$41.35	\$55.30
Network and Computer Systems Administrators	14,596	16,415	1,819	12%	7,260	1,452	\$38.27	\$49.05
TOTAL	37,670	43,287	5,617	15%	20,296	4,059	\$38.68	\$51.50

Source: EMSI 2020.3

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 Cybersecurity Analyst Occupations in East Bay Sub-Region

Occupation	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	5-Yr Openings	Average Annual Openings	25% Hourly Wage	Median Hourly Wage
Computer Network Architects	1,317	1,342	25	2%	501	100	\$43.17	\$54.80
Computer Network Support Specialists	1,410	1,492	82	6%	679	136	\$27.98	\$35.59
Database Administrators	893	957	64	7%	393	79	\$32.19	\$47.01
Information Security Analysts	686	803	116	17%	379	76	\$39.57	\$50.81
Network and Computer Systems Administrators	2,778	2,881	103	4%	1,098	220	\$34.49	\$43.30
TOTAL	7,084	7,474	390	6%	3,050	610	\$35.01	\$45.10

Source: EMSI 2020.3

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 (July 2019 - June 2020)

Occupation	Bay Region	East Bay
Database Administrators	13,834	2,404
Information Security Analysts	9,129	1,495
Network and Computer Systems Administrators	7,210	1,544
Computer Network Architects	5,074	932
Computer Network Support Specialists	1,265	224
Telecommunications Engineering Specialists	450	157
TOTAL	36,962	6,756

Source: Burning Glass

Table 4a. Top Job Titles for Cybersecurity Analyst Occupations for latest 12 months (July 2019 - June 2020)

Bay Region

Region

Common Title	Bay	Common Title	Bay
Data Engineer	3,453	Senior Systems Administrator	350
Network Engineer	2,272	Linux Systems Administrator	324
Security Engineer	2,017	Database Engineer	324
Systems Administrator	1,638	Information Security Engineer	323
Senior Data Engineer	1,285	Information Security Analyst	320
ETL Developer	745	Systems Engineer	306
Security Analyst	738	Senior Architect	299
Database Administrator	713	Salesforce Administrator	291
Security Architect	501	Network Administrator	291
SQL Developer	411	Security Consultant	285
Linux Administrator	370	Data Center Technician	262
Security Manager	365	Network Architect	260
Software Development Engineer	358	Network Security Engineer	252
Oracle Database Administrator	352	Database Developer	228

**Table 4b. Top Job Titles for Cybersecurity Analyst Occupations for latest 12 months (July 2019 - June 2020)
Bay Sub-Region**

East

Common Title	East Bay	Common Title	East Bay
Network Engineer	477	Information Security Engineer	64
Data Engineer	410	Database Developer	63
Systems Administrator	339	Database Engineer	61
Security Engineer	291	Linux Administrator	60
ETL Developer	222	Data Center Technician	59
Database Administrator	160	Network Specialist	56
Senior Data Engineer	156	Cyber Security Engineer	55
Security Analyst	138	Informatica Developer	54
SQL Developer	88	Network Administrator	53
Senior Systems Administrator	87	Network Security Engineer	51
Oracle Database Administrator	83	Senior Architect	48
Security Architect	78	Linux Systems Administrator	47
Network Architect	76	Database Analyst	46
SQL Database Administrator	68	Cyber Security Threat Analyst	46

Source: Burning Glass

Industry Concentration

Table 5. Industries hiring Cybersecurity Analyst Workers in Bay Region

Industry – 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2019)	Jobs in Industry (2024)	% Change (2019-24)	% Occupation Group in Industry (2019)
Custom Computer Programming Services (541511)	6,911	8,770	27%	19%
Computer Systems Design Services (541512)	3,954	4,801	21%	11%
Internet Publishing and Broadcasting and Web Search Portals (519130)	2,221	2,818	27%	6%
Data Processing, Hosting, and Related Services (518210)	1,976	2,873	45%	5%
Software Publishers (511210)	1,768	2,276	29%	5%
Corporate, Subsidiary, and Regional Managing Offices (551114)	1,715	1,791	4%	5%
Electronic Computer Manufacturing (334111)	1,354	1,425	5%	4%
Other Computer Related Services (541519)	985	1,299	32%	3%
Local Government, Excluding Education and Hospitals (903999)	740	770	4%	2%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715)	695	753	8%	2%
Wired Telecommunications Carriers (517311)	695	595	-14%	2%
Colleges, Universities, and Professional Schools (State Government) (902612)	625	651	4%	2%
Temporary Help Services (561320)	513	528	3%	1%
Colleges, Universities, and Professional Schools (611310)	490	542	11%	1%
Research and Development in Biotechnology (except Nanobiotechnology) (541714)	432	572	32%	1%
Engineering Services (541330)	379	409	8%	1%
Commercial Banking (522110)	378	396	5%	1%

Source: EMSI 2020.1

Table 6. Top Employers Posting Cybersecurity Analyst Occupations in Bay Region and East Bay Sub-Region (July 2019 - June 2020)

Employer	Bay	Employer	Bay	Employer	East Bay
Wells Fargo	297	Oracle	106	Wells Fargo	80
Apple Inc.	290	Palo Alto Networks	102	Facebook	51
Amazon	258	Xoriant Inc	96	Pacific Gas and Electric Co	48
Vmware Incorporated	237	Salesforce	94	Lawrence Livermore National Laboratory	48
Facebook	217	Splunk	91	UC Berkeley	45
Deloitte	216	Nsys Design Systems	90	Tesla	43
Cisco Systems Inc	215	KPMG	85	UC Office Of The President	39
Google Inc.	175	NTT Data	79	Anthem Blue Cross	37
Accenture	163	Intelliswift Software	78	Amazon	36
IBM	161	Allied Universal	78	Kaiser Permanente	34
Lockheed Martin Corp	154	Verizon Communications Inc	72	Workday, Inc	32
Pacific Gas and Electric Co	139	Northrop Grumman	70	Tesla Motors	32
Infobahn Softworld Inc	137	Infoobjects Inc	69	Profile500 Corporation	28

Nvidia Corporation	119	Idc Technologies	68	Matchpoint Solutions Inc	27
Microsoft Corporation	117	SAP	66	Lucid Motors Inc	27
Wipro	113	Virtusa	64	Albertsons	26
Anthem Blue Cross	109	Splunk, Inc	62	K Tek Resourcing LLC	25

Source: Burning Glass

Educational Supply

There are three (3) community colleges in the Bay Region issuing 71 awards on average annually (last 3 years ending 2018-19) on TOP 0708.00-Computer Infrastructure and Support. There are two colleges in the East Bay Sub-Region issuing 12 awards on average annually (last 3 years) on this TOP code.

There are five (5) Other Educational Institutions in the Bay Region issuing 53 awards on average annually (last 3 years ending 2016-17) on TOP 0708.00-Computer Infrastructure and Support. There are three (3) Other Educational Institutions in the East Bay Sub-Region issuing 48 awards on average annually (last 3 years) on this TOP code.

There are four (4) institutions in the Bay Region issuing 87 Bachelor's Degrees on average annually (last 3 years ending 2016-17) on TOP 0708.00-Computer Infrastructure and Support. There is one (1) institution in the East Bay Sub-Region issuing seven (7) Bachelor's Degrees on average annually (last 3 years ending 2016-17) on this TOP code.

Table 7a. Community College Awards on TOP 0708.00-Computer Infrastructure and Support in Bay Region

College	Sub-Region	Associate s	Certificate 18+ Units	Certificate Low Unit	Total
Los Medanos	East Bay	6		5	11
Ohlone	East Bay			1	1
San Francisco	Mid-Peninsula	46		13	59
Total Bay Region		52		19	71
Total East Bay Sub-Region		6		6	12

Source: Data Mart

Note: The annual average for awards is 2016-17 to 2018-19.

Table 7b. Other Educational Institutions Awards on TOP 0708.00-Computer Infrastructure and Support in Bay Region

College	Sub-Region	Associate Degree	Award < 1 academic yr	Total
Academy of Art University	Mid-Peninsula	4		4
Golden Gate University-San Francisco	Mid-Peninsula		1	1
ITT Technical Institute-Concord	East Bay	6		6
ITT Technical Institute-Oakland	East Bay	4		4
Unitek College	East Bay		38	38
Total Bay Region		14	39	53
Total East Bay Sub-Region		10	38	48

Source: Data Mart

Note: The annual average for awards is 2014-15 to 2016-17.

Table 7c. Bachelor's Degree Awards on TOP 0708.00-Computer Infrastructure and Support in Bay Region

College	Sub-Region	Bachelor's Degree
Academy of Art University	Mid-Peninsula	22
Cogswell College	Silicon Valley	3

ITT Technical Institute-Concord	East Bay	7
University of California-Santa Cruz	Santa Cruz & Monterey	55
Total Bay Region		87
Total East Bay Sub-Region		7

Source: Data Mart

Note: The annual average for awards is 2014-15 to 2016-17.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 4,059 annual openings for the Cybersecurity Analyst occupational cluster and 211 annual (3-year average) awards for an annual undersupply of 3,848 students. In the East Bay Sub-Region, there is also a gap with 610 annual openings and 67 annual (3-year average) awards for an annual undersupply of 543 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0708.00-Computer Infrastructure and Support

2015-16	Bay (All CTE Programs)	Las Positas College (All CTE Programs)	State (0708.00)	Bay (0708.00)	East Bay (0708.00)	Las Positas College (0708.00)
% Employed Four Quarters After Exit	74%	75%	66%	72%	76%	74%
Median Quarterly Earnings Two Quarters After Exit	\$10,550	\$10,000	\$10,986	\$13,156	\$12,118	\$10,629
Median % Change in Earnings	46%	44%	37%	47%	35%	35%
% of Students Earning a Living Wage	63%	64%	62%	68%	75%	75%

Source: Launchboard Pipeline (version available on (8/3/20))

Skills, Certifications and Education

Table 9. Top Skills for Cybersecurity Analyst Occupations in Bay Region (July 2019 - June 2020)

Skill	Postings	Skill	Postings	Skill	Postings
Python	11,197	Pipeline (Computing)	3,179	Database Administration	2,225
SQL	9,729	Customer Service	3,176	DevOps	2,194
Linux	7,444	Network Engineering	3,087	PERL Scripting Language	2,143
Java	6,031	Information Systems	2,923	Shell Scripting	2,081
Information Security	4,739	Technical Support	2,736	Virtualization	2,051
Extraction Transformation and Loading (ETL)	4,676	Software Engineering	2,629	Microsoft Active Directory	2,039
System Administration	4,499	Apache Kafka	2,608	Data Modeling	1,961
Oracle	4,254	Domain Name System (DNS)	2,564	Wide Area Network (WAN)	1,911
Big Data	4,195	VMware	2,514	Machine Learning	1,887
Apache Hadoop	3,929	Network Security	2,510	Scheduling	1,879
UNIX	3,779	Apache Hive	2,491	Routers	1,874
Cisco	3,671	Transmission Control Protocol / Internet Protocol (TCP / IP)	2,450	Bash	1,841
Project Management	3,636	Data Science	2,406	Cryptography	1,810
Software Development	3,409	Scala	2,332	NoSQL	1,797
Data Warehousing	3,296	Performance tuning	2,279	Apache Webserver	1,794

Source: Burning Glass

Table 10. Certifications for Cybersecurity Analyst Occupations in Bay Region (July 2019 - June 2020)

Note: 79% 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)	2,597	Certified in Risk and Information Systems Control	469
Certified Information Systems Auditor (CISA)	1,241	Microsoft Certified Solutions Expert (MCSE)	371
Cisco Certified Network Associate (CCNA)	1,133	Microsoft Certified Solutions Associate	338
SANS/GIAC Certification	1,097	Project Management Certification	331
Cisco Certified Network Professional (CCNP)	1,072	Cisco Certified Security Professional	305
Certified Information Security Manager (CISM)	1,002	GIAC Certified Incident Handler (GCIH)	283
IT Infrastructure Library (ITIL) Certification	874	GIAC Security Essentials (GSEC)	251
Security Clearance	717	ITIL Certification	236
CompTIA Security+	675	CompTIA Network+	230
Information Systems Certification	644	Certified Salesforce Administrator	204
Driver's License	625	GIAC Certified Intrusion Analyst	186
Cisco Certified Internetwork Expert (CCIE)	571	Systems Security Certified Practitioner	173

Source: Burning Glass

Table 11. Education Requirements for Cybersecurity Analyst Occupations in Bay Region

Note: 50% 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	1,083	6%
Associate Degree	492	3%
Bachelor's Degree or Higher	15,739	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/
 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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