C·O·E CENTERS OF EXCELLENCE FOR LABOR MARKET RESEARCH

Labor Market Analysis: 0702.00/Computer Information Systems

Information Technology Cybersecurity **-** *Certificate requiring 16 to < 30 semester units*

Los Angeles Center of Excellence, October 2023

Summary

Program Endorsement:	**Endorsed: All Criteria Met** ☒	**Endorsed: Some Criteria Met** ☐	**Not Endorsed** ☐

Program Endorsement Criteria		
Supply Gap:	Yes ☑ *(See comments below)*	No ☐
Living Wage: (Entry-Level, 25th)	Yes ☑	No ☐
Education:	Yes ☑	No ☐
Emerging Occupation(s)		
Yes ☐		No ☑

The Los Angeles Center of Excellence for Labor Market Research (LA COE) prepared this report to provide regional labor market supply and demand data related to three middle-skill occupations:

- ***Information Security Analysts*** **(15-1212)** Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies. 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.[1]
- ***Computer Network Support Specialists*** **(15-1231)** Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.[2]
- ***Network and Computer Systems Administrators*** **(15-1244)** Install, configure, and maintain an organization's local area network (LAN), wide area network (WAN), data communications network, operating systems, and physical and virtual servers. Perform system monitoring and verify the integrity and availability of hardware, network, and server resources and systems. Review system and application logs and verify completion of scheduled jobs, including system backups. Analyze network and server resource consumption and control user access. Install and upgrade software and maintain software licenses. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software.[3]

[1] Information Security Analysts: U.S. Bureau of Labor Statistics (bls.gov)
[2] Computer Support Specialists : U.S. Bureau of Labor Statistics (bls.gov)
[3] Network and Computer Systems Administrators (bls.gov)

Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.[4] Although two of the occupations in this report typically require a bachelor's degree, they are considered middle-skill because approximately one-third of workers in the field have completed some college, and associate degree or less education. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations.

Based on the available data, there does not appear to be a supply gap for the occupations of interest. However, the oversupply is with the COE's acceptable margin (25% over or under the number of annual openings) and is therefore considered "supply met" rather than a "supply gap." While this program does not meet the traditional supply/demand endorsement criteria, there may be demand for these workers from local employers that is not reflected in traditional labor market data. For this reason, real-time labor market data is included in this report as well – to provide a more nuanced view of the regional job market for these middle-skill occupations related to cyber and network security occupations. Furthermore, entry-level wages exceed the self-sufficiency standard wage in both Los Angeles and Orange counties, and more than one-third of current workers in the field have completed some college/associate degree or less education. **Therefore, due to all the criteria being met, the LA COE endorses this proposed program.** Detailed reasons include:

Demand:

- ***Supply Gap Criteria –*** Over the next five years, **1,590 jobs are projected to be available annually** in the region due to new job growth and replacements, **which is less than the three-year average of 1,966 awards conferred** by educational institutions in the region.
    - Although there are more awards conferred than job openings, the data suggests that the ***demand has been met for these occupations within the LA/OC region*** since the three-year average number of awards (supply) is within the COE's 25% margin of annual job openings (demand).
    - Over the past 12 months, there were **9,125 online job postings related to these cyber and network security occupations**. The highest number of job postings were for systems administrators, security engineers, cybersecurity engineers, Linux system administrators, and information security analysts.
- ***Living Wage Criteria –*** Within Los Angeles County, all three occupations have **entry-level wages <u>above</u> the self-sufficiency standard hourly wage** ($18.10/hour).[5]

[4] The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

[5] Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California. For more information, visit: http://selfsufficiencystandard.org/california.

- ***Educational Criteria –*** Within the greater LA/OC region, **73% of the annual job openings** for occupations related to cyber and network security **typically require a bachelor's degree.**
    - However, the national-level educational attainment data indicates **between 32% and 51% of workers in the field have completed some college/associate degree or less education.**

Supply:

- There are **27 community colleges** in the greater LA/OC region that issue awards related to cyber and network security, conferring an average of **1,073 awards annually** between 2019 and 2022.
- Between 2019 and 2021, there was an average of **893 awards conferred annually** in related training programs by non-community college institutions throughout the greater LA/OC region.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for these cyber and network security occupations. In the greater Los Angeles/Orange County region, the number of jobs related to these occupations is projected to increase by 6% through 2026. There will be nearly 1,600 job openings per year through 2027 due to job growth and replacements.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties[6]

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	13,178	13,948	770	6%	1,110
Orange	5,556	5,930	375	7%	480
Total	**18,734**	**19,879**	**1,145**	**6%**	**1,590**

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these cyber and network security occupations in Los Angeles County as they relate to the county's self-sufficiency standard wage. Orange County wages are included below in order to provide a complete analysis of the greater LA/OC region. Detailed wage information, by county, is included in Appendix A.

Los Angeles County

All three occupations have entry-level wages above the self-sufficiency standard wage for one adult ($18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between $27.10 and $47.38. Experienced workers can expect to earn wages between $45.54 and $73.33.

[6] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Exhibit 2: Earnings for Occupations in LA County

Occupation	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)	Median Annual Earnings*
Information Security Analysts (15-1212)	$47.38	$61.85	$73.33	$128,600
Computer Network Support Specialists (15-1231)	$27.10	$35.65	$45.54	$74,200
Network and Computer Systems Administrators (15-1244)	$36.47	$47.40	$61.51	$98,600

*Rounded to the nearest $100

Orange County

All three occupations have entry-level wages above the self-sufficiency standard wage for one adult ($20.63 in Orange County). Typical entry-level hourly wages are in a range between $26.74 and $45.67. Experienced workers can expect to earn wages between $45.00 and $70.68.

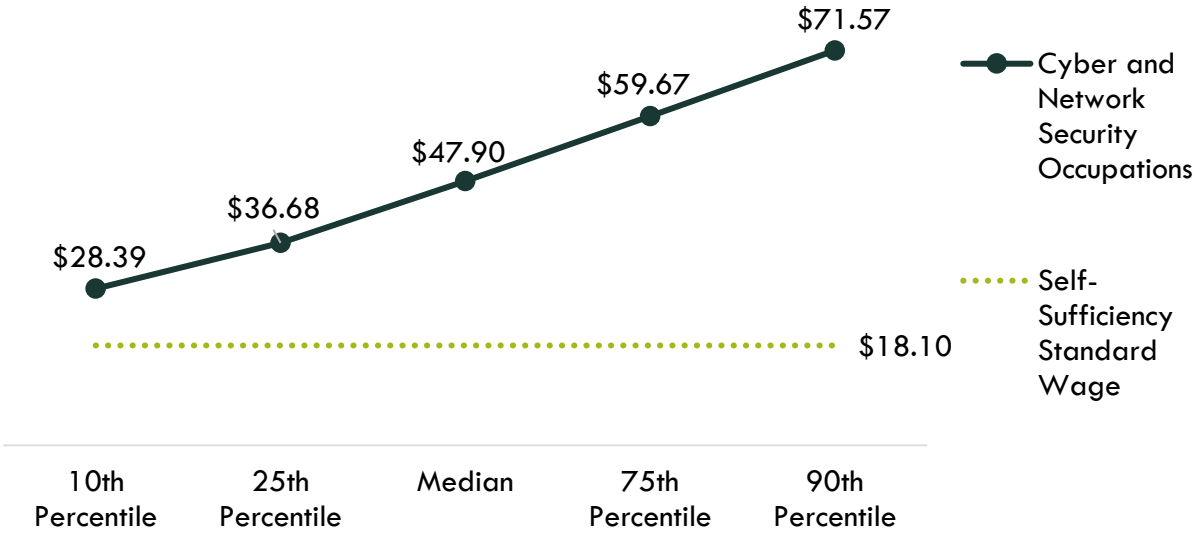
Exhibit 3: Earnings for Occupations in Orange County

Occupation	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)	Median Annual Earnings*
Information Security Analysts (15-1212)	$45.67	$59.61	$70.68	$124,000
Computer Network Support Specialists (15-1231)	$26.74	$35.20	$45.00	$73,200
Network and Computer Systems Administrators (15-1244)	$35.61	$46.28	$60.05	$96,300

*Rounded to the nearest $100

On average, the entry-level earnings for the occupations in this report are $36.68; this is above the living wage for one single adult in Los Angeles County ($18.10). Exhibit 4 shows the average wage for the occupations in this report, from entry-level to experienced workers.

Exhibit 4: Average Hourly Earnings for Cyber and Network Security Occupations in LA/OC



Job Postings

There were 9,125 online job postings related to cyber and network security occupations listed in the past 12 months. Exhibit 5 displays the number of job postings by occupation. The majority of job postings (50%) were *information security analysts*, followed by *network and computer systems administrators* (41%) and *computer network support specialists* (8%). The highest number of job postings were for systems administrators, security engineers, cybersecurity engineers, Linux system administrators, and information security analysts. The top skills were computer science, cyber security, auditing, operating systems, and firewalls. The top three employers, by number of job postings, in the region were Northrop Grumman, Boeing, and Bowman Williams.

Exhibit 5: Job postings by occupation (last 12 months)

Educational Attainment

The Bureau of Labor Statistics (BLS) lists the following typical entry-level education levels for the occupations in this report:

- **Bachelor's degree:** *Information security analysts; Network and computer systems administrators*
- **Associate degree:** *Computer network support specialists*

In the greater LA/OC region, the majority of annual job openings (73%) typically require a bachelor's degree. However, the national-level educational attainment data indicates between

32% and 51% of workers in the field have completed some college/associate degree or less education. Of the 67% of cyber and network security job postings listing a minimum education requirement in the greater Los Angeles/Orange County region, 15% (918) requested high school or vocational training, 6% (391) requested an associate degree, and 79% (4,783) requested a bachelor's degree.

Educational Supply

Community College Supply

Exhibit 6 shows the annual and three-year average number of awards conferred by community colleges in programs that have historically trained for the occupations of interest. The colleges with the most completions in the region are Long Beach, Mt. San Antonio, and Coastline.

Exhibit 6: Regional community college awards (certificates and degrees), 2019-2022

TOP	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
0701.00	Information Technology, General	East LA	10	4	30	15
		Glendale	-	3	17	7
		LA Harbor	-	1	2	1
		LA Mission	3	1	4	3
		LA Southwest	-	2	12	5
		Long Beach	64	106	88	86
		Mt San Antonio	90	49	23	54
		Santa Monica	-	1	-	0
		West LA	5	-	6	4
		LA Subtotal	**172**	**167**	**182**	**174**
		Santa Ana	-	3	9	4
		OC Subtotal	**-**	**3**	**9**	**4**
Supply Subtotal/Average			**172**	**170**	**191**	**178**
0702.00	Computer Information Systems	Citrus	8	4	6	6
		Compton	-	-	12	4
		East LA	15	23	11	16
		El Camino	21	11	28	20
		Glendale	5	6	8	6
		LA City	1	4	3	3
		LA Harbor	-	-	1	0
		LA Mission	1	1	1	1
		LA Southwest	-	-	21	7
		LA Trade-Tech	20	15	17	17
		Long Beach	-	3	-	1

TOP	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
		Mt San Antonio	79	6	68	51
		Rio Hondo	10	6	15	10
		West LA	10	9	14	11
		LA Subtotal	**170**	**88**	**205**	**154**
		Coastline	-	-	2	1
		Cypress	4	-	-	1
		Fullerton	11	31	49	30
		Irvine	2	-	-	1
		Orange Coast	2	-	1	1
		Saddleback	-	1	-	0
		Santa Ana	2	16	18	12
		Santiago Canyon	4	1	1	2
		OC Subtotal	**25**	**49**	**71**	**48**
		Supply Subtotal/Average	**195**	**137**	**276**	**203**
0708.00	Computer Infrastructure and Support	Cerritos	4	4	9	6
		East LA	-	-	3	1
		El Camino	-	-	5	2
		Glendale	3	4	11	6
		LA City	3	5	12	7
		LA Harbor	1	1	2	1
		LA Mission	12	17	32	20
		LA Valley	2	4	3	3
		Long Beach	8	8	2	6
		Mt San Antonio	24	24	36	28
		Pasadena	1	24	8	11
		Rio Hondo	10	11	19	13
		West LA	15	16	7	13
		LA Subtotal	**83**	**118**	**149**	**117**
		Coastline	46	73	91	70
		Cypress	3	1	1	2
		Orange Coast	7	5	7	6
		Saddleback	-	3	13	5
		Santa Ana	-	27	14	14
		OC Subtotal	**56**	**109**	**126**	**97**
		Supply Subtotal/Average	**139**	**227**	**275**	**214**

TOP	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
0708.10	Computer Networking	Cerritos	9	8	6	8
		Glendale	3	-	2	2
		LA City	-	4	8	4
		LA Pierce	20	12	19	17
		Long Beach	47	48	52	49
		Mt San Antonio	11	4	25	13
		Rio Hondo	7	2	5	5
		West LA	48	58	24	43
		LA Subtotal	**145**	**136**	**141**	**141**
		Coastline	59	92	49	67
		Cypress	95	61	71	76
		Fullerton	-	1	-	0
		Irvine	21	10	18	16
		Saddleback	21	19	15	18
		Santa Ana	12	23	45	27
		OC Subtotal	**339**	**345**	**353**	**342**
Supply Subtotal/Average			**353**	**342**	**339**	**345**
0708.20	Computer Support	Citrus	1	1	4	2
		Glendale	7	2	7	5
		LA Pierce	8	6	6	7
		LA Valley	-	1	-	0
		Long Beach	14	40	33	29
		Pasadena	30	34	12	25
		LA Subtotal	**60**	**84**	**62**	**69**
		Cypress	5	3	13	7
		OC Subtotal	**5**	**3**	**13**	**7**
Supply Subtotal/Average			**65**	**87**	**75**	**76**
0709.00	World Wide Web Administration	Cerritos	-	-	3	1
		Glendale	7	10	7	8
		LA Pierce	-	2	-	1
		Long Beach	24	34	44	34
		Santa Monica	-	16	-	5
		West LA	9	6	7	7
		LA Subtotal	**40**	**68**	**61**	**56**
		Fullerton	-	1	-	0

TOP	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
		Saddleback	2	2	3	2
		OC Subtotal	**2**	**3**	**3**	**3**
		Supply Subtotal/Average	**42**	**71**	**64**	**59**
		Supply Total/Average	**966**	**1,034**	**1,220**	**1,073**

Non-Community College Supply

For a comprehensive regional supply analysis, it is important to consider the supply from other institutions in the region that provide training programs for cyber and network security occupations. Exhibit 7 shows the annual and three-year average number of awards conferred by these institutions in relevant programs. Due to different data collection periods, the most recent three-year period of available data is from 2019 to 2021. Between 2019 and 2021, non-community college institutions in the region conferred an average of 893 bachelor's and sub-baccalaureate awards. Bachelor's degrees are included since two of the occupations in this report typically require a bachelor's degree. Sub-baccalaureate awards include associate degrees, postsecondary awards, and other academic awards.

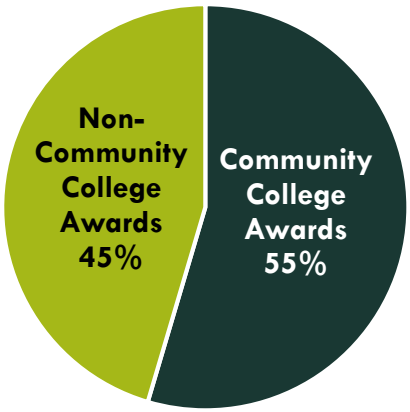
Exhibit 7: Regional non-community college awards, 2019-2021

CIP	Program	Institution	2019-20 Awards	2020-21 Awards	2-Year Average
11.0101	Computer and Information Sciences, General	Azusa Pacific Univ.	21	25	23
		Chapman University	18	23	21
		LA Pacific College	6	2	4
		Loyola Marymount Univ.	27	45	36
		Pitzer College	-	1	1
		The Master's University and Seminary	11	5	8
		UC-Irvine	-	1	1
		University of La Verne	23	36	30
		University of Massachusetts Global	30	36	33
		University of the People	203	292	248
11.0103	Information Technology	Brand College	13	17	15
		CA Intercontinental Univ.	2	-	1
		CSU-Dominguez Hills	4	10	7
		CSU-Los Angeles	166	116	141
		CSU-Northridge	29	51	40
		Platt College-Anaheim	15	17	16
		Platt College-LA	12	6	9

CIP	Program	Institution	2019-20 Awards	2020-21 Awards	2-Year Average
		University of La Verne	2	3	3
11.0199	Computer and Information Sciences, Other	CSU-Dominguez Hills	65	55	60
		CSU-Northridge	73	99	86
11.0901	Computer Systems Networking and Telecommunications	Brand College	2	-	1
11.1001	Network and System Administration/ Administrator	ABCO Technology	25	40	33
		Brand College	9	16	13
		CA Intercontinental Univ.	1	1	1
11.1003	Computer and Information Systems Security/Auditing/ Information Assurance	Learnet Academy	5	4	5
11.1004	Web/Multimedia Management and Webmaster	ABCO Technology	37	35	36
		LA Pacific College	1	1	1
11.1006	Computer Support Specialist	Southern California Institute of Technology	26	17	22
15.1202	Computer/Computer Systems Technology/ Technician	Learnet Academy	4	2	3
		Supply Total/Average	**830**	**956**	**893**

Exhibit 8 shows the proportion of community college awards conferred in LA/OC compared to the number of non-community college awards for the programs in this report. Just over half of awards conferred in these programs are awarded by community colleges in the LA/OC region.

Exhibit 8: Community College Awards Compared to Non-Community College Awards in LA/OC Region, 3-Year Average



Appendix A: Occupational demand and wage data by county

Exhibit 9. Los Angeles County

Occupation (SOC)	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Information Security Analysts (15-1212)	2,604	3,012	408	16%	282	$47.38	$61.85	$73.33
Computer Network Support Specialists (15-1231)	3,373	3,534	161	5%	298	$27.10	$35.65	$45.54
Network and Computer Systems Administrators (15-1244)	7,201	7,402	201	3%	530	$36.47	$47.40	$61.51
Total	**13,178**	**13,948**	**770**	**6%**	**1,110**	**-**	**-**	**-**

Exhibit 10. Orange County

Occupation (SOC)	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Information Security Analysts (15-1212)	1,181	1,386	205	17%	133	$45.67	$59.61	$70.68
Computer Network Support Specialists (15-1231)	1,415	1,489	74	5%	126	$26.74	$35.20	$45.00
Network and Computer Systems Administrators (15-1244)	2,959	3,056	96	3%	221	$35.61	$46.28	$60.05
Total	**5,556**	**5,930**	**375**	**7%**	**480**	**-**	**-**	**-**

Exhibit 11. Los Angeles and Orange Counties

Occupation (SOC)	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	% Age 55 and older*	Typical Entry-Level Education
Information Security Analysts (15-1212)	3,785	4,397	612	16%	415	17%	Bachelor's degree
Computer Network Support Specialists (15-1231)	4,788	5,023	235	5%	424	17%	Associate degree
Network and Computer Systems Administrators (15-1244)	10,160	10,458	297	3%	751	15%	Bachelor's degree
Total	**18,734**	**19,879**	**1,145**	**6%**	**1,590**	**-**	**-**

*The average percentage of workers age 55 and older across all occupations in the greater LA/OC region is 27%. These occupations have a smaller share of older workers, which typically indicates fewer replacements needs to offset the amount of impending retirements.

Appendix B: Sources

- O*NET Online
- Lightcast (formerly Emsi)
- Bureau of Labor Statistics (BLS)
- California Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- Self-Sufficiency Standard at the Center for Women's Welfare, University of Washington
- Chancellor's Office Curriculum Inventory (COCI 2.0)

For more information, please contact:

Luke Meyer, Director
Los Angeles Center of Excellence
Lmeyer7@mtsac.edu

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