Program Recommendation

This report was compiled by the South Central Coast[1] Center of Excellence to provide regional labor market data for the program recommendation – Computer Infrastructure and Support. This report can help determine whether there is demand in the local labor market that is not being met by the supply from programs of study (CCC and non-CCC) that align with this occupation group.

Key Findings

- In the South Central Coast region, **the number of jobs related to Computer Infrastructure and Support are expected to increase** for Information Security Analysts and Computer and Information Research Scientists, while **remaining steady** for the other three related occupations.

- Computer Infrastructure and Support is anticipated to experience a **medium risk of automation** for Computer Network Support Specialists and a **low risk of automation for** all four other related occupations.

- In 2020 there were 1,933 regional completions in programs related to the occupations identified as related to Computer Infrastructure and Support and 956 openings, indicating an **oversupply**.

- Typical entry-level education ranges from **an Associate's degree** for Computer Network Support Specialists, to a **Bachelor's degree** for Computer and Information System Managers, Information Security Analysts, and Computer Occupations, All Other; and a **Master's degree** for Computer and Information Research Scientists.

- Completers of Computer Infrastructure and Support programs from the 2018-2019 academic year in the South Central Coast region had a **median annual wage upon completion of $41,676.**

- 54% of students are **employed within a year** after completing a program.

- 55% of students **attained a living wage** within a year of completion.

- Completers experienced an average of +**22%** change in earnings after exiting.

- 70% of students were **part-time**, 10% **skill builders**, 34% **first-generation**, and 73% **economically disadvantaged.**

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[1] The South Central Coast Region consists of San Luis Obispo County, Santa Barbara County, Ventura County, and the following cities from North Los Angeles County: Canyon Country, Castaic, Lake Hughes, Lancaster, Littlerock, Llano, Newhall, Palmdale, Pearblossom, Santa Clarita, Stevenson Ranch, and Valencia.

Occupation Codes and Descriptions

There are five occupations in the standard occupational classification (SOC) system that were identified as related to Computer Infrastructure and Support for this analysis. The occupation titles and descriptions, as well as reported job titles, are included in Exhibit 1.

Exhibit 1 – Occupation, description, and sample job titles

SOC Code	Title	Description	Sample of Reported Job Titles
11-3021	**Computer and Information System Managers**	Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.	Application Development Director, Computing Services Director, Data Processing Manager, Information Systems Director (IS Director), Information Systems Manager (IS Manager), Information Systems Supervisor (IS Supervisor), Information Technology Director (IT Director), Information Technology Manager, Management Information Systems Director (MIS Director), Technical Services Manager
15-1212	**Information Security Analysts**	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.	Information Security Officer, Information Security Specialist, Information Systems Security Analyst, Information Systems Security Officer (ISSO), Information Technology Security Analyst (IT Security Analyst), Network Security Analyst, Security Analyst, Systems Analyst
15-1221	**Computer and Information Research Scientists**	Conduct research into fundamental computer and information science as theorists, designers, or inventors. Develop solutions to problems in the field of computer hardware and software.	Computer Scientist, Computer Specialist, Control Systems Computer Scientist, Research Scientist, Scientific Programmer Analyst
15-1231	**Computer Network Support Specialists**	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.	Computer Network Specialist, IT Consultant (Information Technology Consultant), Network Specialist, Network Support Specialist, Network Technician Analyst, Network Technician, Personal Computer Network Analyst, Systems Analyst

SOC Code	Title	Description	Sample of Reported Job Titles
15-1299	**Computer Occupations, All Other**	All computer occupations not listed separately.	--

Source: O*NET Online

Current and Future Employment

In the South Central Coast region, the number of jobs related to Computer Infrastructure and Support are expected to increase for Information Security Analysts and Computer and Information Research Scientists, while remaining steady for the other three related occupations.

Exhibit 2 – Five-year projections for Computer Infrastructure and Support in the South Central Coast region

SOC	Occupation	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change
11-3021	**Computer and Information System Managers**	2,587	2,650	63	2%
15-1212	**Information Security Analysts**	475	555	80	17%
15-1221	**Computer and Information Research Scientists**	404	434	29	7%
15-1231	**Computer Network Support Specialists**	639	661	21	3%
15-1299	**Computer Occupations, All Other**	3,369	3,438	69	2%

Source: Economic Modeling Specialists International (EMSI)

Earnings

Exhibit 3 contains hourly wages and annual average earnings for these occupations. Entry-level hourly earnings are represented by the 25th percentile of wages, median hourly earnings are represented by the 50th percentile of wages, and experienced hourly earnings are represented by the 75th percentile of wages, demonstrating various levels of employment.

Exhibit 3 – Earnings for Computer Infrastructure and Support in the South Central Coast region

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
11-3021	**Computer and Information System Managers**	$60.51	$77.66	$97.86
15-1212	**Information Security Analysts**	$37.40	$55.95	$63.78
15-1221	**Computer and Information Research Scientists**	$42.85	$59.33	$74.29
15-1231	**Computer Network Support Specialists**	$26.27	$32.98	$41.76
15-1299	**Computer Occupations, All Other**	$29.02	$42.99	$60.75

Source: Economic Modeling Specialists International (EMSI)

Exhibit 3b: Earnings for Computer Infrastructure and Support in the South Central Coast Region

Bar chart showing:
- Living Wage: $17.38
- 10th Percentile: $30.00
- 25th Percentile: $39.21
- Median: $53.78
- 75th Percentile: $67.69
- 90th Percentile: $86.01

Source: Family Needs Calculator (Living wage is based on Single Adult household with no children); Economic Modeling Specialists International (EMSI)

Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is looking for computer support workers, and what they are looking for in potential candidates. To identify job postings related to Computer Infrastructure and Support the following standard occupational classifications were used:

11-3021	Computer and Information System Managers
15-1212	Information Security Analysts
15-1221	Computer and Information Research Scientists
15-1231	Computer Network Support Specialists
15-1299	Computer Occupations, All Other

Top Occupations

In 2021, there were 4,573 employer postings for the occupations related to Computer Infrastructure and Support.

Exhibit 4 – Top occupations in job postings and risk of automation tables

SOC Code	Occupation	Job Postings, Full Year 2021
15-1299	**Computer Occupations, All Other**	3,495
15-1212	**Information Security Analysts**	581
15-1221	**Computer and Information Research Scientists**	196
11-3021	**Computer and Information Systems Managers**	184
15-1231	**Computer Network Support Specialists**	107

Source: Labor Insight/Jobs (Burning Glass)

SOC Code	Occupation	Risk of Automation
15-1299	**Computer Occupations, All Other**	Low
15-1212	**Information Security Analysts**	Low
15-1221	**Computer and Information Research Scientists**	Low
11-3021	**Computer and Information Systems Managers**	Low
15-1231	**Computer Network Support Specialists**	Medium

Source: Labor Insight/Jobs (Burning Glass)

Top Titles

The top job titles for employers posting ads for jobs related to Computer Infrastructure and Support are listed in Exhibit 5. Data Analyst and Systems Engineer are mentioned most often (56 postings).

Exhibit 5 –Job Titles

Title	Job Postings, Full Year 2021
Data Analyst	56
Systems Engineer	56
Project Manager	35
Senior Systems Engineer	33
Data Scientist	32

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 6 lists the major employers hiring professionals in the Computer Infrastructure and Support field. The top employer posting job ads was Anthem Blue Cross. The top worksite cities in the region for these occupations were Thousand Oaks, Santa Barbara, Palmdale, Santa Clarita, and Goleta.

Exhibit 6 – Top Employers (n=3,162)

Employer	Job Postings, Full Year 2021
Anthem Blue Cross	291
Raytheon	224
Northrop Grumman	207
Lockheed Martin Corporation	132
Amgen	105

Source: Labor Insight/Jobs (Burning Glass)

Skills

The tables in Exhibit 7 list employers' most commonly requested skills in job postings related to Computer Infrastructure and Support. Project Management is the most sought-after specialized skill, followed by Systems Engineering, and SQL. Communication Skills, Teamwork/Collaboration, and Planning were the most requested baseline skills. Microsoft Excel, Microsoft Office, and SQL were the most commonly requested software and programming skills.

Exhibit 7 –Specialized Skills (n= 35,509)

Skills	Job Postings, Full Year 2021
Project Management	913
Systems Engineering	750
SQL	681
Scheduling	614
Python	561
Information Systems	557
Data Analysis	529
Budgeting	492
Software Development	479
Quality Assurance and Control	434

Source: Labor Insight/Jobs (Burning Glass)

Baseline Skills (n= 16,523)

Skills	Job Postings, Full Year 2021
Communication Skills	1,801
Teamwork / Collaboration	1,333
Planning	1,006
Problem Solving	934
Microsoft Excel	845
Research	793
Microsoft Office	719
Troubleshooting	653
Writing	637
Detail-Oriented	634

Source: Labor Insight/Jobs (Burning Glass)

Software and Programming Skills (n= 15,636)

Skills	Job Postings, Full Year 2021
Microsoft Excel	845
Microsoft Office	719
SQL	681
Python	561
Software Development	479
Microsoft Powerpoint	384
SAP	361
Microsoft Word	317
Linux	311
Software Engineering	287

Source: Labor Insight/Jobs (Burning Glass)

The table below lists the skill clusters most in demand for Computer Infrastructure and Support occupations.

Skill Clusters in Demand (n= 37,494)

Skill Cluster	Job Postings, Full Year 2021
Information Technology: System Design and Implementation	1,527
Business: Project Management	1,110
Information Technology: Microsoft Office and Productivity Tools	1,046
Information Technology: Software Development Principles	980
Business: Business Process and Analysis	807
Information Technology: SQL Databases and Programming	725
Information Technology: Cybersecurity	719
Customer and Client Support: Basic Customer Service	640
Administration: Scheduling	614
Analysis: Data Analysis	598

Source: Labor Insight/Jobs (Burning Glass)

Industry Concentration

Exhibit 8 shows the industries with the most Computer Infrastructure and Support postings in the South Central Coast. Note: 30% of records have been excluded because they do not include an industry. As a result, the chart below may not be representative of the full sample.

Exhibit 8 – Industries employing the most in the Computer Infrastructure and Support field, 2021

Industry	Occupation Group Jobs in Industry	% of Occupation Group in Industry
Manufacturing	1,098	34%
Professional, Scientific, and Technical Services	749	23%
Finance and Insurance	465	15%
Public Administration	156	5%
Educational Services	125	4%

Source: Labor Insight/Jobs (Burning Glass)

Certifications

Exhibit 9 lists the most in-demand certifications in the Computer Infrastructure and Support field. The top requested certification in job postings was Security Clearance.

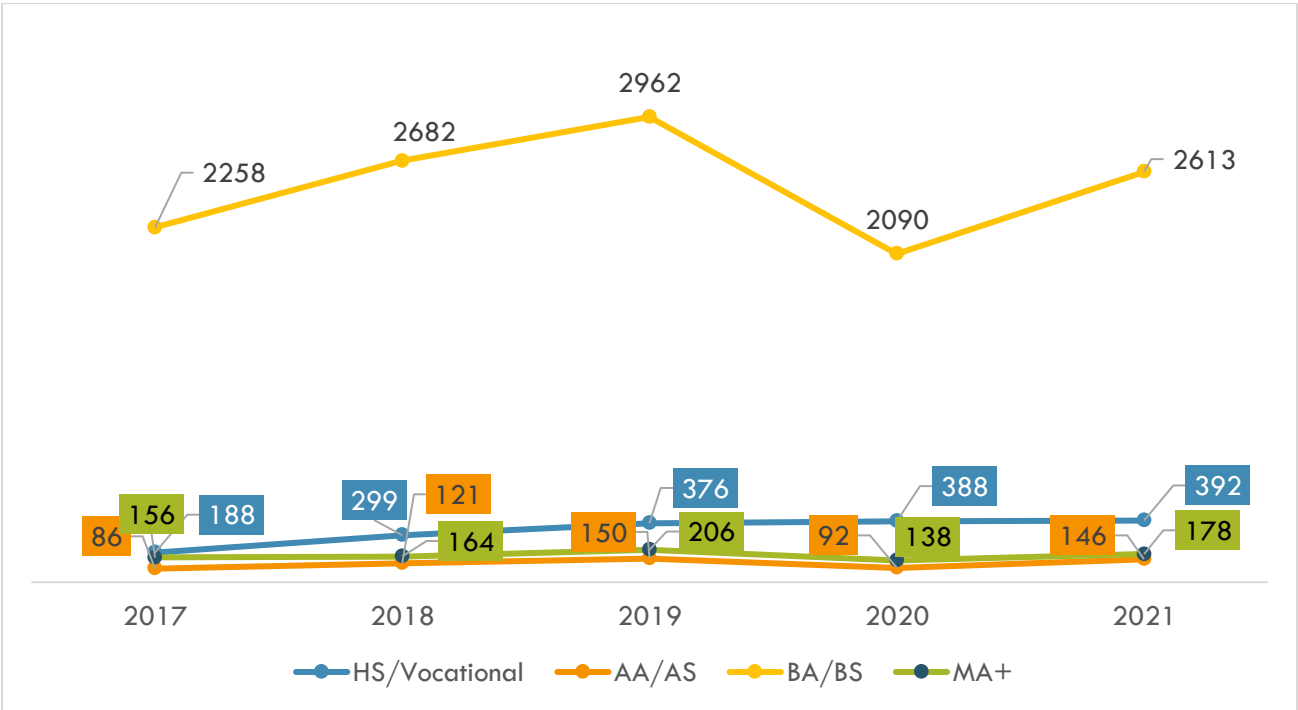**Exhibit 9 – Certifications (n= 3,427)**

Skills	Job Postings, Full Year 2021
Security Clearance	864
Certified Information Systems Security Professional (CISSP)	281
CompTIA Security+	227
Driver's License	183
Project Management Certification	140
Certified Information Security Manager (CISM)	118
SANS/GIAC Certification	105
Cisco Certified Network Associate (CCNA)	105
Project Management Professional (PMP)	103
IT Infrastructure Library (ITIL) Certification	79

Source: Labor Insight/Jobs (Burning Glass)

Job Postings - Minimum Educational Attainment – Change Over Time

Exhibit 10 displays the change in job advertisements over the last five years for Computer Infrastructure and Support, according to the minimum advertised education. In 2021, there were 3,329 total job ads posted, with 392 of them requiring a high school diploma or vocational degree and the majority, 2,613, suggesting a minimum educational attainment of BA/BS for this occupational grouping.

Exhibit 10 – Educational Demand, Minimum Advertised

Source: Labor Insight / Jobs (Burning Glass)

Job Postings – Proportion of Job Postings by Minimum Educational Attainment Required

To gauge employer preference for candidates with particular education levels, the proportion of job postings by minimum advertised education appears in Exhibit 11. Employers posting job ads for this group of occupations under Computer Infrastructure and Support have frequently sought candidates with a bachelor's degree.

Exhibit 11 – Occupational Demand by Education, Minimum Advertised

Minimum Education Requirement	2017	2018	2019	2020	2021
HS Diploma / Vocational Training	7%	9%	10%	14%	12%
Associate Degree	3%	4%	4%	3%	4%
Bachelor's Degree	84%	82%	80%	77%	79%
Graduate Degree	6%	5%	6%	5%	5%

Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 12 shows the typical entry-level education requirement for the occupations of interest, along with the typical on-the-job training needed to attain competency in the occupation.

Exhibit 12 – Education and Training Requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training
11-3021	Computer and Information System Managers	Bachelor's degree	None
15-1212	Information Security Analysts	Bachelor's degree	None
15-1221	Computer and Information Research Scientists	Master's degree	None
15-1231	Computer Network Support Specialists	Associate's degree	None
15-1299	Computer Occupations, All Other	Bachelor's degree	None

Source: Bureau of Labor Statistics Employment Projections (Educational Attainment)

Regional Completions and Openings

There were 1,933 regional completions (2020) and 956 regional openings (2020) in the South Central Coast region in programs related to the occupations identified as aligned with Computer Infrastructure and Support.

Exhibit 13 – Completions and Openings

29 Regional Institutions had Related Programs (2020)	**1,933** Regional Completions (2020)	**956** Annual Openings (2020)

Source: Economic Modeling Specialists International (EMSI)

Related Programs

CIP Code	Program	Completions (2020)
11.0701	Computer Science	619
10.0304	Animation, Interactive Technology, Video Graphics, and Special Effects	190
14.0901	Computer Engineering, General	152
52.0101	Business/Commerce, General	140
11.0901	Computer Systems Networking and Telecommunications	129
45.0702	Geographic Information Science and Cartography	84
11.0103	Information Technology	78
51.0707	Health Information/Medical Records Technology/Technician	74
14.0903	Computer Software Engineering	61
52.0703	Small Business Administration/Management	51

Source: Economic Modeling Specialists International (EMSI)

CCC and Non-CCC Awards

Exhibit 14 below lists the number of completers from programs related to Computer Infrastructure and Support in the South Central Coast Region.

Exhibit 14 – CCC and Non-CCC Awards the South Central Coast Region, 2020

CCC Programs	Completers
College of the Canyons	179
Moorpark	119
Santa Barbara City College	153
Antelope Valley	135
Allan Hancock	90
Cuesta College	52
Oxnard	45
Non-CCC Programs	**Completers**
Cal Poly San Luis Obispo	390
UC Santa Barbara	339
CSU Channel Islands	89
California Lutheran University	158
The Master's University and Seminary	20
California Institute of the Arts	77
Larus College	37
Ventura Adult and Continuing Education	17
Westmont College	18
CET – Santa Maria	15

Source: Economic Modeling Specialists International (EMSI)

Student Outcomes

The CTE LaunchBoard provides student outcome data on the effectiveness of CTE programs. The following student outcome information was collected from exiters of regional Computer Infrastructure and Support Programs (TOP: 0708.00) for the 2018-19 academic year.

- Completers of Computer Infrastructure and Support programs from the 2018-2019 academic year in the South Central Coast region had a **median annual wage upon completion of $41,676.**

- 54% of students are **employed within a year** after completing a program.

- 55% of students **attained a living wage** within a year of completion.

- Completers experienced an average of +**22%** change in earnings after exiting.

- 70% of students were **part-time,** 10% **skill builders,** 34% **first-generation,** and 73% **economically disadvantaged.**

Sources

O*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, CTE LaunchBoard, Statewide CTE Outcomes Survey, Employment Development Department Unemployment Insurance Dataset

Notes

Data included in this analysis represent the labor market demand for relevant positions most closely related to Computer Infrastructure and Support. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study and can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions. All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.