Cloud Computing
(Computer Information Systems TOP: 0702)

July 2019

Prepared by the South Central Coast Center of Excellence for Labor Market Research

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 – Cloud Computing. 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 jobs related to the identified occupations under TOP 0702, Computer Information Systems, are expected to increase over the next five years.

- All related occupations are at a low risk of automation.

- In 2017 there were 998 regional completions in programs related to the occupations identified as related to Computer Information Systems and 1,313 openings, indicating an undersupply.

- Typical entry-level education ranges from Some college, no degree for Computer User Support Specialists to an associate's degree for Web Developers, to a bachelor's for Computer Systems Engineers/Architects and Software Developers, Applications.

- Completers of regional Computer Information Systems programs (TOP 0702) from the 2015-2016 academic year had a median annual wage upon completion of $32,002.

- 58% of students are earning a living.

- 73% of students are employed within a year after completing a program.

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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

Currently, there are four occupations in the standard occupational classification (SOC) system that have been identified as related to this certificate for Cloud Computing. 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
15-1132	**Software Developers, Applications**	Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. May supervise computer programmers.	Application Developer, Application Integration Engineer, Applications Developer, Computer Consultant, Information Technology Analyst (IT Analyst), Software Architect, Software Developer, Software Development Engineer, Software Engineer, Technical Consultant
15-1134	**Web Developers**	Design, create, and modify Web sites. Analyze user needs to implement Web site content, graphics, performance, and capacity. May integrate Web sites with other computer applications. May convert written, graphic, audio, and video components to compatible Web formats by using software designed to facilitate the creation of Web and multimedia content.	Designer, Technology Applications Engineer, Web Architect, Web Design Specialist, Web Designer, Web Developer, Web Development Director, Web Development Instructor, Webmaster
15-1151	**Computer User Support Specialists**	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.	Computer Specialist, Computer Support Specialist, Computer Technician, Desktop Support Technician, Help Desk Analyst, Help Desk Technician, Information Technology Specialist (IT Specialist), Network Technician, Support Specialist, Technical Support Specialist
15-1199.02	**Computer Systems Engineers/Architects**	Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions.	Architect, Electronic Data Interchange System Developer (EDI System Developer), Information Technology Architect (IT Architect), Network and Infrastructure Engineer, Network Engineer, Research Systems Architect, Solution Architect, System Architect, Systems Consultant, Systems Engineer

Source: O*NET Online

Current and Future Employment

In the South Central Coast region, the number of jobs related to Computer Information Systems are expected to increase over the next five years. Exhibit 2 contains detailed employment projection data for these occupations.

Exhibit 2 – Five-year projections for Computer Information Systems in the South Central Coast region

SOC	Occupation	2018 Jobs	2023 Jobs	2018-2023 Change	2018-2023 % Change
15-1132	Software Developers, Applications	3,258	3,811	553	17%
15-1134	Web Developers	1,058	1,137	79	7%
15-1151	Computer User Support Specialists	3,351	3,615	265	8%
15-1199	Computer Occupations, All Other (15-1199.02 Computer Systems Engineers/Architects)	2,756	2,854	98	4%

Source: Economic Modeling Specialists International (EMSI)

Earnings

In the South Central Coast region, the average wage for the listed occupations is $34.47 per hour.

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

Exhibit 3 – Earnings for Computer Information Systems in the South Central Coast region

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
15-1132	Software Developers, Applications	$32.65	$47.21	$65.55
15-1134	Web Developers	$16.98	$26.08	$40.14
15-1151	Computer User Support Specialists	$20.79	$26.66	$33.78
15-1199	Computer Occupations, All Other (15-1199.02 Computer Systems Engineers/Architects)	$28.78	$41.12	$54.83

Source: 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 employing computer information analysts, and what they are looking for in potential candidates. To identify job postings related to Computer Information Systems, the following standard occupational classifications were used:

15-1132	Software Developers, Applications
15-1134	Web Developers
15-1151	Computer User Support Specialists
15-1199.02	Computer Systems Engineers/Architects

Top Occupations

In 2018, there were 5,525 employer postings for these occupations related to Computer Information Systems.

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

SOC Code	Occupation	Job Postings, Full Year 2018
15-1132	Software Developers, Applications	2,790
15-1151	Computer User Support Specialists	1,125
15-1199.02	Computer Systems Engineers/Architects	938
15-1134	Web Developers	672

Source: Labor Insight/Jobs (Burning Glass)

SOC Code	Occupation	Risk of Automation
15-1132	Software Developers, Applications	Low
15-1151	Computer User Support Specialists	Low
15-1199.02	Computer Systems Engineers/Architects	Low
15-1134	Web Developers	Low

Source: Labor Insight/Jobs (Burning Glass)

Top Titles

The top job titles for employers posting ads for jobs related to Computer Information Systems are listed in Exhibit 5. Software Development Engineer is mentioned as the job title in 17% of all relevant job postings (948 postings).

Exhibit 5 –Job titles

Title	Job Postings, Full Year 2018
Software Development Engineer	948
Systems Engineer	281
.Net Developer	140
Software Developer	139
Senior Systems Engineer	133
Java Developer	94
Geek Squad Agent	76

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 6 lists the major employers hiring professionals in the Computer Information Systems field. The top employer posting job ads was Northrop Grumman. The top worksite cities in the region for these occupations were Santa Barbara, Thousand Oaks, Oxnard, Santa Clarita, and Palmdale.

Exhibit 6 – Top employers (n=3,034)

Employer	Job Postings, Full Year 2018
Northrop Grumman	136
Best Buy	114
Raytheon	100
Lockheed Martin	94
Amazon	55

Source: Labor Insight/Jobs (Burning Glass)

Skills

Software Engineering is the most sought after skill for employers hiring for these jobs related to Computer Information Systems.

Exhibit 7 –Job skills (n=5,171)

Skills	Job Postings, Full Year 2018
Software Engineering	1,354
Software Development	1,290
SQL	1,215
Javascript	1,163
Java	921

Source: Labor Insight/Jobs (Burning Glass)

Industry Concentration

Exhibit 8 shows the industries where most within this field are employed in the South Central Coast region. Note: 42% 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, 2018

Industry	Occupation Group Jobs in Industry	% of Occupation Group in Industry
Manufacturing	791	25%
Professional, Scientific, and Technical Services	707	22%
Administration and Support and Waste Management and Remediation Services	690	22%
Retail Trade	233	7%
Information	123	4%

Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 9 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 9 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training
15-1132	Software Developers, Applications	Bachelor's Degree	None
15-1134	Web Developers	Associate's Degree	None
15-1151	Computer User Support Specialists	Some college, no degree	None
15-1199.02	Computer Systems Engineers/Architects	Bachelor's Degree	None

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

Regional Completions and Openings

There were 998 regional completions (2017) and 1,313 regional openings (2017) in the South Central Coast region in programs related to the occupations identified as related to Computer Information Systems.

Exhibit 10 – Completions and Openings

16 Regional Institutions had Related Programs (2017)	**998** Regional Completions (2017)	**1,313** Annual Openings (2017)

Source: Economic Modeling Specialists International (EMSI)

Related Programs

CIP Code	Program	Completions (2017)
11.0701	Computer Science	499
14.0901	Computer Engineering, General	162
11.0901	Computer Systems Networking and Telecommunications	87
11.1003	Computer and Information Systems Security/Information Assurance	49
14.0903	Computer Software Engineering	48
11.0103	Information Technology	47
11.1006	Computer Support Specialist	34
11.0801	Web Page, Digital/Multimedia and Information Resources Design	18
11.1001	Network and System Administration/Administrator	17
11.0101	Computer and Information Sciences, General	15
11.0201	Computer Programming/Programmer, General	10
11.0401	Information Science/Studies	6
11.0804	Modeling, Virtual Environments and Simulations	6
11.0301	Data Processing and Data Processing Technology/Technician	0
11.1002	System, Networking, and LAN/WAN Management/Manager	0
11.1004	Web/Multimedia Management and Webmaster	0

Source: Economic Modeling Specialists International (EMSI)

Student Outcomes

The LaunchBoard provides student outcome data on the effectiveness of Career Education programs. The following student outcome information was collected from exiters of the Computer Information Systems program (TOP Code: 0702) in the South Central Coast region for the 2015-16 academic year.

- The median annual wage for students after exiting is $32,002
- Starting salary in the region for Computer User Support Specialists is $49,712
- 58% of students are earning a living wage
- 73% of students are employed within a year after completing a program
- Students who transfer and earn a bachelor's degree could pursue the following careers:
    - Computer Systems Analysts
    - Information Security Analysts

Source: CTE LaunchBoard

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 represents the labor market demand for positions most closely related to computer information systems. 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 should not be used to establish current job openings, because the numbers may include duplicate job postings or postings intended to gather a pool of applicants. Real-time labor market information 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.