Labor Market Analysis: 0702.00/Computer Information Systems
Full Stack Web Application Developer - *Certificate requiring 16 to fewer than 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 ☑	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 four IT occupations:

- *Computer Programmers (15-1251)* Create, modify, and test the code and scripts that allow computer applications to run. Work from specifications drawn up by software and web developers or other individuals. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.[1]

- *Software Developers (15-1252)* Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team.[2]

- *Web Developers (15-1254)* Develop and implement websites, web applications, application databases, and interactive web interfaces. Evaluate code to ensure that it is properly structured, meets industry standards, and is compatible with browsers and devices. Optimize website performance, scalability, and server-side code and processes. May develop website infrastructure and integrate websites with other computer applications. [3]

- *Web and Digital Interface Designers (15-1255)* Design digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes. May evaluate web design

---

[1] Computer Programmers (bls.gov)
[2] Software Developers, Quality Assurance Analysts, and Testers (bls.gov)
[3] Web Developers and Digital Designers (bls.gov)

following web and accessibility standards, and may analyze web use metrics and optimize websites for marketability and search engine ranking. May design and test interfaces that facilitate the human-computer interaction and maximize the usability of digital devices, websites, and software with a focus on aesthetics and design. May create graphics used in websites and manage website content and links.[4]

Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.[5] Although the occupations in this report typically require a bachelor's degree, they are included in this report because community colleges in the region offer training programs for these pathway occupations. 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 appears to be a supply gap for these web developer occupations in the region. While entry-level wages exceed the self-sufficiency standard wage in both Los Angeles and Orange counties, the Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education. **Therefore, due to some of the criteria being met, the LA COE endorses this proposed program.** Detailed reasons include:

Demand:

- *Supply Gap Criteria* – Over the next five years, **6,704 jobs are projected to be available annually** in the region due to new job growth and replacements, **which is more than the three-year average of 1,100 awards conferred** by educational institutions in the region.
  - **There were 3,658 job postings over the past 12 months that included the keyword "full stack".** The top titles listed on these job postings were full stack developers, full stack software engineers, software engineers, full stack engineers, and .net full stack developers.
- *Living Wage Criteria* – Within Los Angeles County, these four occupations have entry-level wages **above** the self-sufficiency standard hourly wage ($18.10/hour).[6]
- *Educational Criteria* – The Bureau of Labor Statistics (BLS) lists a **bachelor's degree** as the **typical entry-level education** for the occupations in this report.
  - Furthermore, the national-level educational attainment data indicates between **14% and 30% of workers in the field have completed some**

---

[4] Web Developers and Digital Designers: Occupational Outlook Handbook: : U.S. Bureau of Labor Statistics (bls.gov)
[5] 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.
[6] Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California. For more information, visit: http://selfsufficiencystandard.org/california.

college/associate degree or less education, while between 70% and 86% have completed a bachelor's degree or more education.

Supply:

- There are **28 community colleges** in the greater LA/OC region that issue awards related to web development, conferring an average of **780 awards annually** between 2019 and 2022.
- Between 2019 and 2021, there was an average of **320 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 web developer occupations. In the greater Los Angeles/Orange County region, the number of jobs related to these occupations is projected to increase by 10% through 2026. There will be more than 6,700 job openings per year through 2027 due to job growth and replacements.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties[7]

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	49,278	54,579	5,301	11%	4,628
Orange	22,904	25,095	2,191	10%	2,077
Total	**72,182**	**79,674**	**7,492**	**10%**	**6,704**

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these web developer 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 four occupations have entry-level wages <u>above</u> the self-sufficiency standard wage for one adult ($18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between $25.09 and $51.35. Experienced workers can expect to earn wages between $56.58 and $82.40.

---

[7] 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*
Computer Programmers (15-1251)	$33.79	$47.81	$62.45	$99,400
Software Developers (15-1252)	$51.35	$65.39	$82.40	$136,000
Web Developers (15-1254)	$25.09	$40.31	$56.58	$83,900
Web and Digital Interface Designers (15-1255)	$26.54	$35.68	$57.88	$74,200

*Rounded to the nearest $100

Orange County

All four occupations have entry-level wages <u>above</u> the self-sufficiency standard wage for one adult ($20.63 in Orange County). Typical entry-level hourly wages are in a range between $23.61 and $50.42. Experienced workers can expect to earn wages between $54.27 and $80.79.

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*
Computer Programmers (15-1251)	$33.54	$47.28	$61.64	$98,300
Software Developers (15-1252)	$50.42	$64.14	$80.79	$133,400
Web Developers (15-1254)	$23.61	$38.31	$54.27	$79,700
Web and Digital Interface Designers (15-1255)	$25.00	$33.93	$54.97	$70,600

*Rounded to the nearest $100

On average, the entry-level earnings for the occupations in this report are $33.91; 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 Web Developer Occupations in LA/OC

Web Developer Occupations: $24.50 (10th Percentile), $33.91 (25th Percentile), $46.90 (Median), $64.25 (75th Percentile), $82.95 (90th Percentile)

Self-Sufficiency Standard Wage: $18.10
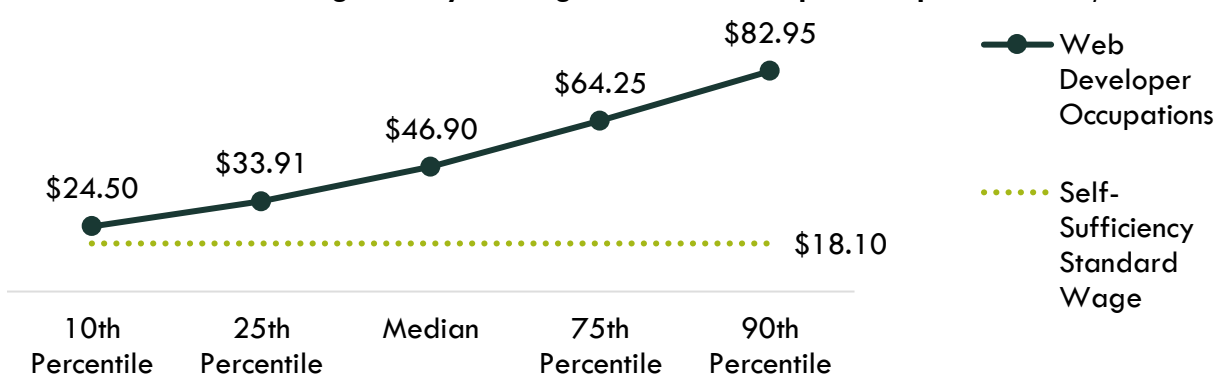
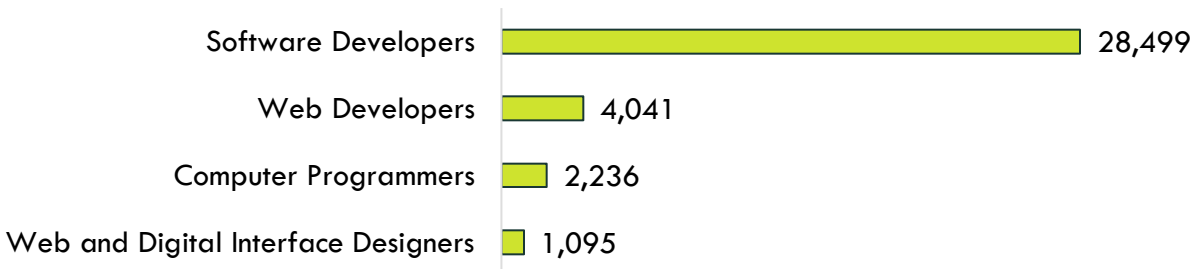**Job Postings**

There were 35,871 online job postings related to web development listed in the past 12 months. Exhibit 5 displays the number of job postings by occupation. The majority of job postings (79%) were for *software developers*, followed by *web developers* (11%) and *computer programmers* (6%). The highest number of job postings were for software engineers, principal software engineers, DevOps engineers, embedded software engineers, and software developers. The top skills were computer science, software engineering, software development, Python (programming language), an agile methodology. The top three employers, by number of job postings, in the region were: Boeing, Motion Recruitment, and CyberCoders.

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

Occupation	Count
Software Developers	28,499
Web Developers	4,041
Computer Programmers	2,236
Web and Digital Interface Designers	1,095

Of these web developer job postings listed in the past 12 months, **3,658 job postings included the keyword "full stack".** The top titles listed on job postings were full stack developers, full stack software engineers, software engineers, full stack engineers, and .net full stack developers. Top skills were full stack development, JavaScript (programming language), React.js (JavaScript library), computer science, and software engineering. The top three employers, by number of job postings, in the region were CyberCoders, Motion Recruitment, and SpaceX.

Educational Attainment

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for each of the four occupations in this report. Furthermore, the national-level educational attainment data indicates between 14% and 30% of workers in the field have completed some college/associate degree or less education, while between 70% and 86% have completed a bachelor's degree or more education. Of the 60% of web developer job postings listing a minimum education requirement in the greater Los Angeles/Orange County region, 5% (1,154) requested high school or vocational training, 3% (632) requested an associate degree, and 92% (19,589) 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 Orange Coast, Mt. San Antonio, and Santa Monica.

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
0614.30	Website Design and Development	Citrus	-	-	1	0
		LA Pierce	2	4	5	4
		Mt San Antonio	7	6	1	5
		Pasadena	1	1	7	3
		Santa Monica	2	3	2	2
		West LA	-	-	3	1
		LA Subtotal	**12**	**14**	**19**	**15**
		Coastline	1	1	-	1
		Fullerton	-	1	2	1
		Irvine	-	5	4	3
		Orange Coast	9	7	13	10
		Saddleback	2	7	4	4
		Santa Ana	2	1	-	1
		Santiago Canyon	3	6	5	5
		OC Subtotal	**17**	**28**	**28**	**24**
	Supply Subtotal/Average		**29**	**42**	**47**	**39**
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
		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

TOP	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
		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**
0707.00	Computer Software Development	LA City	-	-	1	0
		LA Harbor	-	-	2	1
		LA Mission	-	-	2	1
		LA Pierce	-	4	7	4
		Santa Monica	-	1	1	1
		West LA	-	-	6	2
		LA Subtotal	**-**	**5**	**19**	**8**
		Cypress	1	-	-	0
		Golden West	2	6	4	4
		Orange Coast	2	2	-	1
		Saddleback	3	10	15	9
		OC Subtotal	**8**	**18**	**19**	**15**
	Supply Subtotal/Average		**8**	**23**	**38**	**23**
0707.10	Computer Programming	Cerritos	2	3	7	4
		Citrus	1	3	9	4
		East LA	4	1	-	2
		Glendale	3	-	-	1
		LA City	6	8	10	8
		LA Harbor	-	2	4	2
		LA Mission	4	7	7	6
		LA Pierce	4	5	5	5
		LA Southwest	1	2	2	2
		LA Valley	6	13	8	9
		Long Beach	5	3	7	5
		Mt San Antonio	114	83	125	107
		Pasadena	21	23	23	22
		Santa Monica	46	65	71	61
		LA Subtotal	**217**	**218**	**278**	**238**

TOP	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
		Coastline	-	-	1	0
		Cypress	20	6	5	10
		Fullerton	28	24	28	27
		Irvine	4	-	-	1
		Orange Coast	157	206	160	174
		Santa Ana	1	-	-	0
		Santiago Canyon	3	2	2	2
		OC Subtotal	**213**	**238**	**196**	**216**
	Supply Subtotal/Average		**430**	**456**	**474**	**453**
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
		Saddleback	2	2	3	2
		OC Subtotal	**2**	**3**	**3**	**3**
	Supply Subtotal/Average		**42**	**71**	**64**	**59**
0709.10	E-Commerce (technology emphasis)	East LA	1	1	2	1
		LA Subtotal	**1**	**1**	**2**	**1**
		Saddleback	1	-	2	1
		OC Subtotal	**1**	**-**	**2**	**1**
	Supply Subtotal/Average		**2**	**1**	**4**	**2**
	Supply Total/Average		**706**	**730**	**903**	**780**

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 web developers. 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 320 bachelor's and sub-baccalaureate awards. Sub-baccalaureate awards include associate degrees, postsecondary awards, and other

academic awards. Bachelor's awards are included since all of the occupations in this report typically require a bachelor's degree.

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

CIP	Program	Institution	2019-20 Awards	2020-21 Awards	2-Year Average
11.0103	Information Technology	Bethesda Univ.	-	-	-
		Brand College	13	17	15
		CA Intercontinental University	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
		Univ. of La Verne	2	3	3
11.0201	Computer Programming/ Programmer, General	ABCO Technology	46	34	40
		Platt College-Anaheim	4	-	2
11.0801	Web Page, Digital/ Multimedia and Information Resources Design	LA Pacific College	-	4	2
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
52.0208	E-Commerce/ Electronic Commerce	University of La Verne	4	1	3
		Supply Total/Average	**340**	**299**	**320**

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. Seven out of ten 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
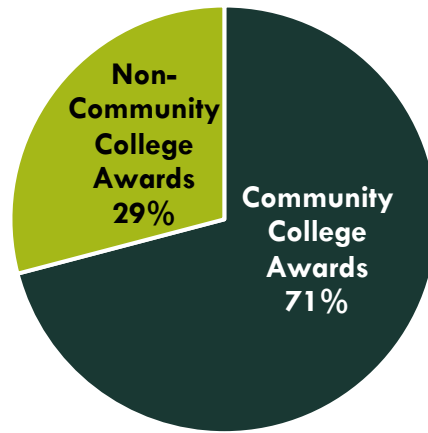
Appendix A: Occupational demand and wage data by county

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)
Computer Programmers (15-1251)	3,566	3,475	(92)	(3%)	245	$33.79	$47.81	$62.45
Software Developers (15-1252)	37,248	41,684	4,436	12%	3,480	$51.35	$65.39	$82.40
Web Developers (15-1254)	2,971	3,307	336	11%	299	$25.09	$40.31	$56.58
Web and Digital Interface Designers (15-1255)	5,492	6,113	621	11%	604	$26.54	$35.68	$57.88
Total	49,278	54,579	5,301	11%	4,628	-	-	-

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)
Computer Programmers (15-1251)	1,642	1,587	(55)	(3%)	112	$33.54	$47.28	$61.64
Software Developers (15-1252)	18,171	20,123	1,952	11%	1,649	$50.42	$64.14	$80.79
Web Developers (15-1254)	1,151	1,266	115	10%	112	$23.61	$38.31	$54.27
Web and Digital Interface Designers (15-1255)	1,940	2,118	178	9%	204	$25.00	$33.93	$54.97
Total	**22,904**	**25,095**	**2,191**	**10%**	**2,077**	-	-	-

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
Computer Programmers (15-1251)	5,209	5,062	(146)	(3%)	357	23%	Bachelor's degree
Software Developers (15-1252)	55,419	61,807	6,388	12%	5,128	14%	Bachelor's degree
Web Developers (15-1254)	4,122	4,574	451	11%	411	11%	Bachelor's degree
Web and Digital Interface Designers (15-1255)	7,432	8,231	799	11%	808	9%	Bachelor's degree
Total	**72,182**	**79,674**	**7,492**	**10%**	**6,704**	-	-

*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

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