



Labor Market Analysis: 0702.00 – Computer Information Systems Data Science

Los Angeles Center of Excellence, October 2024

Program Endorsement:	Endorsed: All Criteria Met ☐	Endorsed: Some Criteria Met ☒	Not Endorsed ☐
Program Endorsement Criteria			
Supply Gap:	Yes ☐	No ☒ (Supply met - see below)	
Living Wage: (Entry-Level, 25th)	Yes ☒	No ☐	
Education:	Yes ☐	No ☒	
Emerging Occupation(s)			
Yes ☒		No ☐	

SUMMARY

This report analyzes whether local labor market demand is being met by community college programs aligned with the identified target occupations¹ or whether a shortage of workers exists. Labor market demand is measured by annual job openings while education supply is measured by the number of awards (degrees and certificates) conferred on average each year.

Based on the available data, there appears to be a slight oversupply in the region for these target occupations. However, since the gap is within the COE's acceptable margin (25% over or under the number of annual openings), it is 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 target occupations related to business data analytics. Entry-level wages for the target occupations exceed the self-sufficiency standard wage in both Los Angeles and Orange counties; however, the Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for these occupations.

Recommendation: Due to the living wage program endorsement criterion being met, and the fact that not all completers from related supply programs will enter the field of business data analytics, the Los Angeles Center of Excellence for Labor Market Research (LA COE) endorses this proposed program.

¹ Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree. 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.

Key Findings

Supply Gap

- 2,119 annual job openings are projected in the region through 2028. This number is slightly less than the three-year average of 2,189 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 **12,194 online job postings for these occupations related to business data analytics**. The highest number of job postings were for data engineers, data analysts, business systems analysts, data scientists, and business intelligence analysts.

Living Wage

- All target occupations in this report have entry-level wages **above** Los Angeles County's self-sufficiency standard hourly wage (\$24.03/hour).²

Educational Attainment

- A bachelor's degree is the typical entry-level education for the target occupations according to the Bureau of Labor Statistics (BLS).
- 13%-27% of workers in the field have completed associate degree or less education, according to national educational attainment data.
 - 73%-87% of current workers in the field hold a bachelor's degree or more education.

Community college supply

- 28 community colleges issued awards related to business data analytics in the greater LA/OC region.
- 1,073 awards (degrees and certificates) were conferred on average each year between 2021 and 2023.

Other postsecondary supply

- 24 educational institutions in the LA/OC region have conferred awards in programs related to business data analytics over the past three years.
- 1,116 awards were conferred on average each year by other postsecondary institutions throughout the greater LA/OC region between 2020 and 2022.

TARGET OCCUPATIONS

LA COE prepared this report to provide regional labor market and postsecondary supply data related to four target occupations and one emerging occupation. Currently, there is not a standard occupational classification (SOC) code for a middle-skill occupation in the field of business data analytics. While the occupations in this report typically require a bachelor's degree and are not traditionally considered middle-skill, these occupations are most closely aligned with

² Center for Women's Welfare, University of Washington. (2024). *The self-sufficiency standard for California 2024*. <http://selfsufficiencystandard.org/California>.

the knowledge, skills, and abilities required for an entry-level job seeker in the emerging field of data analytics. [For full occupation descriptions, please see Appendix.](#)

- **Computer Systems Analysts (15-1211)**³
- **Database Administrators (15-1242)**⁴
- **Database Architects (15-1243)**⁵
- **Data Scientists (15-2051)**⁶
 - **Business Intelligence Analysts (15-2051.01)**⁷

OCCUPATIONAL DEMAND

Exhibit 1 shows the five-year occupational demand projections for these occupations related to business data analytics. In the greater Los Angeles/Orange County region, the number of jobs related to these occupations is projected to increase by 7% through 2028. There will be more than 2,100 job openings per year through 2028 due to job growth and replacements. The majority of jobs in 2023 for these occupations related to business data analytics (70%) were located in Los Angeles County.

Exhibit 1: Current employment and occupational demand, Los Angeles and Orange counties⁸

Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
Los Angeles	20,161	21,519	1,358	7%	1,482
Orange	8,816	9,356	540	6%	636
Total	28,977	30,875	1,898	7%	2,119

Detailed Occupation Data

Exhibit 2 displays the current employment and projected occupational demand for each of the target occupations in Los Angeles County. Positive scores for automation resilience⁹ reflect a lower-than-average threat of the occupation(s) being replaced by automation, while negative scores reflect a greater-than-average risk of automation. The average percentage of workers aged 55+ across all occupations in the Los Angeles/Orange County region is 26%; occupations with a larger share of workers aged 55 and older typically have greater replacement needs to offset the amount of impending retirements. On average, 81% of workers across all occupations in California are employed full-time.

³ [Computer Systems Analysts \(bls.gov\)](https://www.bls.gov)

⁴ [Database Administrators and Architects \(bls.gov\)](https://www.bls.gov)

⁵ [Database Administrators and Architects \(bls.gov\)](https://www.bls.gov)

⁶ [Data Scientists \(bls.gov\)](https://www.bls.gov)

⁷ [Business Intelligence Analysts \(onetonline.org\)](https://www.onetonline.org)

⁸ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

⁹ Automation risk is calculated based on the percentage of time spent on high-risk compared to low-risk work, the number of high-risk jobs in compatible occupations, and the overall industry automation risk.

Exhibit 2: Detailed employment and occupational demand, Los Angeles County¹⁰

Occupation	2023 Jobs	2028 Jobs	5-Yr % Change	Annual Openings	Auto-mation Resilience	% Aged 55 and older	% Full Time Workers
Computer Systems Analysts	10,500	10,885	4%	698	18.3	21%	100%
Database Administrators	1,952	2,023	4%	128	11.9	21%	100%
Database Architects	1,284	1,328	3%	83	11.9	21%	100%
Data Scientists	6,426	7,283	13%	572	16.6	14%	Data unavail.
Total	20,161	21,519	7%	1,482	-	-	-

WAGES

The labor market endorsement in this report considers the entry-level hourly wages for these occupations related to business data analytics 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 Los Angeles/Orange County region.

Los Angeles County

All four occupations have entry-level wages above the self-sufficiency standard wage for one adult (\$24.03 in Los Angeles County). Typical entry-level hourly wages are in a range between \$37.66 and \$58.68. (Exhibit 3). Experienced workers can expect to earn wages between \$64.26 and \$89.91.

Exhibit 3: Earnings for occupations in Los Angeles County

Occupation	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)	Median Annual Earnings*
Computer Systems Analysts	\$44.31	\$56.34	\$69.43	\$117,200
Database Administrators	\$37.66	\$50.78	\$64.26	\$105,600
Database Architects	\$58.68	\$74.45	\$89.91	\$154,900
Data Scientists	\$38.55	\$60.29	\$78.48	\$125,400

*Rounded to the nearest \$100

Orange County

All four occupations have entry-level wages above the self-sufficiency standard wage for one adult (\$27.13 in Orange County). Typical entry-level hourly wages are in a range between

¹⁰ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

\$36.20 and \$56.77 (Exhibit 4). Experienced workers can expect to earn wages between \$61.76 and \$86.97.

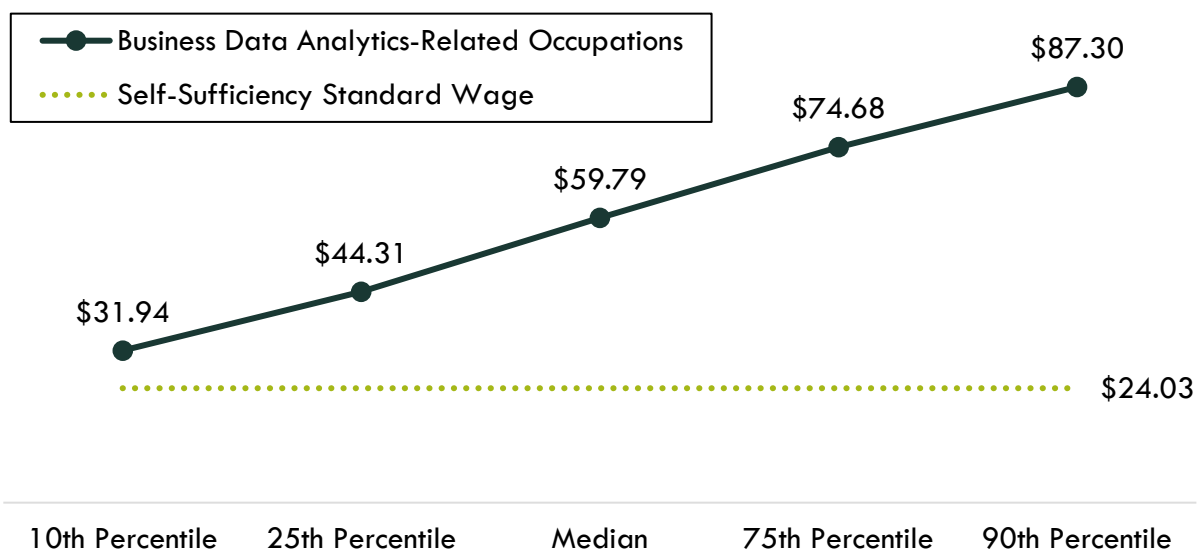
Exhibit 4: Earnings for occupations in Orange County

Occupation	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)	Median Annual Earnings*
Computer Systems Analysts	\$42.85	\$54.42	\$67.05	\$113,200
Database Administrators	\$36.20	\$48.81	\$61.76	\$101,500
Database Architects	\$56.77	\$72.04	\$86.97	\$149,800
Data Scientists	\$37.03	\$57.85	\$75.26	\$120,300

*Rounded to the nearest \$100

Across the greater Los Angeles and Orange County region, the average entry-level hourly earnings for the occupations in this report are \$44.31; this is above the living wage for one single adult in Los Angeles County (\$24.03). Exhibit 5 shows the average hourly wage for the occupations in this report, for entry-level to experienced workers.

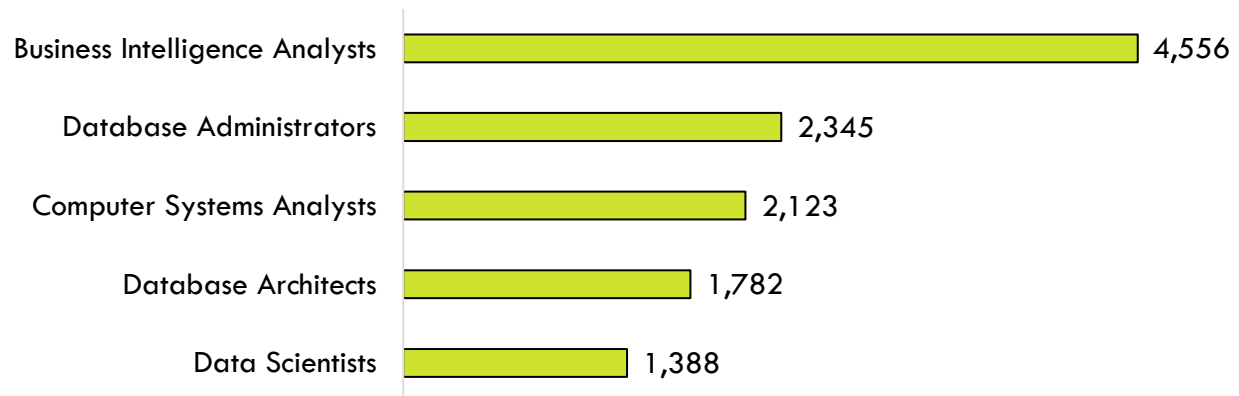
Exhibit 5: Average hourly earnings for business data analytics-related occupations, Los Angeles and Orange counties



JOB POSTINGS

There were 12,194 online job postings related to business data analytics listed in the past 12 months in Los Angeles and Orange counties. Exhibit 6 displays the number of job postings by occupation. The majority of job postings (37%) were for *business intelligence analysts*, followed by *database architects* (19%) and *computer systems analysts* (17%).

Exhibit 6: Job postings by occupation (last 12 months), Los Angeles and Orange counties



Job postings were analyzed for the most common job titles, skills, and employers associated with the target occupations in this report (Exhibit 7).

Exhibit 7: Most commonly requested job titles, skills and employers in job postings, Los Angeles and Orange counties

Top Job Titles	Top Skills	Top Employers
• Data engineers • Data analysts • Business systems analysts • Data scientists • Business intelligence analysts • Database administrators • Machine learning engineers	• SQL (programming language) • Data analysis • Computer science • Python (programming language) • Project management • Data science • Data modeling	• University of California • Deloitte • Disney • Robert Half* • Accenture • Insight Global* • Motion Recruitment* • The Judge Group* • Northrop Grumman

*Staffing companies

In the greater Los Angeles/Orange County region, 65% of the business data analyst-related job postings listed a minimum educational requirement. Exhibit 8 details the number and percentage of job postings by educational level.

Exhibit 8: Education levels requested in job postings for occupations related to business data analytics, Los Angeles and Orange counties

Education Level	Job Postings	% of Job Postings
Bachelor's degree	6,899	87%
Associate degree	342	4%
High school diploma or vocational training	674	9%

EDUCATIONAL ATTAINMENT

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for the occupations in this report (Exhibit 9). The national-level educational attainment data indicates between 13% and 27% of workers in the field have completed an associate degree or less education, while between 73% and 87% hold a bachelor's degree or more education. The Bureau of Labor Statistics (BLS) lists the following typical entry-level education levels for the occupations in this report:

Exhibit 9: Entry-level education preferred by employers nationally, Bureau of Labor Statistics

Occupation	Education Level
Computer Systems Analysts	Bachelor's degree
Database Administrators	Bachelor's degree
Database Architects	Bachelor's degree
Data Scientists	Bachelor's degree

EDUCATIONAL SUPPLY

Community College Supply

Exhibit 10 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 Cypress.

Exhibit 10: Regional community college awards (certificates and degrees), 2021-2023

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Average
0599.00	Other Business and Management	LA City	-	21	4	8
		LA Subtotal	-	21	4	8
		N. Orange Adult	4	7	9	7
		Santa Ana	2	1	-	1
		Santiago Canyon	8	1	2	4
		OC Subtotal	14	9	11	11
Supply Subtotal/Average			14	30	15	20
0701.00	Information Technology, General	East LA	4	30	18	17
		Glendale	3	17	16	12
		LA Harbor	1	2	-	1
		LA Mission	1	4	3	3
		LA Southwest	2	12	1	5
		Long Beach	106	88	73	89
		Mt San Antonio	49	23	12	28

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Average
		Santa Monica	1	-	-	0
		West LA	-	6	4	3
		LA Subtotal	167	182	127	159
		Santa Ana	3	9	25	12
		OC Subtotal	3	9	25	12
Supply Subtotal/Average			170	191	152	171
0702.00	Computer Information Systems	Citrus	4	6	2	4
		Compton	-	12	4	5
		East LA	23	11	23	19
		El Camino	11	28	19	19
		Glendale	6	8	11	8
		LA City	4	3	4	4
		LA Harbor	-	1	2	1
		LA Mission	1	1	-	1
		LA Southwest	-	21	20	14
		LA Trade-Tech	15	17	35	22
		Long Beach	3	-	6	3
		Mt San Antonio	6	68	41	38
		Rio Hondo	6	15	14	12
		Santa Monica	-	-	2	1
		West LA	9	14	8	10
		LA Subtotal	88	205	191	161
		Coastline	-	2	7	3
		Fullerton	31	49	48	43
		Irvine	-	-	1	0
		Orange Coast	-	1	-	0
		Saddleback	1	-	1	1
		Santa Ana	16	18	8	14
		Santiago Canyon	1	1	5	2
		OC Subtotal	49	71	70	63
Supply Subtotal/Average			137	276	261	225
0702.10	Software Applications	Cerritos	2	8	21	10
		LA City	1	-	2	1
		LA Mission	3	-	-	1
		LA Southwest	-	3	-	1

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Average
		Mt San Antonio	-	1	1	1
		Santa Monica	6	12	15	11
		LA Subtotal	12	24	39	25
		Coastline	8	14	53	25
		Cypress	-	2	1	1
		Irvine	50	89	67	69
		Saddleback	11	10	10	10
		OC Subtotal	69	115	131	105
Supply Subtotal/Average			81	139	170	130
0707.20	Database Design and Administration	Citrus	-	1	-	0
		Long Beach	13	11	10	11
		Mt San Antonio	8	16	22	15
		Pasadena	24	14	10	16
		Santa Monica	2	4	5	4
		LA Subtotal	47	46	47	47
		Cypress	-	-	2	1
		Santa Ana	2	2	5	3
OC Subtotal	2	2	7	4		
Supply Subtotal/Average			49	48	54	50
0707.30	Computer Systems Analysis	Cerritos	-	5	2	2
		East LA	-	-	4	1
		LA City	1	6	5	4
		LA Harbor	1	1	-	1
		LA Mission	1	1	2	1
		LA Pierce	6	5	6	6
		LA Trade-Tech	-	-	2	1
		Mt San Antonio	-	9	6	5
		Rio Hondo	-	3	2	2
		LA Subtotal	9	30	29	23
Supply Subtotal/Average			9	30	29	23
0708.10	Computer Networking	Cerritos	8	6	10	8
		Glendale	-	2	2	1
		LA City	4	8	6	6
		LA Pierce	12	19	14	15
		Long Beach	48	52	70	57

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Average
		Mt San Antonio	4	25	13	14
		Rio Hondo	2	5	7	5
		Santa Monica	-	-	1	0
		West LA	58	24	24	35
		LA Subtotal	136	141	147	141
		Coastline	92	49	17	53
		Cypress	61	71	116	83
		Fullerton	1	-	-	0
		Irvine	10	18	27	18
		Saddleback	19	15	17	17
		Santa Ana	23	45	47	38
		OC Subtotal	206	198	224	209
		Supply Subtotal/Average	342	339	371	351
0708.20	Computer Support	Citrus	1	4	-	2
		El Camino	-	-	1	0
		Glendale	2	7	7	5
		LA Pierce	6	6	4	5
		LA Valley	1	-	5	2
		Long Beach	40	33	22	32
		Pasadena	34	12	19	22
		LA Subtotal	84	62	58	68
		Cypress	3	13	15	10
		OC Subtotal	3	13	15	10
		Supply Subtotal/Average	87	75	73	78
0709.00	World Wide Web Administration	Cerritos	-	3	3	2
		Glendale	10	7	2	6
		LA Pierce	2	-	2	1
		Long Beach	34	44	39	39
		Mt San Antonio	-	-	4	1
		Santa Monica	16	-	3	6
		West LA	6	7	8	7
		LA Subtotal	68	61	61	63
		Fullerton	1	-	-	0
		Saddleback	2	3	3	3
		OC Subtotal	3	3	3	3

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Average
Supply Subtotal/Average			71	64	64	66
0709.10	E-Commerce (technology emphasis)	East LA	1	2	1	1
		LA Subtotal	1	2	1	1
		Saddleback	-	2	2	1
		OC Subtotal	-	2	2	1
Supply Subtotal/Average			1	4	3	3
Supply Total/Average			961	1,196	1,192	1,116

Other Postsecondary 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 business data analytics. Exhibit 11 shows the number of awards conferred by these institutions in relevant programs. Due to different data collection periods, the most recent data is from 2020 to 2022. Between 2020 and 2022, other postsecondary college institutions in the region conferred an average of 1,073 bachelor's and sub-baccalaureate awards. Sub-baccalaureate awards include associate degrees, postsecondary awards, and other academic awards that typically take fewer than four years to complete. The majority of awards (60%) in Exhibit 11 are bachelor's awards (641 awards), followed by sub-baccalaureate awards (432 awards).

Exhibit 11: Other regional postsecondary awards, 2020-2022

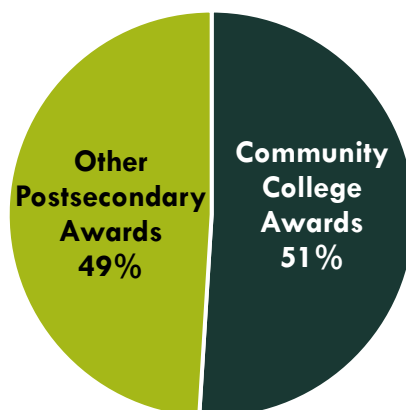
CIP Code	Program	Postsecondary Institution	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
11.0101	Computer and Information Sciences, General	Azusa Pacific University	21	25	5	17
		Chapman University	16	20	25	20
		LA Pacific College	6	2	2	3
		Loyola Marymount Univ.	27	44	51	41
		Pitzer College	-	1	-	0
		UC-Irvine	-	1	-	0
		University of La Verne	23	36	20	26
		Univ. of Mass. Global	30	36	37	34
		University of the People	203	292	478	324
11.0103	Information Technology	Brand College	13	17	18	16
		CA Intercontinental Univ.	2	-	-	1
		CSU-Dominguez Hills	4	10	17	10
		CSU-Los Angeles	134	111	90	112
		CSU-Northridge	29	51	45	42
		Platt College-Anaheim	15	17	12	15

CIP Code	Program	Postsecondary Institution	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
		Platt College-LA	12	6	3	7
		University of La Verne	2	3	15	7
		Univ. of Mass. Global	-	-	1	0
		Westcliff University	-	-	1	0
11.0199	Computer and Information Sciences, Other	CSU-Dominguez Hills	63	55	54	57
		CSU-Northridge	73	99	78	83
11.0801	Web Page, Digital/Multimedia and Information Resources Design	LA Pacific College	-	4	6	3
11.0802	Data Modeling/Warehousing and Database Administration	ABCO Technology	15	21	93	43
11.0899	Computer Software and Media Applications, Other	Art Center College of Design	20	14	21	18
		CA Institute of the Arts	7	1	6	5
		Learnet Academy	10	9	2	7
11.0901	Computer Systems Networking and Telecommunications	Brand College	2	-	2	1
11.1001	Network and System Administration/Administrator	ABCO Technology	25	40	104	56
		Brand College	9	16	9	11
		CA Intercontinental Univ.	1	1	1	1
11.1003	Computer and Information Systems Security/Auditing/Information Assurance	InterCoast Colleges-West Covina	-	-	2	1
		Learnet Academy	5	4	3	4
11.1004	Web/Multimedia Management and Webmaster	ABCO Technology	37	35	161	78
		LA Pacific College	1	1	-	1
11.1006	Computer Support Specialist	Southern California Institute of Technology	26	17	24	22
15.1202	Computer/Computer Systems Technology/Technician	Learnet Academy	4	2	2	3

CIP Code	Program	Postsecondary Institution	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Average
52.0208	E-Commerce/ Electronic Commerce	University of La Verne	4	1	-	2
Supply Total/Average			839	992	1,388	1,073

Exhibit 12 shows the proportion of community college awards conferred in the greater Los Angeles/Orange County region compared to the number of other postsecondary awards for the programs in this report, which is close to a fifty-fifty split.

Exhibit 12: Percentage of community college awards compared to other postsecondary institution awards in the Los Angeles/Orange County region



APPENDIX: OCCUPATION DESCRIPTIONS

LA COE prepared this report to provide regional labor market supply and demand data related to these target occupations:

- **Computer Systems Analysts (15-1211)** Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.¹¹
- **Database Administrators (15-1242)** Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. Identify, investigate, and resolve database performance issues, database capacity, and database scalability. May plan, coordinate, and implement security measures to safeguard computer databases.¹²

¹¹ [Computer Systems Analysts \(bls.gov\)](https://www.bls.gov/occupations/computer-systems-analysts)

¹² [Database Administrators and Architects \(bls.gov\)](https://www.bls.gov/occupations/database-administrators-and-architects)

- **Database Architects (15-1243)** Design strategies for enterprise databases, data warehouse systems, and multidimensional networks. Set standards for database operations, programming, query processes, and security. Model, design, and construct large relational databases or data warehouses. Create and optimize data models for warehouse infrastructure and workflow. Integrate new systems with existing warehouse structure and refine system performance and functionality.¹³
- **Data Scientists (15-2051)** Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets. Visualize, interpret, and report data findings. May create dynamic data reports.¹⁴
 - **Business Intelligence Analysts (15-2051.01)** Produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.¹⁵

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DATA 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)

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¹³ [Database Administrators and Architects \(bls.gov\)](https://www.bls.gov)

¹⁴ [Data Scientists \(bls.gov\)](https://www.bls.gov)

¹⁵ [Business Intelligence Analysts \(onetonline.org\)](https://onetonline.org)