Labor Market Analysis for Program Modification: 0707.20/Database Design and Administration *(Data Analytics)*

Orange County Center of Excellence, December 2024

FOR LABOR MARKET RESEARCH
ORANGE COUNTY

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met ☐	Endorsed: Some LMI Criteria Met ☐	Not LMI Endorsed ☐

Program LMI Endorsement Criteria			
Supply Gap:	Yes ☐		No ☐
	Comments: The OC COE predicates endorsement only for middle-skill occupations. **Since this proposed new program includes above middle-skill occupations only, we are unable to evaluate the labor market information endorsement criteria.**		
Self-Sufficiency Standard Living Wage[1]:	Yes ☐		No ☐
	Comments: See comment above.		
Education:	Yes ☐		No ☐
	Comments: See comment above.		
Additional Considerations			
Emerging Occupation(s):	Yes ☑	Some ☐	No ☐
	Comments: Data analytics and data science are rapidly evolving fields that involve the use of descriptive and predictive analytics to inform business decisions. Generally, a data analyst examines and analyzes data sets to identify trends and provide insights for strategic decision making. Data scientists employ predictive analytics through machine learning models and other statistical methods to predict future trends using historical data.[2]		
OC Resilient Job(s):	Yes ☐	Some ☑	No ☐
	Comments: See Resilient Jobs and US News & World Report Best Jobs		
U.S. News & World Report 2024 Best Jobs List[3]:	Yes ☑	Some ☐	No ☐
	Comments: See Resilient Jobs and US News & World Report Best Jobs		

The Orange County Center of Excellence for Labor Market Research (OC COE) prepared this report to determine whether there is a supply gap in the Los Angeles/Orange County regional labor market related to one above middle-skill occupation – denoted with a caret (^) throughout this report:

- *Data Scientists (15-2051)^*

[1] At the direction of the California Community College Chancellor's Office, the living wage endorsement criteria in this report uses the University of Washington's Center for Women's Welfare Self-Sufficiency Standard, which the COE refers to as a living wage, to determine Orange County's living wage of $27.13, last updated in March 2024.
[2] https://graduate.northeastern.edu/resources/data-analytics-vs-data-science/
[3] "100 Best Jobs of 2024," U.S. News & World Report, accessed May 7, 2024, https://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs.

Apart from a subset under *data scientists (15-2051.00)^* – such as *business intelligence analysts (15-2051.01)^* and *clinical data managers (15-2051.02)^*, *data scientists^* is the only Standard Occupational Classification (SOC) code in the Bureau of Labor Statistics system that is solely for data science jobs. This occupation was added to the SOC system in 2018, making it one of the newest occupations in the federal system. *Data scientists^* typically requires a bachelor's degree and the majority of workers in the field hold a bachelor's, master's, or doctoral degree. It is important to note that there are currently no middle-skill occupations that are directly related to data analytics and data science and typical education requirements for these jobs are high. However, numerous other occupations may utilize data analytics or data science skills.

Though data analyst and data science jobs typically require at least a bachelor's degree, community colleges throughout the country have developed data science programs. There is no singular source that includes data on all these programs. However, the OC COE was able to identify existing programs in numerous states including California, Illinois, Maryland, New Jersey, and North Carolina.[4] Additionally, there are several data analytics and data science certificate programs offered through university extension programs such as those at UC Irvine[5] and UCLA[6].

Online programs such as those offered by Coursera, DataCamp, edX, LinkedIn Learning, and Udemy, provide alternate paths to obtaining data analytics and data science skills. These platforms often partner with businesses to offer online curriculum, such as Google's Data Analytics Certificate[7] or IBM's Data Science Professional Certificate[8] – both of which are offered through Coursera. Additionally, these platforms may work with businesses to provide upskilling opportunities to the current workforce. DataCamp claims that "80% of the Fortune 500 use DataCamp."[9]

The remainder of this report analyzes traditional labor market information for *data scientists^*, the occupation that is most closely related to data analytics and data science jobs. An analysis of online job postings for data analytics and science skills across all occupations - including data analysis, Python and SQL programming, and data visualization - is included to better understand the real-time demand for this emerging area.

The OC COE predicates endorsement only for middle-skill occupations. **Since this proposed new program only includes one occupation, which is classified as above middle-skill, we are unable to evaluate the labor market information endorsement criteria.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for the occupations included in this report.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Data Scientists (15-2051)^	LA: 572	LA: 47	OC: $37.03	Bachelor's degree	11%
	OC: 235	OC: 10			
Total	**808**	**56**	**N/A**	**N/A**	**N/A**

[4] https://magazine.amstat.org/blog/2022/08/01/new-two-year-programs/
[5] https://bootcamp.ce.uci.edu/data/landing/
[6] https://www.uclaextension.edu/digital-technology/data-analytics-management/certificate/data-science
[7] https://www.coursera.org/professional-certificates/google-data-analytics
[8] https://www.coursera.org/professional-certificates/ibm-data-science
[9] https://www.datacamp.com/business

Demand:

- The number of jobs related to *data scientists*^ is projected to increase 13% through 2028, equating to 808 annual job openings.
- Hourly entry-level wages for *data scientists*^ are $38.10, which is significantly above the Self-Sufficiency Standard living wage.
- There were 6,909 online job postings for *data scientists*^ over the past 12 months. The highest number of postings were for data analysts, data scientists, and business intelligence analysts.
    - Across all occupations, there were 53,550 online job postings that requested data analytics and data science skills over the past 12 months.
- The typical entry-level education for these real estate occupations ranges from a high school diploma or equivalent to a bachelor's degree.
- Approximately 11% of workers in the field have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 50 awards conferred by 7 community colleges in Los Angeles and Orange Counties from 2020 to 2023.
    - It is important to note these supply figures reflect awards conferred under the 0707.20 (Database Design and Administration) TOP code. However, community colleges throughout Los Angeles and Orange counties offer data analytics and data science programs under eight different TOP codes, ranging from 0506.00 (Business Management) to 2001.00 (Psychology, General). In many cases, colleges also offer other programs that are unrelated to data analytics and data science under these TOP codes. Therefore, the COE is unable to isolate supply solely for data analytics and data science and supply may be overstated.
- Non-community college institutions conferred an average of 6 awards from 2019 to 2022.
    - The supply data for non-community college institutions includes only programs directly related to data analytics or data science such as 30.7101 (Data Analytics, General) and Business Analytics (30.7102). Students may obtain similar skills in other programs and courses such as mathematics, statistics, econometrics, computer science, and more. These figures also do not include certificates awarded by extension or continuing education programs offered at four-year colleges and universities. Therefore, supply is likely understated.
- Orange County community college students that exited database design and administration programs in the 2020-21 academic year had a median annual wage of $62,244 ($29.93 per hour) after exiting the program and 59% attained the regional living wage.
- Due to a low number of students, data for the percentage of Orange County database design and administration students that exited their program in 2019-20 and who reported that they are working in a job closely related to their field of study in not available.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for *data scientists*^ from 2018 through 2028. Though there was a 7% decline across all occupations in Los Angeles and Orange counties from 2019 to 2020 due to the COVID-19 pandemic, employment for *data scientists*^ increased during the same period and each year thereafter.

In the two years preceding the pandemic, employment for this occupation increased at varying degrees in Orange County, with 10% increase in 2018 followed by a 26% increase in 2019. After steep annual increases from 2018 to 2023, employment for *data scientists*^ in Orange County is only projected to increase 2% through 2028, experiencing a slightly higher rate relative to all occupations in Los Angeles and Orange counties.

Exhibit 2: Annual Percent Change in Jobs for Data Scientists^, 2018-2028

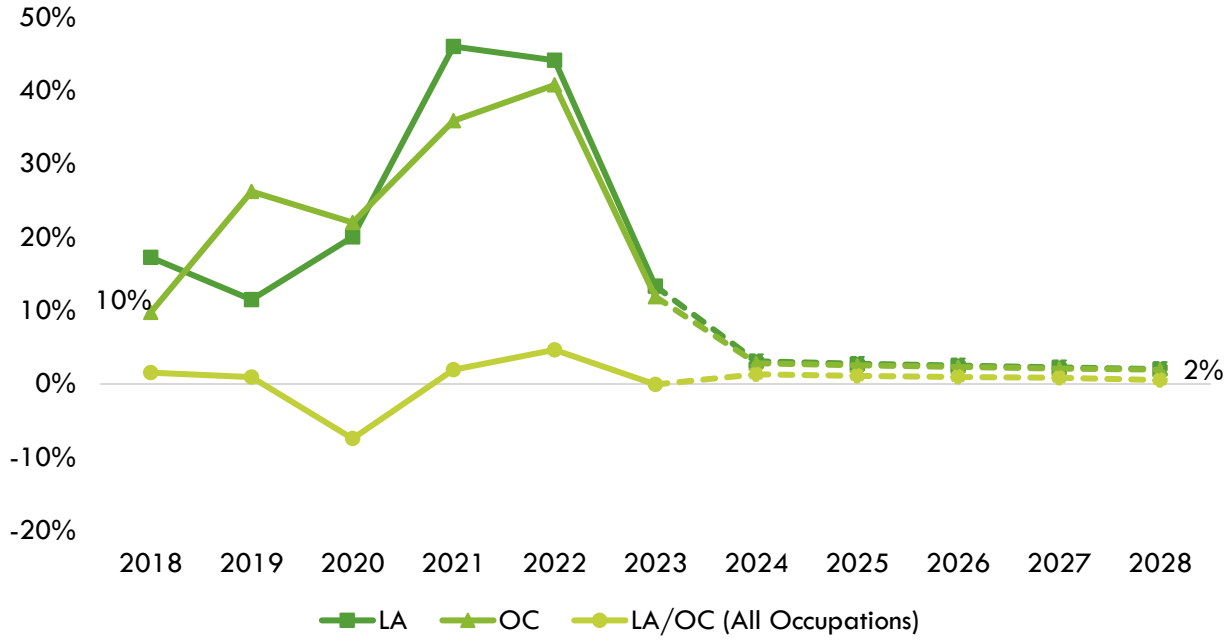


Exhibit 3 shows the five-year occupational demand projections for *data scientists*^. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase by 13% through 2028. There is projected to be 808 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties[10]

Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
Los Angeles	6,426	7,283	857	13%	572
Orange	2,711	3,045	334	12%	235
Total	**9,137**	**10,328**	**1,192**	**13%**	**808**

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for *data scientists*^ in Orange County as they relate to the county's living wage. Los Angeles County wages are included below to provide a complete analysis of the LA/OC region.

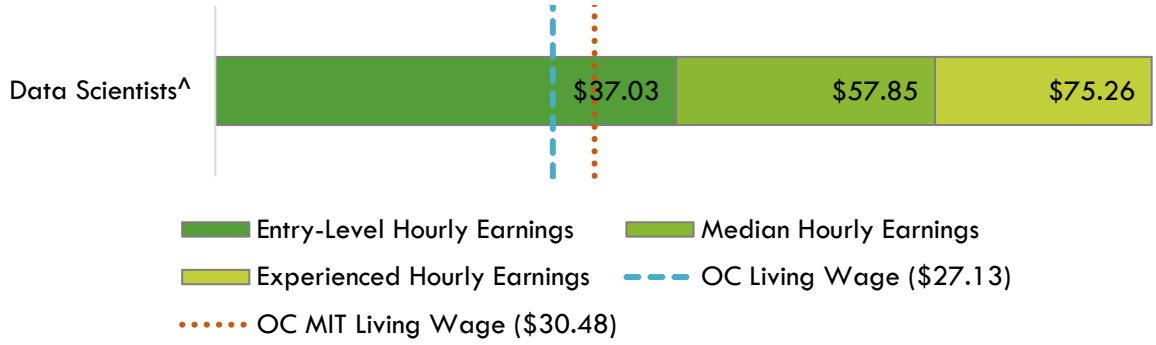
At the direction of the California Community College Chancellor's Office, the living wage endorsement criteria in this report uses the University of Washington's Center for Women's Welfare Self-Sufficiency Standard, which the COE refers to as a living wage, to determine Orange County's living wage of $27.13, last updated in March 2024. Additionally, data for the MIT Living Wage, updated on February 14, 2024,

[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.

is provided as a reference. Currently, the MIT Living Wage in Orange County is $30.48. Both figures, which account for geographic-specific costs of necessities such as housing, food, health care, and transportation to assess the cost of living, are notated in the exhibits below.

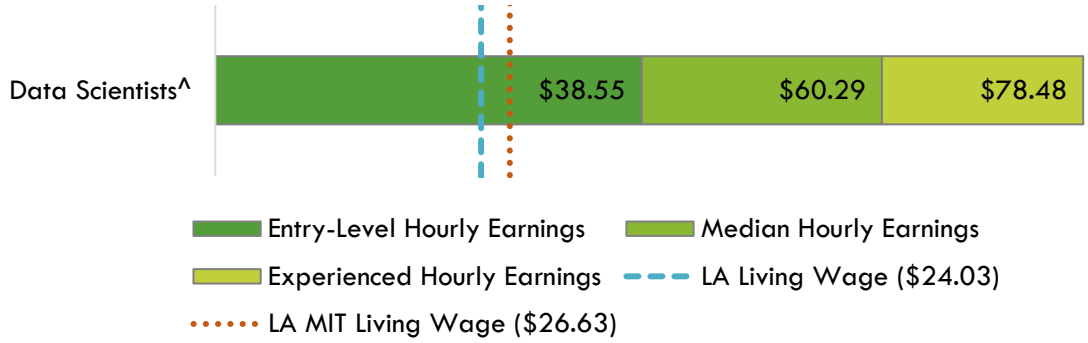
The typical entry-level hourly earnings for *data scientists*^ are $38.55, which is significantly above the living wage for one adult ($27.13 in Orange County). Orange County's average wages ($58.02) are significantly below the average statewide wage of $67.30 for this occupation. Exhibit 4 shows the wage range for this occupation in Orange County and how it compares to the regional living wage.

Exhibit 4: Wages by Occupation in Orange County



The typical entry-level hourly earnings for *data scientists*^ are $38.55, which is significantly above the living wage for one adult ($24.03 in Los Angeles County). Los Angeles County's average wages ($60.45) are significantly below the average statewide wage of $67.30 for this occupation. Exhibit 5 shows the wage range for this occupation in Los Angeles County and how it compares to the regional living wage.

Exhibit 5: Wages by Occupation in Los Angeles County



Resilient Jobs and U.S. News & World Report Best Jobs:

Exhibit 6 shows if the occupation is considered an Orange County Great Recession-Resilient, COVID-19 Pandemic Recession-Resilient Job, or a 2024 U.S. News & World Report (USN&WR) Best Job. *Data scientists^* met the criteria to be considered a COVID-19 Pandemic Recession-Resilient Job and a USN&WR Best Jobs; however, it is not considered a Great Recession-Resilient Job.

Exhibit 6: Resilient Jobs and USN&WR Best Jobs Designations

Occupation	Great Recession-Resilient Job	COVID-19 Pandemic Recession-Resilient Job	2024 USN&WR Best Job
Data Scientists^	☐	☑	☑

Job Postings:

Important Online Job Postings Data Note: *Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors.*[11] *For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast's database.*

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.

This section includes two analyses of online job postings. The first analysis examines online job postings for *data scientists^*. To better understand how data analytics and data science skills can be applied to other occupations, the second analysis examines all online job postings that requested these skills and not only those that are specifically for *data scientists^*.

Occupation Job Postings

There were 6,909 online job postings for *data scientists^* listed in the past 12 months in Orange and Los Angeles counties, as shown in Exhibit 7.

Exhibit 7: Number of Job Postings by Occupation (n=6,909)

Occupation	Job Postings	Percentage of Job Postings
Data Scientists^	6,909	100%
Total Postings	**6,909**	**100%**

[11] K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), https://link.springer.com/book/10.1007/978-81-322-3972-7.

Exhibit 8Exhibit 9 shows the number of job postings by job title for the top 10 most frequently posted titles. The top job titles for this occupation were data analysts, data scientists, business intelligence analysts, machine learning engineers, and data analytics managers.

Exhibit 8: Number of Job Postings by Title (n=6,909)

Employer	Job Postings	Percentage of Job Postings
Data Analysts	586	8%
Data Scientists	540	8%
Business Intelligence Analysts	193	3%
Machine Learning Engineers	176	3%
Data Analytics Managers	77	1%
Oracle Cloud HCM Consultants	64	1%
Enterprise Architects	61	1%
Directors of Data Science	57	1%
Enterprise Solutions Architects	49	1%
Modeling and Simulation Engineers	48	1%

The top employers in the region, by number of job postings, are shown in Exhibit 9.

Exhibit 9: Top Employers by Number of Job Postings (n=6,909)

Employer	Job Postings	Percentage of Job Postings
Deloitte	214	3%
University of California	169	2%
Accenture	114	2%
Disney	97	1%
Kaiser Permanente	78	1%
Amazon	70	1%
PricewaterhouseCoopers	62	1%
Robert Half	55	1%
The Judge Group	53	1%
Tiktok	52	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 10.

Exhibit 10: Top Skills by Number of Job Postings (n=6,909)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Data Analysis (2,828)	Communication (3,059)	SQL (Programming Language) (2,358)
SQL (Programming Language) (2,358)	Management (1,934)	Python (Programming Language) (2,054)
Python (Programming Language) (2,054)	Problem Solving (1,839)	Tableau (Business Intelligence Software) (1,293)
Computer Science (2,024)	Leadership (1,435)	Dashboard (1,161)
Data Science (1,632)	Operations (1,290)	Microsoft Excel (1,102)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Machine Learning (1,431)	Research (1,179)	R (Programming Language) (991)
Statistics (1,381)	Presentations (1,123)	Power BI (919)
Tableau (Business Intelligence Software) (1,293)	Detail Oriented (1,116)	SAP Applications (892)
Project Management (1,276)	Microsoft Excel (1,102)	Amazon Web Services (650)
Dashboard (1,161)	Mathematics (1,086)	Microsoft PowerPoint (628)

Data Analysis and Data Science Skills Postings

Over the past 12 months, there were 53,550 online job postings in Orange and Los Angeles counties that requested data analysis and data science skills. Exhibit 11 shows the top 10 occupations for which employers requested these skills.

In addition to traditional data-related roles such as *data scientists^*, *database administrators^*, and *database architects^*, the top occupations include marketing, finance, and engineering. All top 10 occupations are above middle-skill.

Exhibit 11: Top Data Analytics and Data Science Occupations (n=53,550)

Occupation	Job Postings	Percentage of Job Postings
Data Scientists^	4,265	8%
Computer Occupations, All Other^	3,464	6%
Marketing Managers^	1,842	3%
Management Analysts^	1,702	3%
Database Administrators^	1,669	3%
Market Research Analysts and Marketing Specialists^	1,290	2%
Financial and Investment Analysts^	1,248	2%
Database Architects^	1,166	2%
Financial Managers^	1,051	2%
Industrial Engineers^	978	2%

Exhibit 12 shows the number of job postings by job title.

Exhibit 12: Number of Data Analytics and Data Science Job Postings by Title (n=53,550)

Title	Job Postings	Percentage of Job Postings
Data Analysts	604	1.1%
Data Engineers	540	1.0%
Data Scientists	520	1.0%
Business Analysts	411	0.8%
Financial Analysts	382	0.7%
Machine Learning Engineers	209	0.4%
Business Systems Analysts	195	0.4%
Product Managers	190	0.4%

Title	Job Postings	Percentage of Job Postings
Principal Engineers	180	0.3%
Systems Engineers	180	0.3%

The top employers that requested data analytics and data science skills across all occupations, by number of job postings, are shown in Exhibit 13.

Exhibit 13: Top Data Analytics and Data Science Employers by Number of Job Postings (n=53,550)

Employer	Job Postings	Percentage of Job Postings
University of California	1,362	3%
Amazon	829	2%
SpaceX	782	1%
Kaiser Permanente	584	1%
Robert Half	494	1%
Disney	474	1%
Northrop Grumman	396	1%
Raytheon Technologies	392	1%
Your Path	369	1%
Boeing	355	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 14.

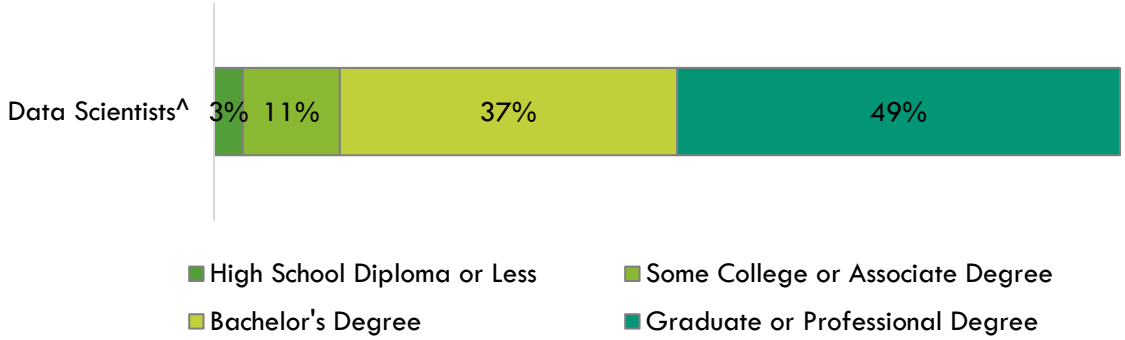
Exhibit 14: Top Skills by Number of Job Postings (n=53,550)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Data Analysis (34,456)	Communication (28,747)	SQL (Programming Language) (13,999)
SQL (Programming Language) (13,999)	Management (20,171)	Python (Programming Language) (13,830)
Python (Programming Language) (13,830)	Problem Solving (15,458)	Microsoft Excel (11,379)
Project Management (11,023)	Operations (15,104)	Microsoft Office (6,861)
Computer Science (9,314)	Leadership (14,715)	Microsoft PowerPoint (6,255)
Marketing (7,675)	Research (12,139)	Tableau (Business Intelligence Software) (5,031)
Finance (7,495)	Detail Oriented (11,739)	Dashboard (4,341)
Automation (6,365)	Microsoft Excel (11,379)	Amazon Web Services (4,237)
Auditing (5,859)	Writing (10,782)	Power BI (4,062)
Machine Learning (5,624)	Planning (10,565)	R (Programming Language) (3,648)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for *data scientists*^. The national-level educational attainment data indicates only 11% of workers in the field have completed some college or an associate degree as their highest level of education. Exhibit 15 shows the educational attainment for this occupation.

Exhibit 15: National-level Educational Attainment for Occupations



Of the 71% of the cumulative job postings for *data scientists*^ that listed a minimum education requirement in Los Angeles/Orange County, 78% (3,836) requested a bachelor's degree and 11% (530) requested a high school diploma, vocational training, or an associate degree.

Educational Supply

Community College Supply:

Exhibit 16 shows the three-year average number of awards conferred by community colleges in the related TOP code: Database Design and Administration (0707.20). The colleges with the most completions in the region are Pasadena, Mt. San Antonio, and Long Beach. Over the past 12 months, there were two related program recommendation requests from regional community colleges.

It is important to note these supply figures reflect awards conferred under the 0707.20 (Database Design and Administration) TOP code. However, community colleges throughout Los Angeles and Orange counties offer data analytics and data science programs under eight different TOP codes, ranging from 0506.00 (Business Management) to 2001.00 (Psychology, General). In many cases, colleges offer other programs that are unrelated to data analytics and data science under these TOP codes. Therefore, the COE is unable to isolate supply solely for data analytics and data science and supply may be overstated. Additionally, *data scientists*^ has high education requirements and employers typically require more than a community college education for these occupations.

Exhibit 16: Regional Community College Awards (Certificates and Degrees), 2020-2023

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0707.20	Database Design and Administration	Citrus	0	1	0	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	0	0	2	1
		Santa Ana	2	2	5	3
		OC Subtotal	**2**	**2**	**7**	**4**
		Supply Total/Average	**49**	**48**	**54**	**50**

As noted previously, community colleges throughout Los Angeles and Orange counties offer data analytics and data science programs under eight different TOP codes. To better understand the colleges that offer data analytics and data science programs, Exhibit 17 shows each college, as well as the TOP code, program name, award type, and approval date for data analytics and data science programs offered by regional community colleges.

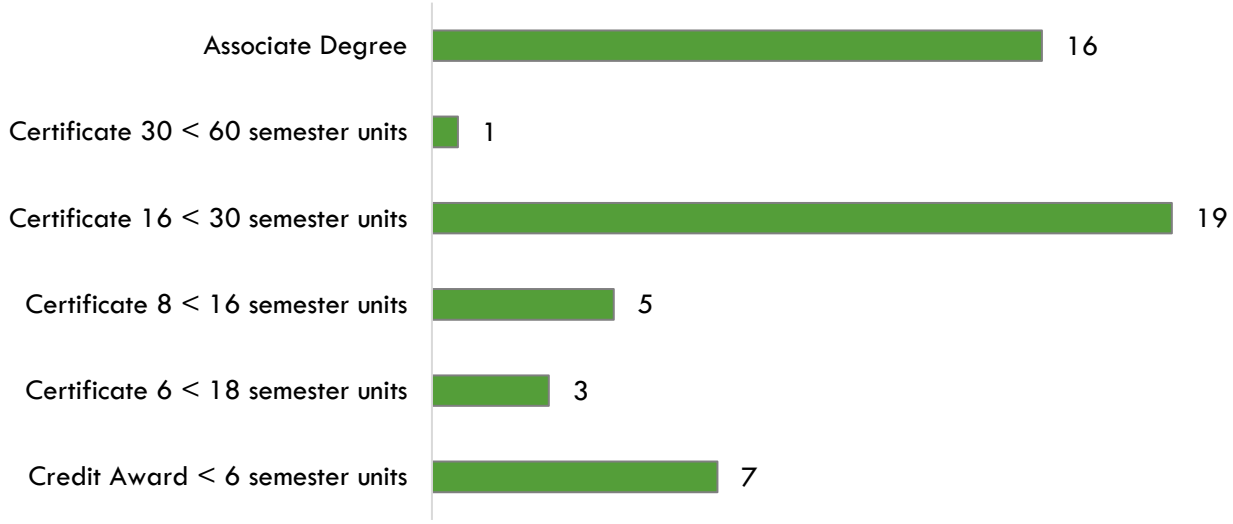
Exhibit 17: Regional Community College Data Analytics and Data Science Programs

TOP Code/Title	College	Program Name	Award Type	CCCCO Approval Date
0502.00/Accounting	Orange Coast	Accounting Data Analytics	Certificate	3/22/23
0506.00/Business Management	Fullerton	Business Data Analytics	Certificate	2/12/21

TOP Code/Title	College	Program Name	Award Type	CCCCO Approval Date
	Pasadena City	Business Data Analytics	Certificate	3/21/22
	Pasadena City	Business Data Analytics	A.S. Degree	3/21/22
0599.00/Other Business and Management	L.A. Harbor	Business Data Analytics	Certificate	11/6/23
0702.00/Computer Information Systems	Coastline	Data Analytics	Certificate	Not available
			A.S. Degree	Not available
	L.A. City	Statistical Data Analytics	Certificate	4/24/2024
	L.A. Mission	Data Analytics	Certificate	5/17/2023
	Long Beach City	Data Analytics	Certificate	12/21/2023
			A.S. Degree	5/22/2024
	Mt. San Antonio	Big Data Analytics	Certificate	4/24/2019
		Big Data Analytics For Business	A.S. Degree	1/28/2022
	Santa Monica	Data Analyst	Certificate	7/19/2022
	West L.A.	Data Analytics	Certificate	9/19/2023
0702.10/Software Applications	East L.A.	Data Analytics	Certificate	7/23/2024
	Santa Monica	Business Information Worker - Data Analytics Applications	Certificate	6/1/2022
0707.00/Computer Software Development	Saddleback	Business Data Analytics And Database	A.S. Degree	9/26/2022
		Data Analytics	Certificate	9/26/2022
0707.20/Database Design and Administration	Cypress	Data Analytics	Certificate	1/29/2021
	Santa Ana	Data Analytics	Certificate	2/8/2022
2001.00/Psychology, General	L.A. Harbor	Social Sciences Data Analytics	Certificate	8/18/2023

Exhibit 18 shows the annual average community college awards by type from 2020-21 to 2022-23. The plurality of the awards are for certificates between 16 and less than 30 semester units, followed by associate degrees.

Exhibit 18: Annual Average Community College Awards by Type, 2020-2023



Community College Student Outcomes:

Orange County students that exited database design and administration programs in the 2020-21 academic year had lower median annual earnings ($62,244) compared to database design and administration students throughout the state ($73,984). Both of these figures are significantly above the living wage. However, a smaller percentage (59%) of Orange County database design and administration students attained the living wage than students throughout the state (78%).

Exhibit 19 shows the Strong Workforce Program (SWP) metrics for database design and administration programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. Currently, no RSCCD college offers courses under the database design and administration TOP code. Therefore, student outcomes data is not available. Of the 1,932 database design and administration students throughout California in the 2020-21 academic year, 8% (152) attended an Orange County community college.

Orange County students that exited database design and administration programs in the 2020-21 academic year had lower median annual earnings ($62,244) compared to database design and administration students throughout the state ($73,984). Both of these figures are significantly above the living wage. However, a smaller percentage (59%) of Orange County database design and administration students attained the living wage than students throughout the state (78%).

Exhibit 19: Database Design and Administration (0707.20) Strong Workforce Program Metrics, 2021-22[12]

SWP Metric	RSCCD	OC Region	California
SWP Students	N/A	152	1,932
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	N/A	43%	47%

[12] All SWP metrics are for 2021-22 unless otherwise noted.

SWP Metric	RSCCD	OC Region	California
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	Insufficient Data	59%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	Insufficient Data	57
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	N/A	Insufficient Data	166
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	N/A	Insufficient Data	71%
Median Annual Earnings for SWP Exiting Students (2020-21)	N/A	$62,244 ($29.93)	$73,984 ($35.57)
Median Change in Earnings for SWP Exiting Students (2020-21)	N/A	30%	18%
SWP Exiting Students Who Attained the Living Wage (2020-21)	N/A	59%	78%

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for *data scientists*^. Exhibit 20 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes:

- Data Analytics, General (30.7101)
- Business Analytics (30.7102)

Between 2019 and 2021, non-community colleges in the region conferred an average of 6 awards annually in related training programs.

It is important to note the supply data for non-community college institutions includes only programs directly related to data analytics or data science such as Data Analytics, General (30.7101) and Business Analytics (30.7102). Students may obtain similar skills in other programs and courses such as mathematics, statistics, econometrics, computer science, and more. These figures also do not include certificates awarded by extension or continuing education programs offered at four-year colleges and universities. Therefore, supply is likely understated.

Exhibit 20: Regional Non-Community College Awards, 2019-2022

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
30.7101	Data Analytics, General	Mount Saint Mary's University	0	0	0	0
		University of Massachusetts Global	3	7	8	6
		Westcliff University	0	0	0	0
Supply Subtotal/Average			**3**	**7**	**8**	**6**
30.7102	Business Analytics	Touro University Worldwide	0	0	0	0
Supply Subtotal/Average			**0**	**0**	**0**	**0**
Supply Total/Average			**3**	**7**	**8**	**6**

Regional Demographics

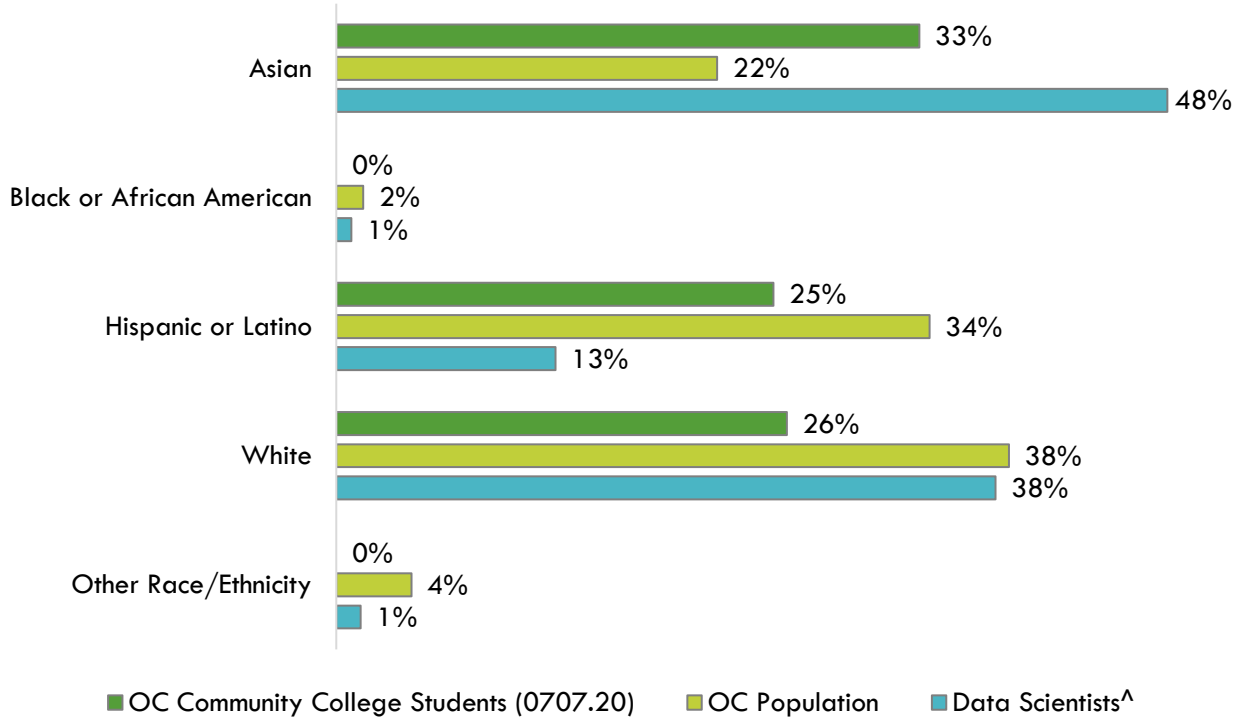
This section examines demographic data for Orange County community college students in database design and administration programs compared to the OC population, along with occupational data, to identify potential diversity and equity issues addressable by community college programs.

Ethnicity:

Exhibit 21 compares the ethnicity of Orange County community college students enrolled in database design and administration programs, the overall Orange County population, and occupation-specific data for *data scientists*^.

Notably, almost half (48%) of workers in the field are Asian, which is significantly higher than the population (22%) and community college database design and administration students (33%). Hispanic or Latino and white demographic groups each account for a quarter of community college database design and administration students, which represents a lower percentage relative to their representation within the population, which accounts for over a third of the population respectively per group. Hispanic or Latino representation among workers in the field (13%) is far below their share of the population (34%) and among community college database design and administration students (25%).

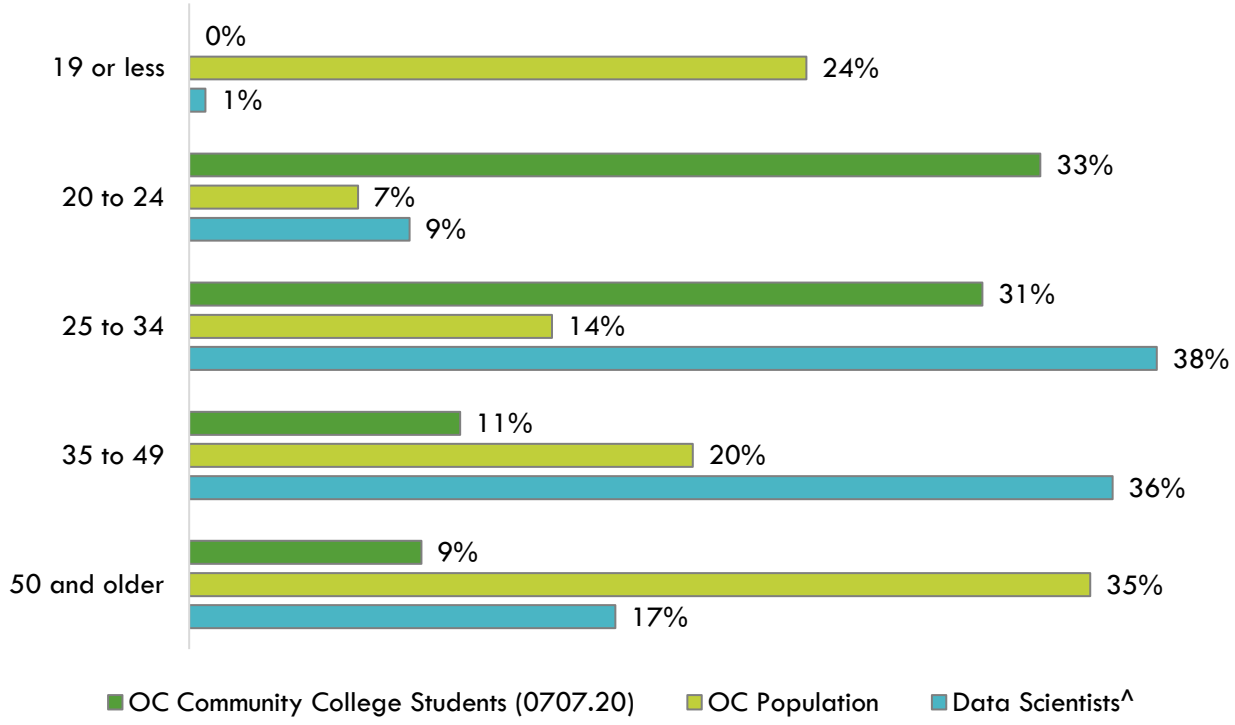
Exhibit 21: Program and County Demographics by Ethnicity



Age:

Exhibit 22 compares the age of Orange County community college students enrolled in database design and administration programs, the overall Orange County population, and occupation-specific data for the *data scientists*^. Nearly three-fourths (74%) of workers in the field are 25 to 49, of which, about half (51%) are 25 to 34. The percentage of individuals 25 to 49 who work in the field (74%) is significantly higher than their share of the population (34%) and among community college database design and administration programs (42%). Conversely, individuals 20 to 24 account for the plurality of community college database design and administration students (33%), which is significantly higher than the population (7%) and workers in the field (9%).

Exhibit 22: Program and County Demographics by Age

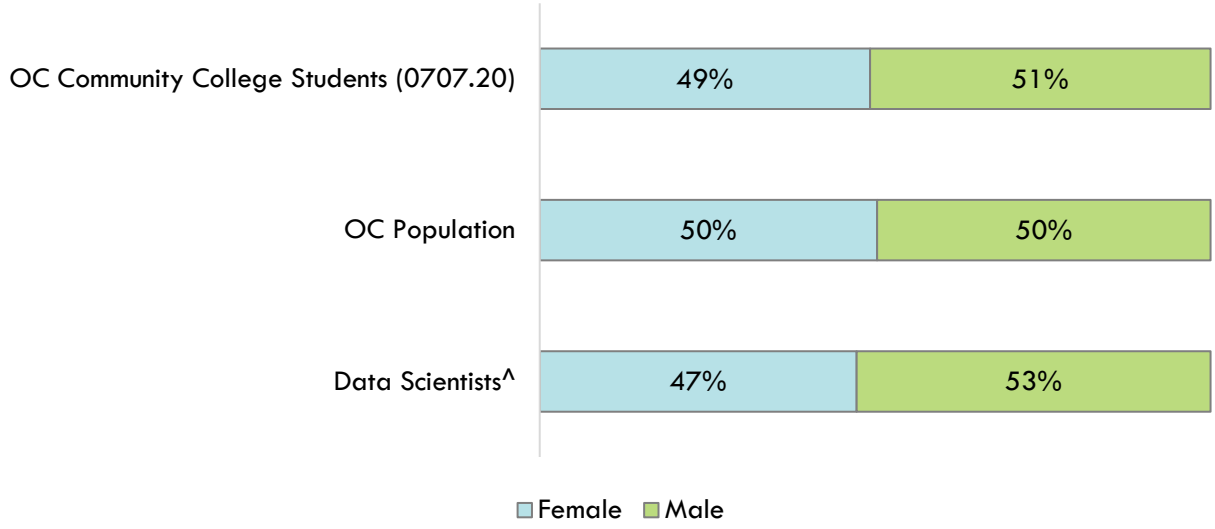


Sex:

evenly between women and men. Albeit with slightly fewer women than men among workers in the field and community college database design and administration students.

Exhibit 23 compares the sex of Orange County community college students enrolled in database design and administration programs, the overall Orange County population, and occupation-specific data for *data scientists*^, which is roughly evenly split evenly between women and men. Albeit with slightly fewer women than men among workers in the field and community college database design and administration students.

Exhibit 23: Program and County Demographics by Sex



Appendix A: Methodology

The OC COE prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the OC COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- 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.

The OC COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a "supply table" with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the OC COE. 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 which 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.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/
Living Wage	"Living Wage" measures the income necessary for an individual or family to afford basic expenses by assessing the costs such as housing, food, child care, health care, transportation, and taxes. Per the CCCCCO's this report's endorsement criteria uses the University of Washington's Center for Women's Welfare Self-Sufficiency Standard last updated in March 2024, which is $27.13 per hour ($56,451 annually) in Orange County. For more information, see: http://www.selfsufficiencystandard.org/California The MIT Living Wage, updated on February 14, 2024, is a nationally recognized living wage metric and is provided for reference. The current MIT Living Wage in Orange County is $30.48. For more information, see: https://livingwage.mit.edu/counties/06059
Typical Education and Training Requirements, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/
Educational Supply	The CCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions
Student Metrics and Demographics	LaunchBoard, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://www.calpassplus.org/LaunchBoard/Home.aspx

Data Type	Source
Population and Occupation Demographics	The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml

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