Program Endorsement Brief: 0707.00/ Computer Software Development
Data Analytics
Business Data Analytics and Databases
Orange County Center of Excellence, December 2021

Summary Analysis

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 Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to two above middle-skill occupations: *market research analysts and marketing specialists* (13-1161), and *operations research analysts* (15-2031). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.[1] While the occupations included in this report are considered above middle-skill, they are in a growing and important field and align with the skills that students can attain through completion of community college programs that focus on data analytics. 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.

Currently, the Bureau of Labor Statistics' (BLS) Standard Occupational Classification (SOC) system does not include an occupation that is solely related to data analytics. However, the occupations included in this report are closely related to the skills that will be taught in these data analytics programs. These skills include programming languages such as R and Python, data visualization tools such as Tableau and Microsoft PowerBI, and data analytics and data management fundamentals. In addition to traditional labor market information, this report includes an analysis of online job postings for these skills to better understand employer demand for these skills across different job types. Though the job postings data suggests these skills are in high demand, regional community colleges should be aware that data analytics jobs typically require at least a bachelor's degree and employers overwhelmingly list a bachelor's degree as the minimum education requirement in online job postings.

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[1] 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.

Based on the available data there appears to be a supply gap for these data analytics occupations in the region. While all annual openings for the occupations in this report typically require a bachelor's degree, entry-level wages exceed the living wage in both Los Angeles and Orange counties. **Therefore, due to some of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

Demand:
- *Supply Gap Criteria –* Over the next five years, there is projected to be **4,349 jobs available annually** in the region due to new job growth and replacements, **which is more than the 352 awards conferred annually** by educational institutions in the region.
- *Living Wage Criteria –*Within Orange County, **all annual job openings** for these two occupations have **entry-level wages above the county's living wage** ($20.63/hour).[2]
- *Educational Criteria –*Within the LA/OC region, *all annual job openings* for occupations related to data analytics *typically require a bachelor's degree.*
  - Furthermore, the national-level educational attainment data indicates *between 15.1% and 19.7% of workers in the field have completed some college or an associate degree.*
  - Additionally, *83.6% of online job postings list a bachelor's degree as the minimum education level required* for data analytics positions.

Supply:
- There are **26 community colleges** in the LA/OC region that issue awards related to data analytics, conferring an average of **297 awards annually** between 2017 and 2020.
- Between 2016 and 2019, there was an average of **55 awards conferred annually** in related training programs by non-community college institutions, all of which were generated by **3 individual non-community college institutions throughout** the region.

Occupational Demand
Exhibit 1 shows the five-year occupational demand projections for these two occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 7% through 2025. There will be more than 4,300 job openings per year through 2025 due to job growth and replacements.

This report includes employment projection data by Emsi which uses EDD information. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy, during the projection period, will be at approximately full employment. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and

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[2] Living wage data was pulled from California Family Needs Calculator on 11/20/2021. For more information, visit the California Family Needs Calculator website: https://insightcced.org/family-needs-calculator/

occupational employment. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties[3]

Geography	2020 Jobs	2025 Jobs	2020-2025 Change	2020-2025 % Change	Annual Openings
Orange	11,398	12,064	666	6%	1,236
Los Angeles	28,046	29,968	1,921	7%	3,114
Total	**39,444**	**42,031**	**2,587**	**7%**	**4,349**

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these data analytics occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

Orange County: All annual openings for these data analytics occupations have entry-level wages above the living wage for one adult ($20.63 in Orange County). Typical entry-level hourly wages are in a range between $23.40 and $35.01. Experienced workers can expect to earn wages between $42.69 and $58.97, which are higher than the living wage estimate. Orange County's average wages are below the average statewide wage of $41.28 for these occupations.

Los Angeles County: All annual openings for these data analytics occupations have entry-level wages above the living wage for one adult ($18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between $24.11 and $36.18. Experienced workers can expect to earn wages between $61.58 and $73.80, which are higher than the living wage estimate. Los Angeles County's average wages are below the average statewide wage of $41.28 for these occupations.

Job Postings

Occupation Analysis

There were 21,069 online job postings related to the data analytics occupations included in this report listed in the past 12 months. However, the occupation market research analysts and marketing specialists includes jobs titles that are more focused on traditional marketing than market research or data analysis. To focus more closely on data analysis, the online job posting search was filtered to only include postings that specifically requested data analysis skills. There were 2,189 of these online job postings listed in in the past 12 months. The highest number of job postings were for operations analysts, sales operations analysts, marketing analysts, marketing data analysts, and sales analysts. The top skills were: data analysis, SQL, Tableau, marketing,
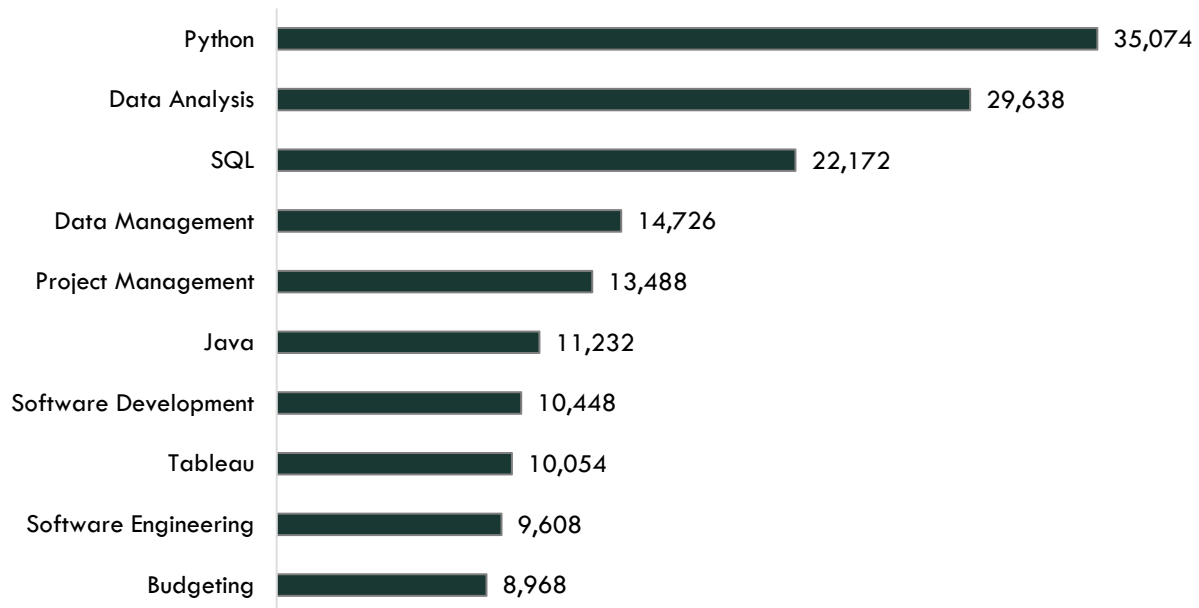
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[3] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

and project management. The top three employers, by number of job postings, in the region were: Anthem Blue Cross, University of California, and Deloitte.

Skills Analysis

To better understand demand for the skills that students can attain through completion of a community college data analytics program or certificate, an analysis of online job postings was performed using the following skills as inputs: data analysis, data visualization, data management, R, Python, Power BI, and Tableau. There were 78,465 job postings related to these skills listed in the last 12 months. The highest number of job postings were for data analysts, data engineers, senior software engineers, data scientists, and software engineers. The top three employers, by number of job listings, in the region were: Anthem Blue Cross, Deloitte, and Raytheon. The top skills were: Python, data analysis, SQL, data management. Exhibit 2 shows the top 10 skills requested in online job postings related to data analytics.

Exhibit 2: Top 10 Skills in Data Analytics Online Job Postings in LA/OC Region

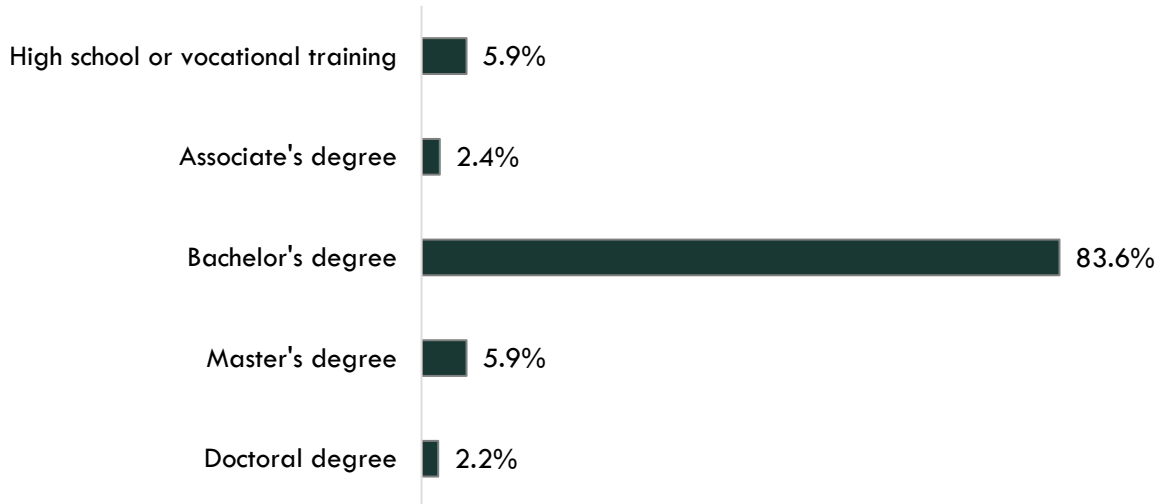| Skill	Postings
Python	35,074
Data Analysis	29,638
SQL	22,172
Data Management	14,726
Project Management	13,488
Java	11,232
Software Development	10,448
Tableau	10,054
Software Engineering	9,608
Budgeting	8,968

It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.

Educational Attainment

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for both market research analysts and marketing specialists and operations research analysts. Furthermore, the national-level educational attainment data indicates between 15.1% and 19.7% of workers in the field have completed some college or an associate degree as their highest level of education. Of the 76% of online job postings that requested relevant data analytics skills that list a minimum educational requirement in Los Angeles/Orange County, 83.6% (49,596) requested a bachelor's degree and 2.4% (1,417) requested and associate degree. Exhibit 3

shows the minimum education requested by employers in online data analytics job postings throughout the region.

Exhibit 3: Minimum Education Requested in Online Data Analytics Job Postings in LA/OC Region

Education Level	Percentage
High school or vocational training	5.9%
Associate's degree	2.4%
Bachelor's degree	83.6%
Master's degree	5.9%
Doctoral degree	2.2%

Educational Supply

Community College Supply—Exhibit 4 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Computer Information Systems (0702.00), Computer Software Development (0707.00), Database Design and Administration (0707.20), Computer Systems Analysis (0707.30), and Computer Infrastructure and Support (0708.00). The colleges with the most completions in the region are: Coastline and Mt. San Antonio. Over the past 12 months, there were nine other related program recommendation requests from regional community colleges.

Exhibit 4: Regional community college awards (certificates and degrees), 2017-2020

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
0702.00	Computer Information Systems	Cypress	8	5	4	6
		Fullerton	20	15	11	15
		Irvine	-	-	2	1
		Orange Coast	3	4	2	3
		Santa Ana	6	4	2	4
		Santiago Canyon	2	3	4	3
		OC Subtotal	**39**	**31**	**25**	**32**
		Citrus	7	5	8	7
		Compton	-	1	-	0

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
		East LA	16	19	15	17
		El Camino	18	14	21	18
		Glendale	-	-	5	2
		LA City	4	1	1	2
		LA Mission	9	5	1	5
		LA Trade	14	8	20	14
		Mt San Antonio	-	-	79	26
		Pasadena	1	-	-	0
		Rio Hondo	19	21	10	17
		West LA	6	8	10	8
		LA Subtotal	**94**	**82**	**170**	**115**
	Supply Subtotal/Average		**133**	**113**	**195**	**147**
0707.00	Computer Software Development	Cypress	1	1	1	1
		Golden West	3	4	2	3
		Orange Coast	7	7	2	5
		Saddleback	3	13	3	6
		OC Subtotal	**14**	**25**	**8**	**16**
		LA City	-	1	-	0
		LA Subtotal	**0**	**1**	**0**	**0**
	Supply Subtotal/Average		**14**	**26**	**8**	**16**
0707.20	Database Design and Administration	Santa Ana	4	1	8	4
		OC Subtotal	**4**	**1**	**8**	**4**
		Citrus	-	1	1	1
		Long Beach	1	3	1	2
		Mt San Antonio	4	11	12	9
		Pasadena	-	-	4	1
		Santa Monica	2	1	5	3
		LA Subtotal	**7**	**16**	**23**	**15**
	Supply Subtotal/Average		**11**	**17**	**31**	**20**
0707.30	Computer Systems Analysis	Cypress	5	2	-	2
		OC Subtotal	**5**	**2**	**0**	**2**
		Cerritos	4	2	3	3
		East LA	-	-	1	0
		LA Mission	-	-	1	0
		LA Subtotal	**4**	**2**	**5**	**4**

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
		Supply Subtotal/Average	9	4	5	6
0708.00	Computer Infrastructure and Support	Coastline	65	49	46	53
		Cypress	1	2	3	2
		Orange Coast	-	-	7	2
		OC Subtotal	**66**	**51**	**56**	**58**
		Cerritos	-	-	4	1
		Glendale	-	-	3	1
		LA City	-	-	3	1
		LA Harbor	1	1	1	1
		LA Mission	-	2	12	5
		LA Valley	8	5	2	5
		Long Beach	1	3	8	4
		Mt San Antonio	20	24	24	23
		Pasadena	-	1	1	1
		Rio Hondo	-	-	9	3
		West LA	-	4	15	6
		LA Subtotal	**30**	**40**	**82**	**51**
		Supply Subtotal/Average	96	91	138	108
		Supply Total/Average	263	251	377	297

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 analytics. Exhibit 5 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: Data Modeling/Warehousing and Database Administration (11.0802). Due to different data collection periods, the most recent three-year period of available data is from 2016 to 2019. Between 2016 and 2019, non-community college institutions in the region conferred an average of 55 awards annually in related training programs.

Exhibit 5: Regional non-community college awards, 2016-2019

CIP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
11.0802	Data Modeling/ Warehousing and Administration	ABCO Technology	3	6	7	5
		University of Phoenix-California	8	4	1	4
		University of Southern California	24	57	54	45

CIP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
		Supply Total/Average	35	67	62	55

Appendix A: Occupational demand and wage data by county

Exhibit 6. Orange County

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Market Research Analysts and Marketing Specialists (13-1161)	10,467	11,054	587	6%	1,157	$23.40	$31.13	$42.69
Operations Research Analysts (15-2031)	931	1,010	79	9%	79	$35.01	$46.21	$58.97
Total	**11,398**	**12,064**	**666**	**6%**	**1,236**			

Exhibit 7. Los Angeles County

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Market Research Analysts and Marketing Specialists (13-1161)	25,937	27,680	1,743	7%	2,935	$24.11	$32.09	$44.01
Operations Research Analysts (15-2031)	2,110	2,288	178	8%	178	$36.18	$47.77	$60.94
Total	**28,046**	**29,968**	**1,921**	**7%**	**3,114**			

Exhibit 8. Los Angeles and Orange Counties

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Market Research Analysts and Marketing Specialists (13-1161)	36,404	38,734	2,330	6%	4,092
Operations Research Analysts (15-2031)	3,041	3,298	257	8%	257
Total	**39,444**	**42,031**	**2,587**	**7%**	**4,349**

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

For more information, please contact:

Jacob Poore, Interim Director
Center of Excellence, Orange County
poore_jacob@rsccd.edu

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