Labor Market Analysis for Program Recommendation: 0707.10/Computer Programming *(Certificate of Achievement (Transcripted): Computer Programming)*

Orange County Center of Excellence, March 2025

FOR LABOR MARKET RESEARCH
ORANGE COUNTY

Summary

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

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:		
Education:	Yes ☐		No ☐
	Comments:		
Additional Considerations			
Emerging Occupation(s):	Yes ☐	Some ☐	No ☑
	Comments: N/A		
OC Resilient Job(s):	Yes ☐	Some ☐	No ☑
	Comments: See Resilient Jobs and US News & World Report Best Jobs		
U.S. News & World Report 2025 Best Jobs List[2]:	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 two computer programming occupations:

- Above Middle-Skill – denoted with an asterisk (^) throughout this report.
  - *Computer Programmers (15-1251)^*
  - *Software Developers (15-1252)^*

[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] "100 Best Jobs," U.S. News & World Report, accessed January 28, 2025, https://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs.

The OC COE predicates endorsement only for middle-skill occupations. **Since this proposed program includes above middle-skill occupations only, 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
Computer Programmers (15-1251)^	LA: 279 OC: 127 *TTL: 406*	*Accounted for Below*	OC: $35.74	Bachelor's degree	21%
Software Developers (15-1252)^	LA: 3,062 OC: 1,384 *TTL: 4,445*	LA: 4,656 OC: 2,174 *TTL: 6,830*	OC: $57.29	Bachelor's degree	11%
Total	**4,852**	**6,830**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to these computer programming occupations are projected to increase by 8% through 2028, equating to 4,852 annual job openings.
- Hourly entry-level wages for these computer programming occupations range from $35.74 to $57.29 in Orange County, which is above the Self-Sufficiency Standard living wage.
- There were 17,403 online job postings for these computer programming occupations over the past 12 months. The highest number of postings were for software engineers, principal software engineers, and embedded software engineers.
- The typical entry-level education for these computer programming occupations is a bachelor's degree.
- Between 11% and 21% of these computer programming occupations have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 1,596 awards conferred by 28 community colleges in Los Angeles and Orange Counties from 2020 to 2023.
- Non-community college institutions conferred an average of 5,234 awards from 2019 to 2022.
- Orange County community college students that exited computer programming programs in the 2020-21 academic year had a median annual wage of $40,730 ($19.58 per hour) after exiting the program and 46% attained the regional living wage.
- Throughout Orange County, 75% of computer programming students that exited their program in 2019-20 reported that they are working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for all two computer programming occupations from 2018 through 2028. Though employment declined by 7% across all occupations in Los Angeles and Orange counties due to the COVID-19 pandemic from 2019 to 2020, employment for these computer programming occupations stagnated during the same period.

In the two years preceding the pandemic, employment for these occupations increased in Orange County, from 2018 through 2019. After a stagnation in employment in 2020 and an increase through 2023, employment for these two computer programming occupations in Orange County is projected to grow through 2028, experiencing a similar rate relative to all occupations in Los Angeles and Orange counties.

Exhibit 2: Annual Percent Change in Jobs for Computer Programming Occupations, 2018-2028

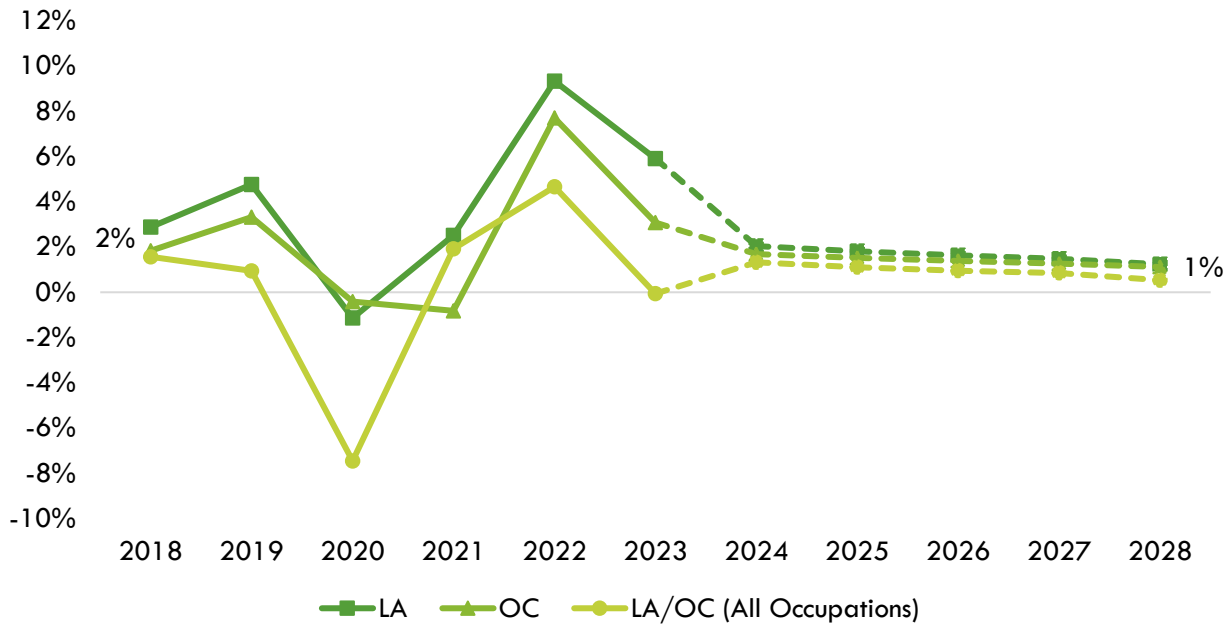


Exhibit 3 shows the five-year occupational demand projections for these above middle-skill computer programming occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 8% through 2028. There is projected to be 4,852 jobs available annually.

Exhibit 3: Above Middle-Skill Occupational Demand in Los Angeles and Orange Counties

Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
Los Angeles	45,166	48,994	3,828	8%	3,341
Orange	21,233	22,757	1,524	7%	1,511
Total	**66,399**	**71,751**	**5,352**	**8%**	**4,852**

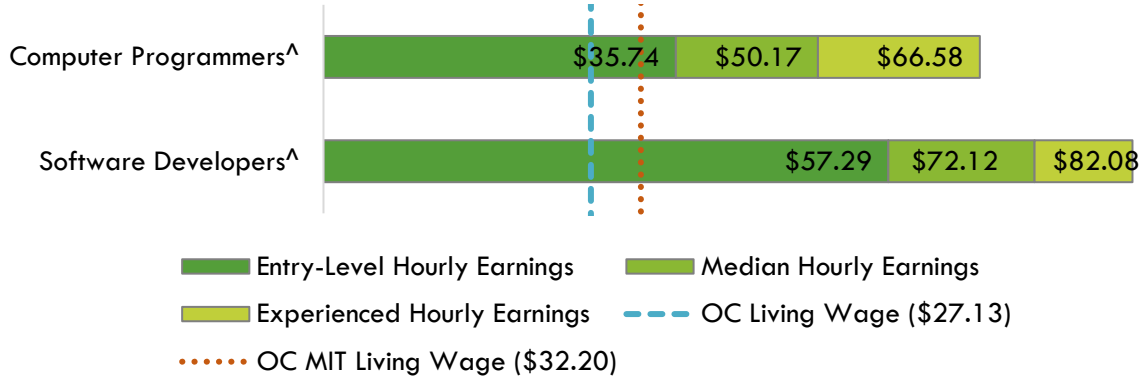
Wages:

The labor market endorsement in this report considers the entry-level hourly wages for these computer programing occupations 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 10, 2025, is provided as a reference. Currently, the MIT Living Wage in Orange County is $32.20. 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.

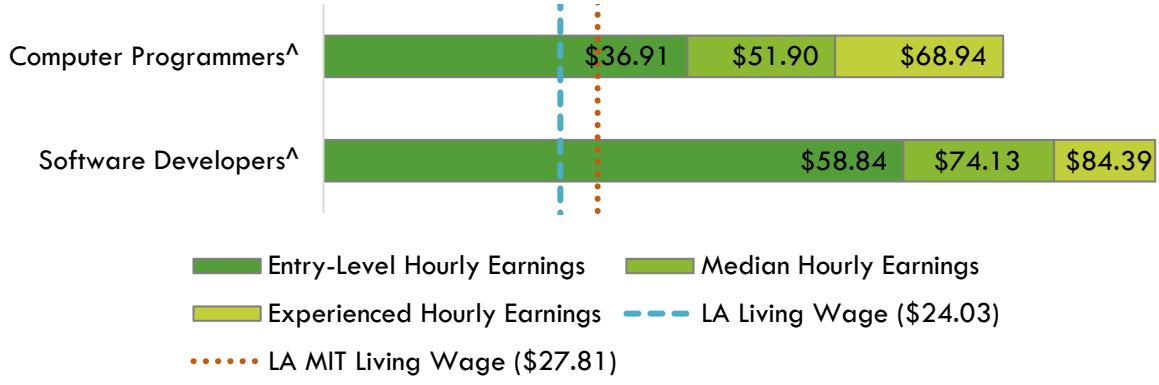
Entry-level wages for these computer programming occupations range from $35.74 to $57.29, which is significantly above the Self-Sufficiency Standard living wage for one adult ($27.13 in Orange County). Orange County's average wages of $69.42 are significantly below the average statewide wage of $81.46 for these occupations. Exhibit 4 shows the wage range for each of these computer programming occupations in Orange County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 4: Wages by Occupation in Orange County



Entry-level wages for these computer programming occupations range from $36.91 to $58.84, which is significantly above the Self-Sufficiency Standard living wage for one adult ($24.03 in Los Angeles County). Los Angeles County's average wages of $71.28 are below the average statewide wage of $81.46 for these occupations. Exhibit 5 shows the wage range for each of these computer programming occupations in Los Angeles County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 5: Wages by Occupation in Los Angeles County



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

Exhibit 6 shows if each occupation is considered an Orange County Great Recession-Resilient, COVID-19 Pandemic Recession-Resilient Job, or a 2025 U.S. News & World Report (USN&WR) Best Job. Only one occupation, *software developers*^, met the criteria to be considered a USN&WR Best Job. *Computer programmers*^ did not meet the criteria for any of these designations.

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

Occupation	Great Recession-Resilient Job	COVID-19 Pandemic Recession-Resilient Job	2025 USN&WR Best Job
Above Middle-Skill			
Computer Programmers^	☐	☐	☐
Software Developers^	☐	☐	☑

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.*[3] *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.

There were 17,403 online job postings related to these computer programming occupations listed in the past 12 months. Exhibit 7 shows the number of job postings by occupation. The majority (94%) of job postings were for *software developers*^.

Exhibit 7: Number of Job Postings by Occupation (n=17,403)

Occupation	Job Postings	Percentage of Job Postings
Software Developers^	16,347	94%
Computer Programmers^	1,056	6%
Total Postings	**17,403**	**100%**

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

The top employers for the above middle-skill computer programming occupations in the region, by number of job postings, are shown in Exhibit 8.

Exhibit 8: Top Above Middle-Skill Employers by Number of Job Postings (n=17,403)

Employer	Job Postings	Percentage of Job Postings
Amazon	450	3%
Raytheon Technologies	289	2%
Northrop Grumman	262	2%
Disney	255	1%
Insight Global	205	1%
Anduril Industries	187	1%
SpaceX	178	1%
Jobot	174	1%
Motion Recruitment	170	1%
Labelbox	154	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for these above middle-skill occupations in Exhibit 9.

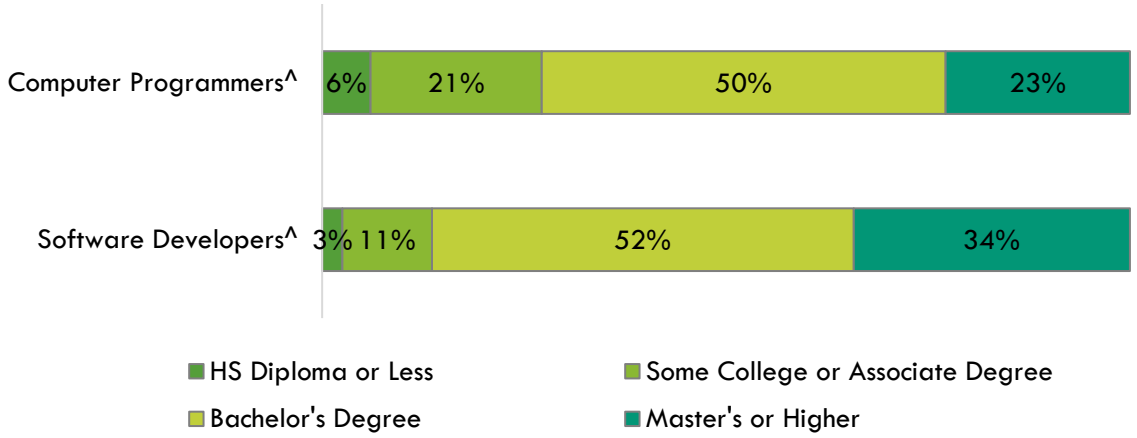
Exhibit 9: Top Skills for Above Middle-Skill Occupations by Number of Job Postings (n=17,403)

Top Specialized Skills	Top Soft Skills	Top Software and Computer Skills
Computer Science (6,747)	Communication (6,982)	Python (Programming Language) (4,483)
Software Engineering (5,458)	Problem Solving (4,442)	Amazon Web Services (3,726)
Software Development (4,982)	Troubleshooting (Problem Solving) (3,510)	Java (Programming Language) (3,467)
Python (Programming Language) (4,483)	Management (3,500)	SQL (Programming Language) (3,431)
Amazon Web Services (3,726)	Leadership (2,870)	Application Programming Interface (API) (3,407)
Agile Methodology (3,611)	Operations (2,812)	JavaScript (Programming Language) (3,151)
Java (Programming Language) (3,467)	Innovation (2,373)	C++ (Programming Language) (2,739)
SQL (Programming Language) (3,431)	Writing (1,987)	C# (Programming Language) (2,258)
Application Programming Interface (API) (3,407)	Mentorship (1,872)	Microsoft Azure (2,032)
Scalability (3,288)	Detail Oriented (1,806)	React.js (Javascript Library) (1,903)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a bachelor's degree for these computer programming occupations, *computer programmers*^ and *software developers*^. However, the national-level educational attainment data indicates between 11% and 21% of workers in the field have completed some college or an associate degree as their highest level of education. Exhibit 10 shows the educational attainment for each occupation, sorted by highest community college educational attainment to lowest.

Exhibit 10: National-level Educational Attainment for Occupations



Of the 59% of the postings for these above middle-skill computer programming occupations that listed a minimum education requirement, 89% (9,128) requested a bachelor's degree and 7% (697) requested a high school diploma or an associate degree.

Educational Supply

The following supply tables display the total supply for above-middle skill computer programming occupations that align with these TOP/CIP codes and program needs.

Community College Supply:

Exhibit 11 shows the three-year average number of awards conferred by community colleges in the related TOP code(s):

- Information Technology, General (0701.00)
- Computer Information Systems (0702.00)
- Computer Software Development (0707.00)
- Computer Programming (0707.10)
- Database Design and Administration (0707.20)
- Computer Systems Analysis (0707.30)
- Computer Infrastructure and Support (0708.00)
- Computer Networking (0708.10)
- Computer Electronics (0934.10)

The colleges with the most completions in the region are Mt. San Antonio, Orange Coast, and Long Beach Over the past 12 months, there were one other related program recommendation requests from regional community colleges.

Exhibit 11: 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
0701.00	Information Technology, General	East LA	4	30	18	17
		Glendale	3	17	16	12
		LA Harbor	1	2	0	1
		LA Mission	1	4	3	3
		LA Swest	2	12	1	5
		Long Beach	106	88	73	89
		Mt San Antonio	49	23	12	28
		Santa Monica	1	0	0	0
		West LA	0	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	0	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	0	1	2	1

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
		LA Mission	1	1	0	1
		LA Swest	0	21	20	14
		LA Trade	15	17	35	22
		Long Beach	3	0	6	3
		Mt San Antonio	6	68	41	38
		Rio Hondo	6	15	14	12
		Santa Monica	0	0	2	1
		West LA	9	14	8	10
		LA Subtotal	**88**	**205**	**191**	**161**
		Coastline	0	2	7	3
		Fullerton	31	49	48	43
		Irvine	0	0	1	0
		Orange Coast	0	1	0	0
		Saddleback	1	0	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**
0707.00	Computer Software Development	LA City	0	1	0	0
		LA Harbor	0	2	2	1
		LA Mission	0	2	0	1
		LA Pierce	4	7	7	6
		Santa Monica	1	1	2	1
		West LA	0	6	1	2
		LA Subtotal	**5**	**19**	**12**	**12**
		Golden West	6	4	1	4
		Orange Coast	2	0	0	1
		Saddleback	10	15	16	14
		OC Subtotal	**18**	**19**	**17**	**18**
Supply Subtotal/Average			**23**	**38**	**29**	**30**
0707.10	Computer Programming	Cerritos	3	7	2	4
		Citrus	3	9	7	6
		East LA	1	0	1	1
		LA City	8	10	19	12
		LA Harbor	2	4	6	4
		LA Mission	7	7	6	7
		LA Pierce	5	5	7	6

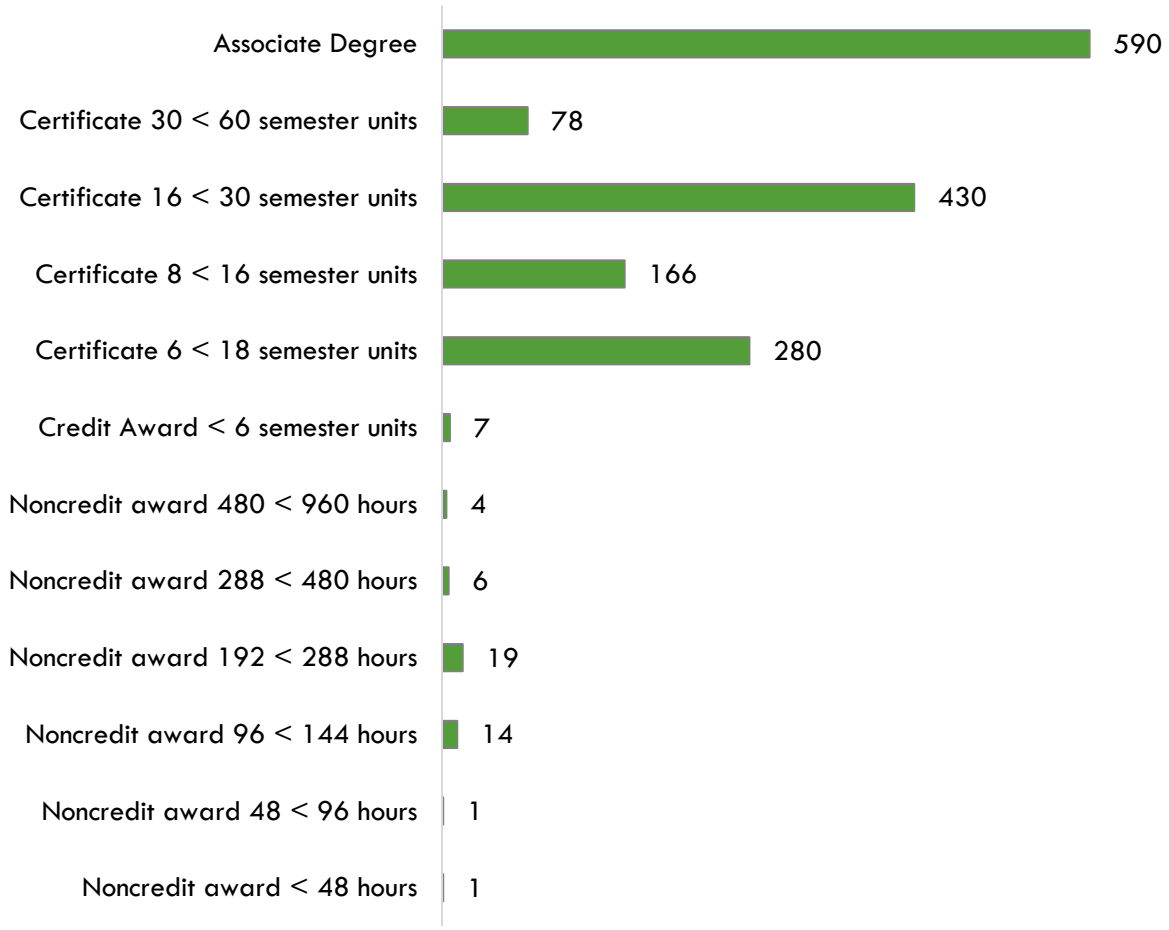
TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
		LA Swest	2	2	3	2
		LA Valley	13	8	15	12
		Long Beach	3	7	4	5
		Mt San Antonio	83	125	65	91
		Pasadena	23	23	37	28
		Santa Monica	65	71	55	64
		LA Subtotal	**218**	**278**	**227**	**241**
		Coastline	0	1	2	1
		Cypress	6	5	5	5
		Fullerton	24	28	32	28
		Orange Coast	206	160	250	205
		Santiago Canyon	2	2	3	2
		OC Subtotal	**238**	**196**	**292**	**242**
Supply Subtotal/Average			**456**	**474**	**519**	**483**
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 Subtotal/Average			**49**	**48**	**54**	**50**
0707.30	Computer Systems Analysis	Cerritos	0	5	2	2
		East LA	0	0	4	1
		LA City	1	6	5	4
		LA Harbor	1	1	0	1
		LA Mission	1	1	2	1
		LA Pierce	6	5	6	6
		LA Trade	0	0	2	1
		Mt San Antonio	0	9	6	5
		Rio Hondo	0	3	2	2
		LA Subtotal	**9**	**30**	**29**	**23**
		-	**-**	**-**	**-**	**-**
		OC Subtotal	**-**	**-**	**-**	**-**
Supply Subtotal/Average			**9**	**30**	**29**	**23**

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0708.00	Computer Infrastructure and Support	Cerritos	4	9	14	9
		East LA	0	3	11	5
		El Camino	0	5	8	4
		Glendale	4	11	3	6
		LA City	5	12	19	12
		LA Harbor	1	2	1	1
		LA Mission	17	32	20	23
		LA Valley	4	3	2	3
		Long Beach	8	2	24	11
		Mt San Antonio	24	36	17	26
		Pasadena	24	8	17	16
		Rio Hondo	11	19	30	20
		West LA	16	7	4	9
		LA Subtotal	**118**	**149**	**170**	**146**
		Coastline	73	91	81	82
		Cypress	1	1	0	1
		Orange Coast	5	7	2	5
		Saddleback	3	13	14	10
		Santa Ana	27	14	20	20
		Santiago Canyon	0	0	1	0
		OC Subtotal	**109**	**126**	**118**	**118**
Supply Subtotal/Average			**227**	**275**	**288**	**263**
0708.10	Computer Networking	Cerritos	8	6	10	8
		Glendale	0	2	2	1
		LA City	4	8	6	6
		LA Pierce	12	19	14	15
		Long Beach	48	52	70	57
		Mt San Antonio	4	25	13	14
		Rio Hondo	2	5	7	5
		Santa Monica	0	0	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	0	0
		Irvine	10	18	27	18
		Saddleback	19	15	17	17

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
		Santa Ana	23	45	47	38
		OC Subtotal	**206**	**198**	**224**	**209**
		Supply Subtotal/Average	**342**	**339**	**371**	**351**
0934.10	Computer Electronics	East LA	7	24	24	18
		El Camino	10	9	18	12
		LA Trade	14	16	2	11
		Mt San Antonio	7	18	17	14
		LA Subtotal	**38**	**67**	**61**	**55**
		Orange Coast	4	2	0	2
		Saddleback	22	10	8	13
		OC Subtotal	26	12	8	15
		Supply Subtotal/Average	**64**	**79**	**69**	**71**
		Supply Total/Average	**1,413**	**1,671**	**1,703**	**1,596**

Exhibit 12 shows the annual average community college awards by type from 2020-21 to 2022-23. The plurality of the awards are for associate degrees, followed by certificates between 16 and less than 30 semester units and certificates between 6 and less than 30 semester units

Exhibit 12: Annual Average Community College Awards by Type, 2020-2023



Community College Student Outcomes:

Exhibit 13 shows the Strong Workforce Program (SWP) metrics for computer programming programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. Of the 2,731 Orange County computer programming students in the 2020-21 academic year, 22% (594) attended an RSCCD college.

RSCCD students that exited computer programming programs in the 2021-22 academic year had higher median annual earnings ($46,400 or $22.31 per hour) compared to all computer programming students in Orange County ($40,730 or $19.58 per hour). A higher percentage of RSCCD computer programming students attained the living wage (57%) when compared to all computer programming students in Orange County (46%).

Exhibit 13: Computer Programming (0707.10) Strong Workforce Program Metrics, 2021-22[4]

SWP Metric	RSCCD	OC Region	California
SWP Students	594	2,731	36,846
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	23%	19%	23%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	Insufficient Data	74%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	Insufficient Data	109	796
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	49	331	4,665
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	Insufficient Data	75%	67%
Median Annual Earnings for SWP Exiting Students (2020-21)	$46,400 ($22.31)	$40,730 ($19.58)	$46,810 ($22.50)
Median Change in Earnings for SWP Exiting Students (2020-21)	32%	19%	24%
SWP Exiting Students Who Attained the Living Wage (2020-21)	57%	46%	59%

Non-Community College Supply:

To comprehensively analyze the regional supply, it is crucial to include data from other institutions offering computer programming programs. Exhibit 14 displays the annual and three-year average awards granted by these institutions under the related Classification of Instructional Programs (CIP) code:

- Computer and Information Sciences, General (11.0101)
- Artificial Intelligence (11.0102)
- Information Technology (11.0103)
- Computer Programming/Programmer, General (11.0201)
- Computer Programming, Specific Platforms (11.0205)
- Computer Programming, Other (11.0299)
- Computer Science (11.0701)
- Computer Engineering Technology/Technician (15.1201)
- Computer/Computer Systems Technology/Technician (15.1202)
- Data Science, General (30.7001)
- Data Analytics, General (30.7101)

No awards were conferred under the related CIP codes:

- Computer Programming, Specific Applications (11.0202)
- Computer Programming, Vendor/Product Certification (11.0203)
- Computer Game Programming (11.0204)
- Computer Systems Analysis/Analyst (11.0501)
- Cloud Computing (11.0902)
- Computer Software Technology/Technician (15.1204)
- Data Visualization (30.7103)

The available data covers 2019 to 2022. During this period, non-community college institutions in the region conferred an average of 5,240 awards annually in related programs.

[4] All SWP metrics are for 2020-21 unless otherwise noted.

Exhibit 14: Regional Non-Community College Awards, 2019-2022

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
11.0101	Computer and Information Sciences, General	Azusa Pacific University	21	25	5	17
		Chapman University	16	20	25	20
		Los Angeles Pacific College	6	2	2	3
		Loyola Marymount University	27	46	60	44
		Mount Saint Mary's University	0	0	0	0
		Pacific States University	2	2	4	3
		Pitzer College	0	1	0	0
		The Master's University and Seminary	9	5	3	6
		University of California-Irvine	4	1	0	2
		University of La Verne	23	36	20	26
		University of Massachusetts Global	30	36	37	34
		University of the People	203	292	478	324
		Vanguard University of Southern California	0	0	0	0
		Westcliff University	0	4	22	9
		Supply Subtotal/Average	**341**	**470**	**656**	**489**
11.0102	Artificial Intelligence	University of Southern California	11	7	23	14
		Supply Subtotal/Average	**11**	**7**	**23**	**14**
11.0103	Information Technology	Bethesda University	0	0	0	0
		Brand College	13	17	18	16
		California Intercontinental University	2	0	0	1
		California State Polytechnic University-Pomona	0	16	21	12
		California State University-Dominguez Hills	4	10	17	10
		California State University-Fullerton	58	62	19	46

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		California State University-Los Angeles	180	141	118	146
		California State University-Northridge	29	51	45	42
		Platt College-Anaheim	15	17	12	15
		Platt College-Los Angeles	12	6	3	7
		University of La Verne	2	3	15	7
		University of Massachusetts Global	0	0	1	0
		Westcliff University	0	3	65	23
		Supply Subtotal/Average	**315**	**326**	**334**	**325**
11.0201	Computer Programming/ Programmer, General	ABCO Technology	46	34	14	31
		Platt College-Anaheim	4	0	0	1
		Supply Subtotal/Average	**50**	**34**	**14**	**33**
11.0205	Computer Programming, Specific Platforms	ABCO Technology	0	0	0	0
		Supply Subtotal/Average	**0**	**0**	**0**	**0**
11.0701	Computer Science	Azusa Pacific University	0	0	9	3
		Biola University	18	18	15	17
		California Institute of Technology	73	84	78	78
		California State Polytechnic University-Pomona	266	297	229	264
		California State University-Dominguez Hills	77	90	96	88
		California State University-Fullerton	360	396	400	385
		California State University-Long Beach	316	304	312	311
		California State University-Los Angeles	177	182	172	177

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		California State University-Northridge	172	228	274	225
		Chapman University	30	45	50	42
		Claremont McKenna College	25	17	13	18
		Concordia University-Irvine	0	0	3	1
		Harvey Mudd College	47	48	48	48
		Occidental College	14	14	31	20
		Pitzer College	9	5	10	8
		Pomona College	34	33	49	39
		Scripps College	11	4	6	7
		Southern California Institute of Technology	10	7	5	7
		The Master's University and Seminary	0	0	0	0
		University of California-Irvine	886	990	869	915
		University of California-Los Angeles	437	507	507	484
		University of Southern California	1,273	1,386	1,015	1,225
		Supply Subtotal/Average	**4,235**	**4,655**	**4,191**	**4,360**
15.1201	Computer Engineering Technology/ Technician	California State University-Long Beach	4	5	6	5
		Supply Subtotal/Average	**4**	**5**	**6**	**5**
15.1202	Computer/ Computer Systems Technology/ Technician	Learnet Academy Inc	4	2	2	3
		University of La Verne	0	0	0	0
		Supply Subtotal/Average	**4**	**2**	**2**	**3**
30.7001	Data Science, General	Vanguard University of Southern California	0	0	0	0
		Supply Subtotal/Average	**0**	**0**	**0**	**0**
30.7101	Data Analytics, General	Mount Saint Mary's University	0	0	0	0

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		University of Massachusetts Global	3	7	8	6
		Westcliff University	0	0	0	0
		Supply Subtotal/Average	**3**	**7**	**8**	**6**
		Supply Total/Average	**4,963**	**5,506**	**5,234**	**5,234**

Regional Demographics

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

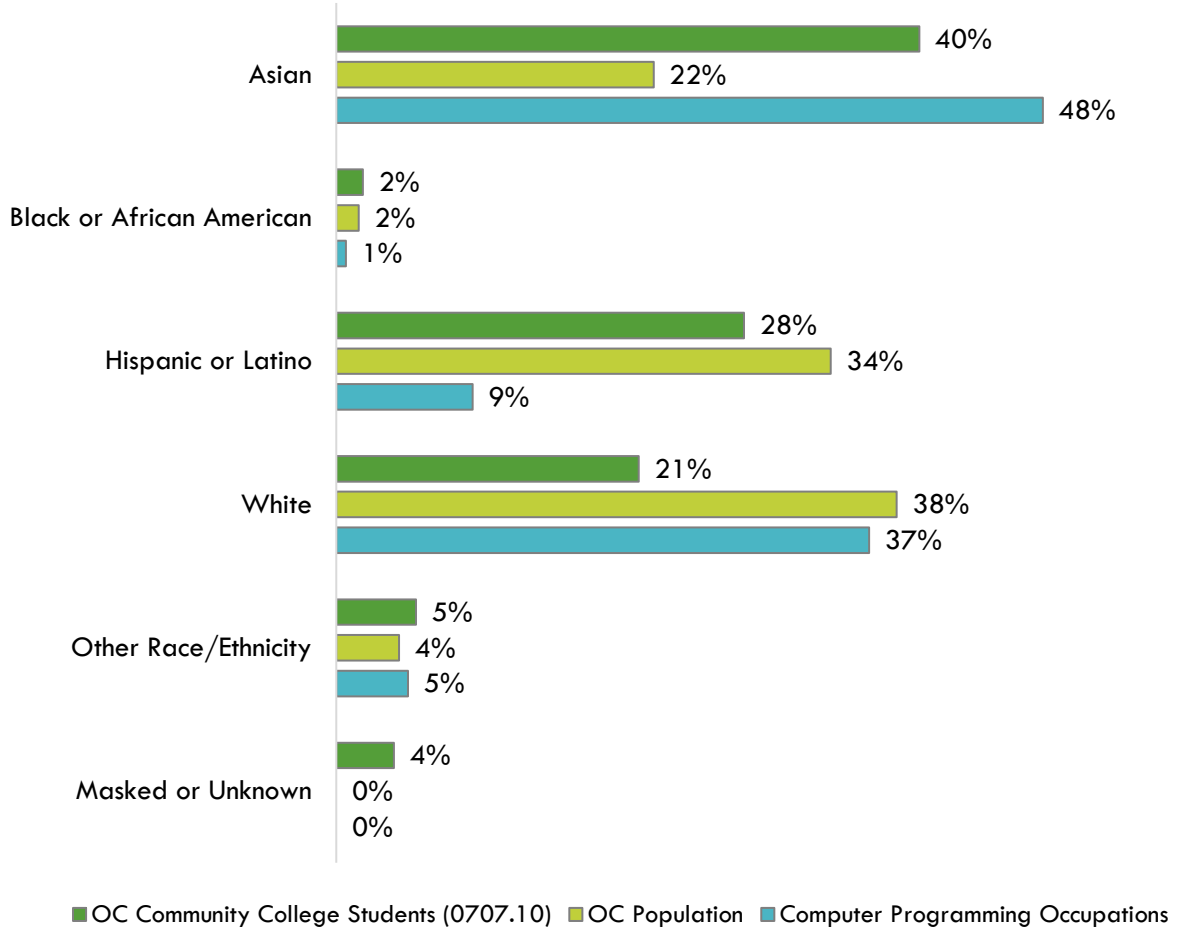
Ethnicity:

Exhibit 15 compares the ethnicity of Orange County community college students enrolled in computer programming programs, the overall Orange County population, and occupation-specific data for the four computer programming occupations included in this report.

Notably, 48% of workers employed in these computer programming occupations are Asian, which is more than doubled than the population (22%) and higher than community college computer programming students (40%). Conversely, 37% of workers in the field are white, which is slightly below the population (38%), but much higher than the community college computer programming students (21%)

Examining disaggregated data for each occupation (not shown), the occupation with the highest percentage of Asian workers is *software developers*^ (50%), which has the highest entry-level wages of the two computer programming occupations. *Computer programmers*^ has the highest percentage of white workers (38%). This occupation also has the lowest entry-level wages of the two computer programming occupations.

Exhibit 15: Program and County Demographics by Ethnicity



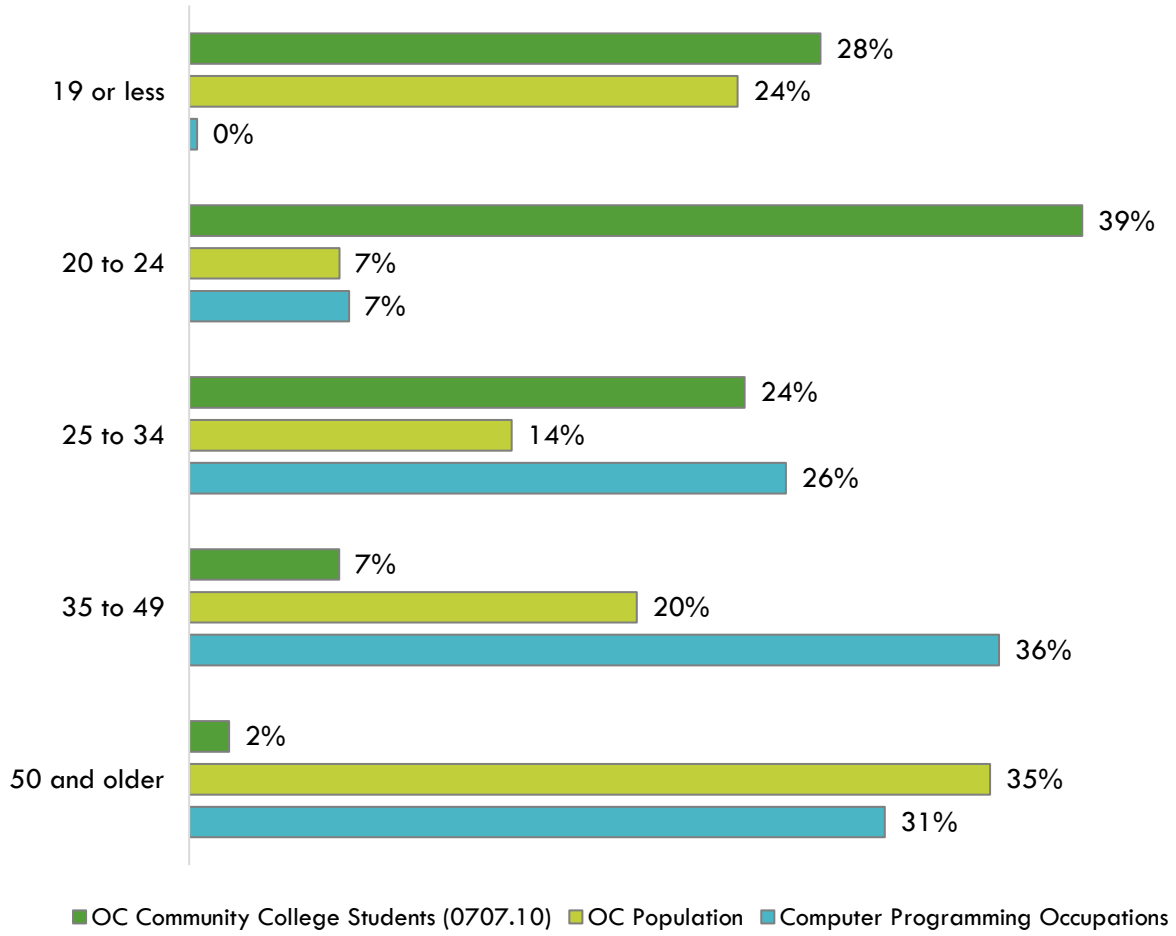
Age:

Exhibit 16 compares the age of Orange County community college students enrolled in computer programming programs, the overall Orange County population, and occupation-specific data for the four computer programming occupations included in this report.

Nearly 67% of workers in these computer programming occupations are aged 35 and older, which is higher than the population (55%) and significantly higher than community college computer programming students (9%). Conversely, 26% of workers in the field are aged between 25 and 34, which is higher than the population (14%) but only slightly higher than the community college computer programming students (24%).

Examining disaggregated data for each occupation (not shown), the occupation with the highest percentage of workers aged between 25 and 34 is *software developers^* (28%), which has the highest entry-level wages of the two computer programming occupations. Conversely, the occupation with the highest percentage of workers aged 35 and older is *computer programmers^* (70%). This occupation also has the lowest entry-level wages of the two computer programming occupations.

Exhibit 16: Program and County Demographics by Age



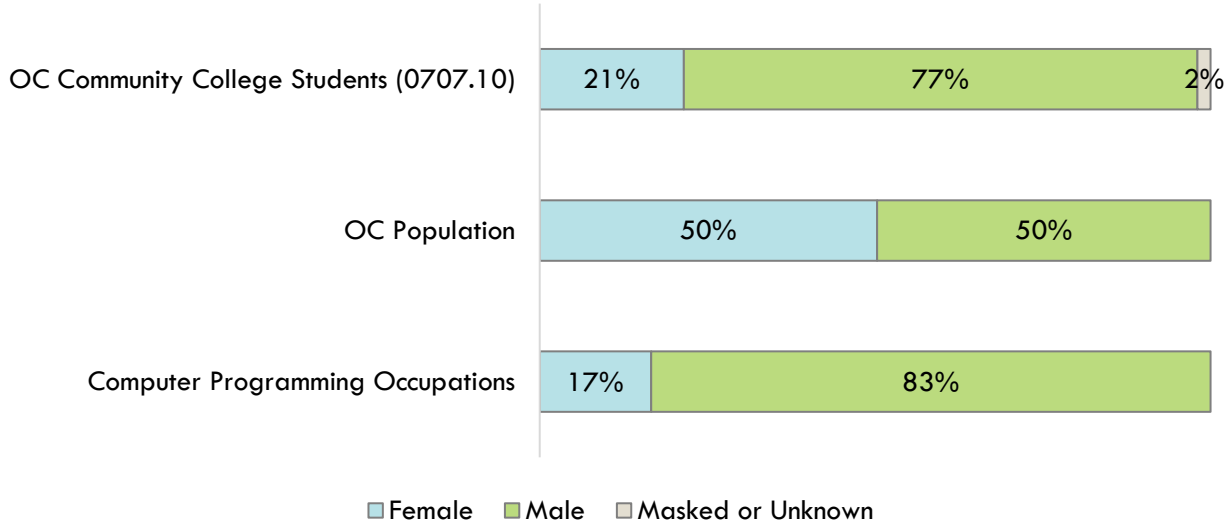
Sex:

Exhibit 17 compares the sex of Orange County community college students enrolled in computer programming programs, the overall Orange County population, and occupation-specific data for these computer programming occupations.

Though the population is split evenly between women and men, only 21% of community college commercial dance students and 17% of workers in the field are women.

Examining disaggregated data for each occupation (not shown), both occupations have nearly the same percentage women: *software developers*^ (17%) and *computer programmers*^ (16%).

Exhibit 17: 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 10, 2025, is a nationally recognized living wage metric and is provided for reference. The current MIT Living Wage in Orange County is $32.20. 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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March 2025