Labor Market Analysis for Program Recommendation: 0956.30/Machining and Machine Tools (*Machine Technology Level I Certificate*) (*Machine Technology Level II Certificate*)

Orange County Center of Excellence, July 2024

Summary

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

Program LMI Endorsement Criteria		
	Yes ☑	No ☐
Supply Gap:	*Comments:* There are projected to be **2,657 annual job openings** throughout Los Angeles and Orange counties for these machining occupations, which **is more than the 340 awards conferred by educational institutions.**	
	Yes ☐	No ☑
California Insight Living Wage: (Entry-Level, 25th)[1]	*Comments:* **Nearly 96% of annual job openings** for these machining occupations **have entry-level hourly wages below the OC living wage of $20.63.**	
	Yes ☑	No ☐
Education:	*Comments:* Though the majority (96%) of annual openings for these occupations typically require a high school diploma or equivalent, **23% to 50% of workers in the field have completed some college or an associate degree as their highest level of education.**	

Emerging Occupation(s)	
Yes ☐	No ☑
Comments: N/A	

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 seven machining occupations:

- Below Middle-Skill – denoted with an asterisk (*) throughout this report.
  - *Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic (51-4021)**
- Middle-Skill
  - *Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic (51-4031)*

[1] The living wage endorsement criteria in this report uses the California Insight Center's living wage of $20.63 for Orange County, last updated in September 2021, as currently employed by the Chancellor's Office for the *Students Who Attained the Living Wage Strong Workforce Program* metric. However, this figure is outdated and does not reflect recent increases in the cost of living. The MIT Living Wage, updated on February 14, 2024, better accounts for existing economic conditions, with the current MIT Living Wage in Orange County being $30.48, which is mentioned as a reference only throughout this labor market analysis brief.

- *Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic (51-4032)*
- *Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic (51-4033)*
- *Machinists (51-4041)*
- *Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic (51-4081)*
- *Tool and Die Makers (51-4111)*

Middle-skill occupations typically require a community college education while below middle-skill occupations usually request up to a high school diploma or equivalent. Though OC COE labor market analysis reports typically focus on middle-skill occupations, the below middle-skill occupation included in this report align with program objectives. Additionally, students can obtain employment in this below middle-skill occupation with a community college education. Therefore, the endorsement of this report considers data for both the below middle-skill and middle-skill occupations.

Based on the available data, there appears to be a supply gap for these machining occupations. Though most annual openings have entry-level wages below the California Insight living wage, typical education requirements for these occupations align with a community college education. **Therefore, due to some regional labor market criteria being met, the COE endorses this proposed program.**

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
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic (51-4021)*	LA: 109 OC: 53 TTL: *163*	*Accounted for Below*	OC: $16.91	High school diploma or equivalent	31%
Below Middle-Skill Total	**163**	***Accounted for Below***	**N/A**	**N/A**	**N/A**
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic (51-4031)	LA: 234 OC: 113 TTL: *347*	LA: 8 OC: 0 TTL: 8	OC: $17.95	High school diploma or equivalent	27%
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic (51-4032)	LA: *47* OC: 22 TTL: *69*	*Accounted for Below*	OC: $17.98	High school diploma or equivalent	26%

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic (51-4033)	LA: 312 OC: 164 TTL: *477*	*Accounted for Below*	OC: $17.20	High school diploma or equivalent	23%
Machinists (51-4041)	LA: 809 OC: 466 TTL: *1,275*	LA: 199 OC: 134 TTL: 332	OC: $18.70	High school diploma or equivalent	41%
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic (51-4081)	LA: 124 OC: 88 TTL: *212*	*Accounted for Above*	OC: $17.68	High school diploma or equivalent	28%
Tool and Die Makers (51-4111)	LA: *75* OC: 40 TTL: *115*	LA: 0 OC: 0 TTL: 0	OC: $28.48	Postsecondary nondegree award	50%
Middle-Skill Total	**2,494**	**340**	**N/A**	**N/A**	**N/A**
Total	**2,657**	**340**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to these machining occupations is projected to decrease 1% through 2027, resulting in 2,657 projected annual job openings.
- Hourly entry-level wages for these machining occupations range from $16.56 to $27.91 in Orange County; nearly 96% of annual job openings have entry-level wages below the California Insight living wage.
- There were 3,211 online job postings for these machining occupations over the past 12 months. The highest number of postings were for CNC machinists, machinists, and CNC lathe machinists.
- The typical entry-level education for these machining occupations ranges from a high school diploma or equivalent to a postsecondary nondegree award.
- Between 23% and 50% of workers in these occupations have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 207 awards conferred by 11 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions conferred an average of 133 awards from 2019 to 2021.
- Orange County community college students that exited machining and machine tools programs in the 2020-21 academic year had a median annual wage of $50,384 ($24.22 per hour) after exiting the program and 56% attained the regional living wage (California Insight).
- Throughout Orange County, 83% of machining and machine tools 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 seven machining occupations from 2017 through 2027. Employment for these seven machining occupations decreased 13% in Orange County from 2019 to 2020 due to the COVID-19 pandemic, which is significantly higher than the 7% decline across all occupations in Los Angeles and Orange counties during the same period.

In the three years preceding the pandemic, employment for these occupations fluctuated in Orange County, with an increase in 2018 following and preceding declines in 2017 and 2019. After a decrease in employment in 2020 and an increase through 2022, employment for these seven occupations in Orange County is projected to remain flat through 2027, experiencing a lower rate relative to all occupations in Los Angeles and Orange counties.

Exhibit 2: Annual Percent Change in Jobs for Machining Occupations, 2017-2027

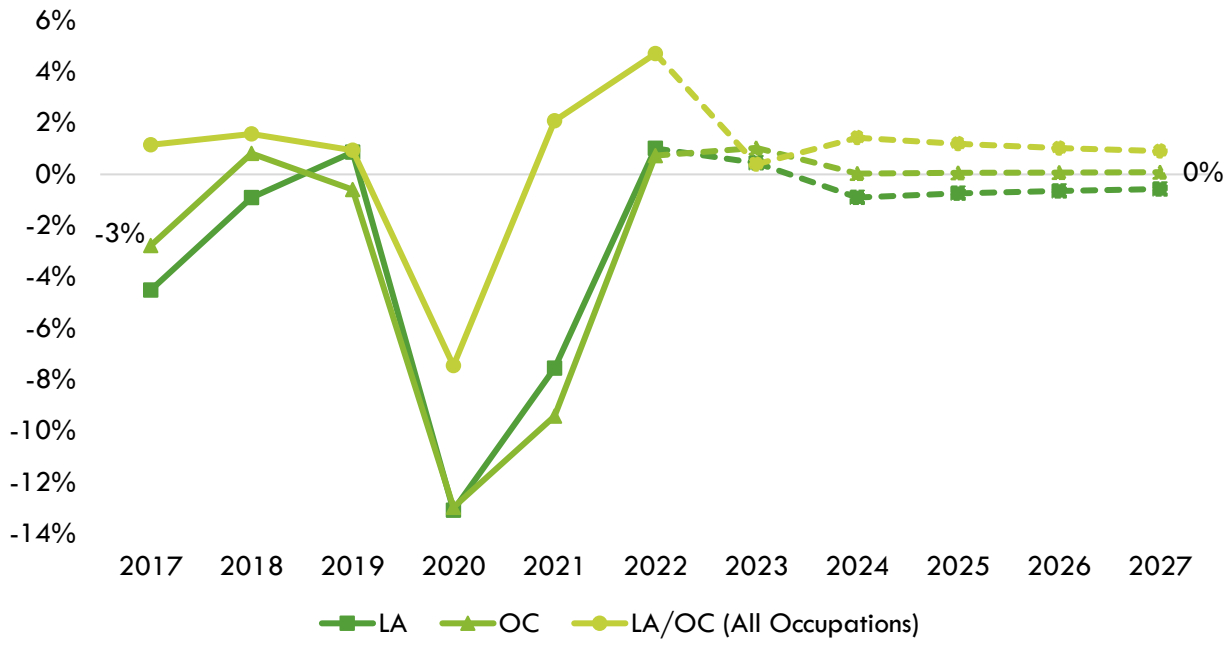


Exhibit 3 shows the five-year occupational demand projections for *extruding and drawing machine setters, operators, and tenders, metal and plastic**, the only below middle-skill occupations included in this report. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to decrease 5% through 2027. There is projected to be 163 jobs available annually.

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

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	1,096	1,032	(63)	(6%)	109
Orange	524	502	(22)	(4%)	53
Total	**1,620**	**1,535**	**(85)**	**(5%)**	**163**

Exhibit 4 shows the five-year occupational demand projections for the six middle-skill occupations analyzed in this report. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to decrease 1% through 2027. There is projected to 2,494 jobs available annually.

Exhibit 4: Middle-Skill Occupational Demand in Los Angeles and Orange Counties[2]

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	15,918	15,573	(344)	(2%)	1,600
Orange	8,416	8,553	137	2%	894
Total	**24,334**	**24,126**	**(207)**	**(1%)**	**2,494**

Wages:

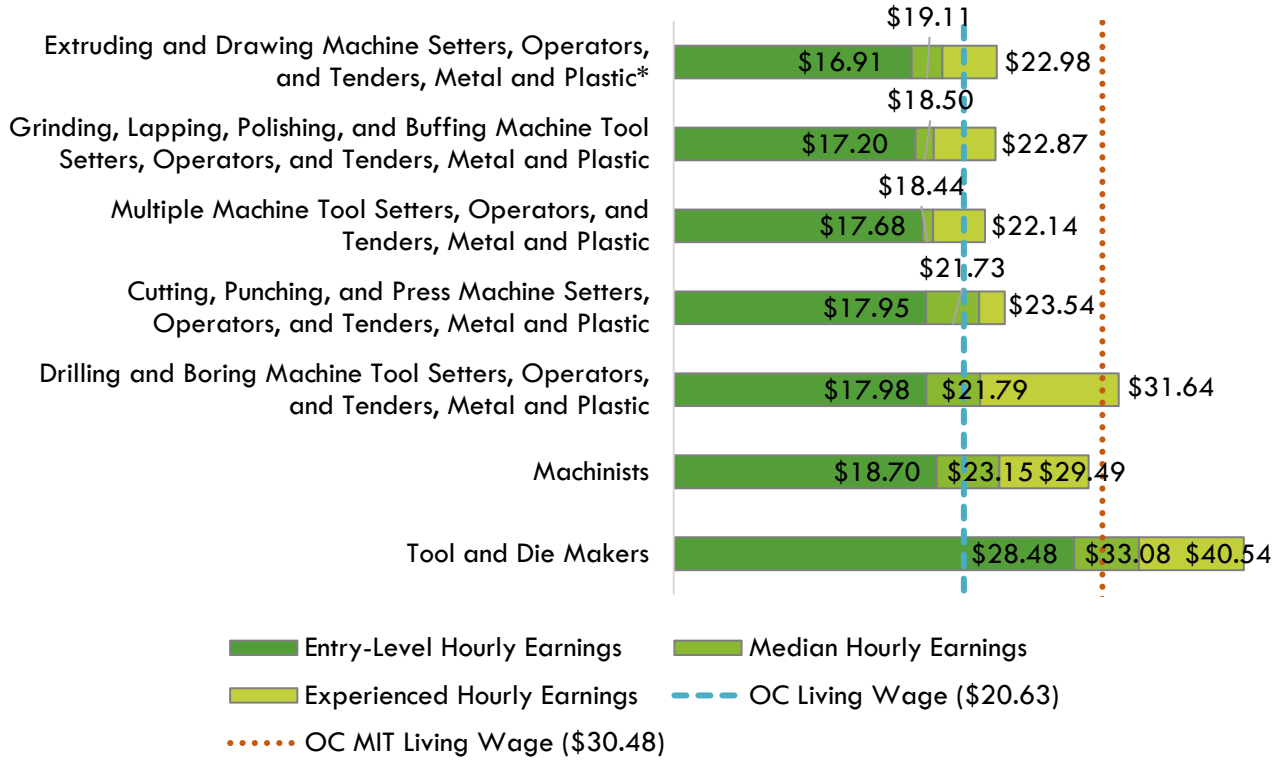
The labor market endorsement in this report considers the entry-level hourly wages for these machining occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region.

It is important to note that the living wage endorsement criteria in this report uses the California Insight Center's living wage of $20.63 for Orange County, last updated in September 2021, as currently employed by the Chancellor's Office for the *Students Who Attained the Living Wage Strong Workforce Program* metric. However, this figure is outdated and does not reflect recent increases in the cost of living. The MIT Living Wage, updated on February 14, 2024, better accounts for existing economic conditions, with the current MIT Living Wage in Orange County being $30.48. Both figures are notated in the exhibits below.

Nearly 96% of annual openings for these machining occupations have entry-level wages below the California Insight living wage for one adult ($20.63 in Orange County). Typical entry-level hourly wages range between $16.91 and $28.48. Orange County's average wages of $23.81 are below the average statewide wage of $24.28 for these occupations. Exhibit 5 shows the wage range for each of the seven machining occupations in Orange County and how they compare to the Insight and MIT living wages, sorted from lowest to highest entry-level wage.

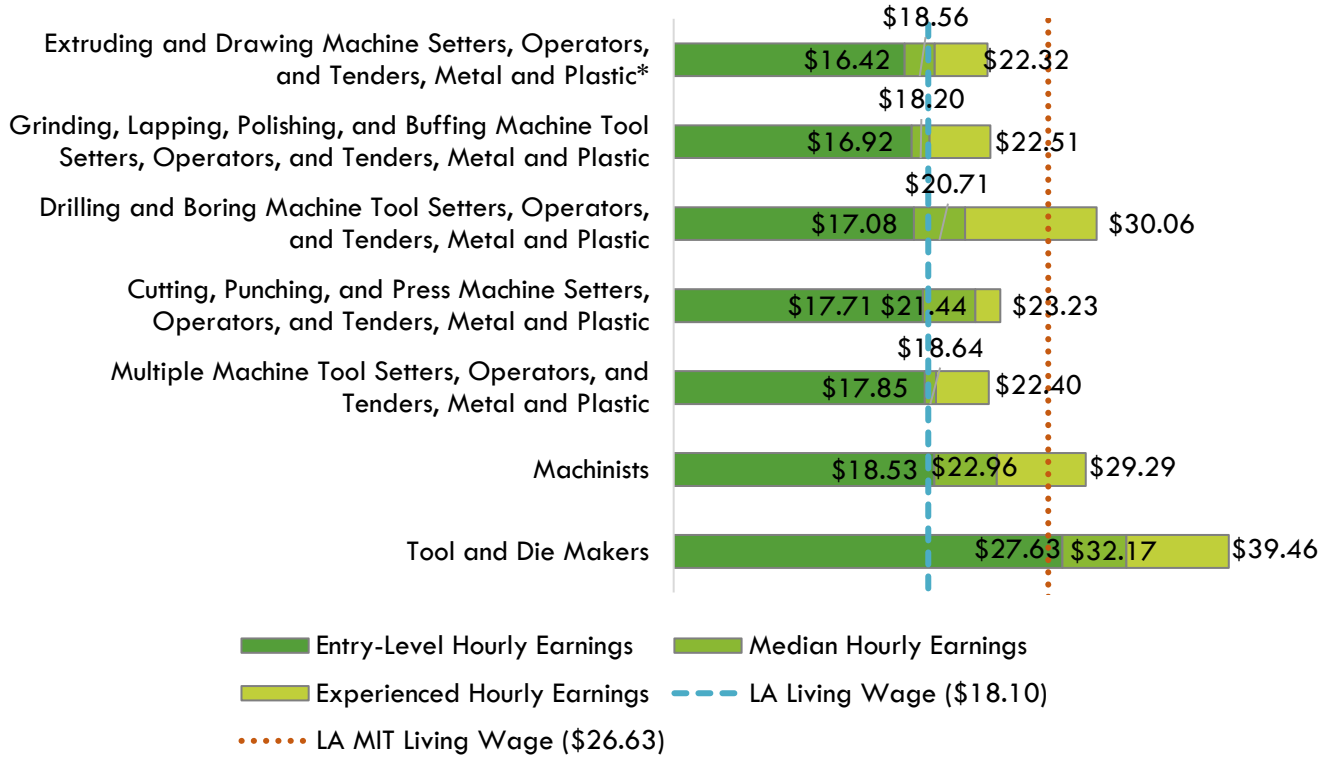
[2] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Exhibit 3: Wages by Occupation in Orange County



Just over half (52%) of annual openings for these machining occupations have entry-level wages above the California Insight living wage for one adult ($18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between $16.42 and $27.63. Los Angeles County's average wages of $23.51 are above the average statewide wage of $24.28 for these occupations. Exhibit 6 shows the wage range for each of the seven machining occupations in Los Angeles County how they compare to the Insight and MIT living wages, sorted from lowest to highest entry-level wage.

Exhibit 4: Wages by Occupation in Los Angeles County



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 3,211 online job postings related to the seven machining occupations listed in the past 12 months. Of those, most were for *machinists* (63%), followed distantly by *grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic* (16%). Exhibit 7 shows the number of job postings by occupation.

Exhibit 5: Number of Job Postings by Occupation (n=3,211)

Occupation	Job Postings	Percentage of Job Postings
Machinists	2,030	63%
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	522	16%
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	318	10%
Tool and Die Makers	254	8%
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic*	53	2%
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	32	1%
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2	0%
Total Postings	**3,211**	**100%**

The top employers in the region for the only below-middle skill occupation examined in this report, *extruding and drawing machine setters, operators, and tenders, metal and plastic**, by number of job postings, are shown in Exhibit 8.

Exhibit 6: Top Below Middle-Skill Employers by Number of Job Postings (n=53)

Employer	Job Postings	Percentage of Job Postings
Kforce	10	19%
PeopleReady	5	9%
Tekni-Plex	5	9%
Pactiv Evergreen	4	8%
Breeders Choice Pet Foods	3	6%
Pactiv	3	6%
Revolution 96.2	3	6%
Aerotek	2	4%
Helpmates	2	4%
Kimco Staffing	2	4%

[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 in the region for the six middle-skill machining occupations, by number of job postings, are shown in Exhibit 9.

Exhibit 7: Top Middle-Skill Employers by Number of Job Postings (n=3,158)

Employer	Job Postings	Percentage of Job Postings
Aerotek	384	12%
Precision Castparts	95	3%
Volt	87	3%
Flowserve	83	3%
Flag Solutions	71	2%
Applied Medical Resources Corporation	70	2%
Express Employment Professionals	45	1%
Howmet Aerospace	44	1%
Acara Solutions	38	1%
SpaceX	37	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for *extruding and drawing machine setters, operators, and tenders, metal and plastic**, in Exhibit 10.

Exhibit 8: Top Skills for Below Middle-Skill Occupation by Number of Job Postings (n=53)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Extrusion (48)	Troubleshooting (Problem Solving) (19)	Disassembler (3)
Plastics Extrusion (15)	Mechanical Aptitude (12)	TeamQuest (1)
Plastic Materials (14)	Teamwork (9)	
Safety Standards (14)	Computer Literacy (8)	
Standard Operating Procedure (12)	Operations (7)	
Tooling (12)	English Language (6)	
Machine Setup (8)	Lifting Ability (6)	
Injection Molding (7)	Packaging And Labeling (6)	
Hand Tools (6)	Mathematics (5)	
Housekeeping (6)	Planning (5)	

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for the six middle-skill occupations in Exhibit 11.

Exhibit 9: Top Skills for Middle-Skill Occupations by Number of Job Postings (n=3,158)

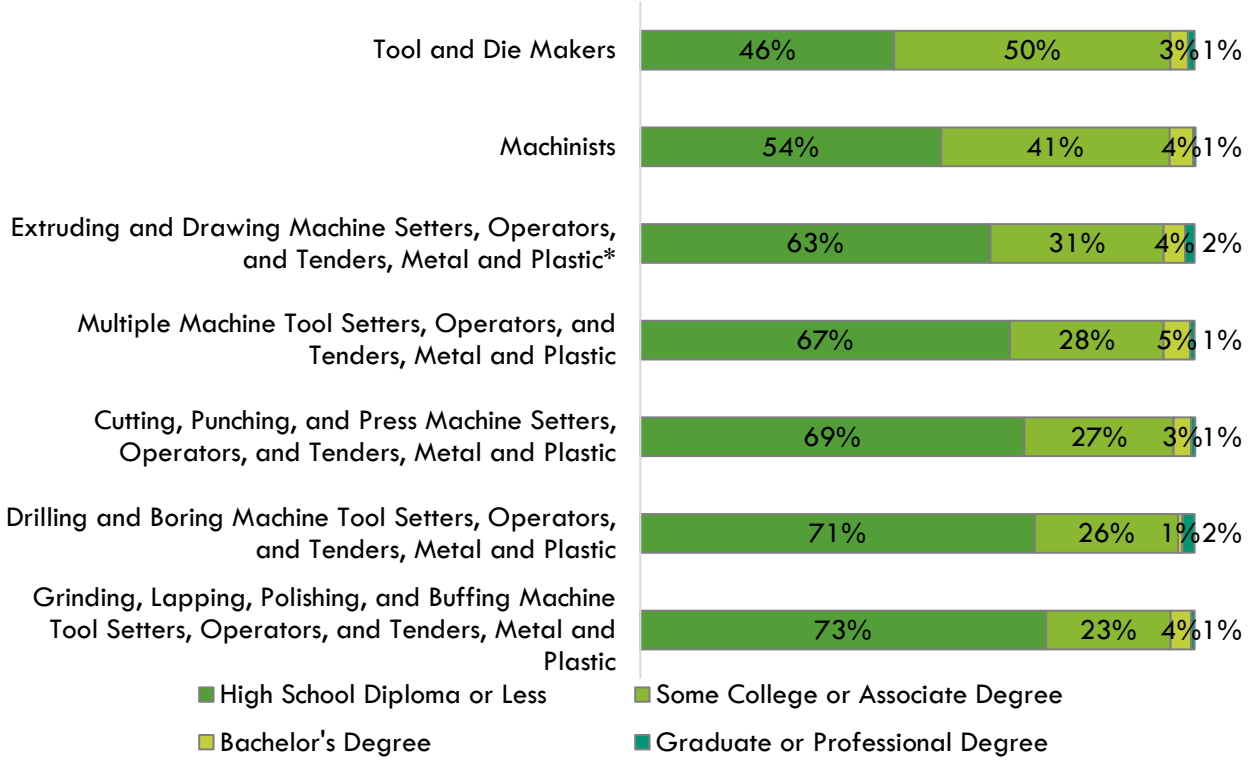
Top Specialized Skills	Top Soft Skills	Top Computer Skills
Machining (1,770)	Operations (1,253)	Mastercam (CAD/CAM Software) (132)
Lathes (1,240)	Mathematics (834)	Microsoft Office (114)
Tooling (1,134)	Detail Oriented (505)	G-Codes (110)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Blueprinting (949)	English Language (457)	SolidWorks (CAD) (60)
Micrometer (884)	Lifting Ability (455)	Angular (Web Framework) (58)
Mills (860)	Communication (448)	Toolkits (46)
Computer Numerical Control (CNC) (782)	Troubleshooting (Problem Solving) (395)	Microsoft Excel (44)
Calipers (765)	Problem Solving (316)	Microsoft Outlook (31)
Grinding Machine (674)	Management (245)	Enterprise Document Management System (27)
Deburring (574)	Computer Literacy (233)	Microsoft Access (24)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for all machining occupations examined in this report with exception of *tool and die makers,* which requires a postsecondary nondegree award. However, national-level educational attainment data indicates 31% of workers in the below middle-skill occupation and between 23% to 50% of workers in the middle-skill occupations have completed some college or an associate degree as their highest level of education. Exhibit 12 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 30% of the postings for the below middle-skill occupations that listed a minimum education requirement, 100% (16) requested a high school diploma.

In addition, of the 45% of the cumulative job postings for the middle-skill occupation that listed a minimum education requirement in Los Angeles/Orange County, 99% (1,428) requested a high school diploma or an associate degree and 0.5% (7) requested a bachelor's degree.

Educational Supply

Community College Supply:

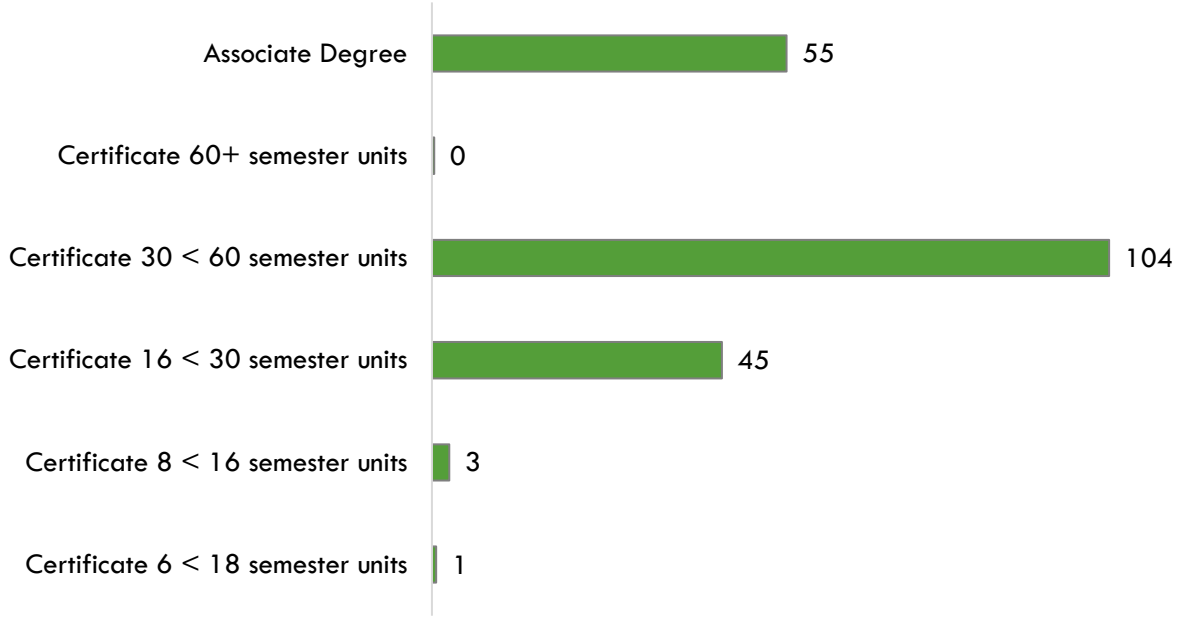
Exhibit 13 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Machining and Machine Tools (0956.30) and Sheet Metal and Structural Metal (0956.40). The colleges with the most completions in the region are Santa Ana, Orange Coast, and Cerritos. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Exhibit 11: Regional Community College Awards (Certificates and Degrees), 2019-2022

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0956.30	Machining and Machine Tools	Cerritos	37	14	16	22
		Compton	12	0	16	9
		El Camino	22	4	26	17
		Glendale	7	1	1	3
		LA Pierce	8	2	2	4
		LA Trade	4	2	7	4
		LA Valley	3	3	6	4
		Pasadena	0	2	3	2
		LA Subtotal	**93**	**28**	**77**	**66**
		Orange Coast	74	41	27	47
		Santa Ana	102	76	81	86
		OC Subtotal	**176**	**117**	**108**	**134**
Supply Subtotal/Average			**269**	**145**	**185**	**200**
0956.40	Sheet Metal and Structural Metal	Long Beach	1	11	11	8
		LA Subtotal	**1**	**11**	**11**	**8**
		-	-	-	-	-
		OC Subtotal	**-**	**-**	**-**	**-**
Supply Subtotal/Average			**1**	**11**	**11**	**8**
Supply Total/Average			**270**	**156**	**196**	**207**

Exhibit 14 shows the annual average community college awards by type from 2019-20 through 2021-22. The plurality of the awards are for certificates between 30 and less than 60 semester units, followed by associate degrees and certificates between 16 and less than 30 semester units.

Exhibit 12: Annual Average Community College Awards by Type, 2019-2022



Community College Student Outcomes:

Exhibit 15 shows the Strong Workforce Program (SWP) metrics for machining and machine tools programs in North Orange County Community College District (NOCCCD), the Orange County Region, and California. Only two community colleges in Orange County (Orange Coast and Santa Ana) provide related programs. Therefore, data is unavailable for NOCCCD. There were 312 Orange County machining and machine tools students in the 2020-21 academic year in Orange County. Due to the low number of students, data is unavailable for two metrics.

Orange County students that exited machining and machine tools programs in the 2020-21 academic year had identical median annual earnings ($50,384 or $24.22 per hour) compared to all machining and machine tools students statewide ($50,384 or $24.22 per hour). Furthermore, a lower percentage of Orange County machining and machine tools students attained the California Insight living wage (56%) when compared to all machining and machine tools students in California (66%).

Exhibit 13: Machining and Machine Tools (0956.30) Strong Workforce Program Metrics, 2020-21[4]

SWP Metric	NOCCCD	OC Region	California
SWP Students	N/A	312	1,900
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	N/A	44%	37%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	Insufficient Data	91%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	57	172

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

SWP Metric	NOCCCD	OC Region	California
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	N/A	Insufficient Data	78
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	N/A	83%	77%
Median Annual Earnings for SWP Exiting Students	N/A	$50,384 ($24.22)	$50,384 ($24.22)
Median Change in Earnings for SWP Exiting Students	N/A	17%	34%
SWP Exiting Students Who Attained the Living Wage	N/A	56%	66%

Non-Community College Supply:

To comprehensively analyze the regional supply, it is crucial to include data from other institutions offering machining programs. Exhibit 16 displays the annual and two-year average awards granted by these institutions under the related Classification of Instructional Programs (CIP) code: Machine Tool Technology/Machinist (48.0501).

The available data covers 2019 to 2021. During this period, non-community college institutions in the region conferred an average of 133 awards annually in related training programs.

Exhibit 14: Regional Non-Community College Awards, 2019-2021

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
48.0501	Machine Tool Technology / Machinist	NTMA Training Centers of Southern California	139	124	132
		Pomona Unified School District Adult and Career Education	2	0	1
Supply Total/Average			**141**	**124**	**133**

Regional Demographics

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

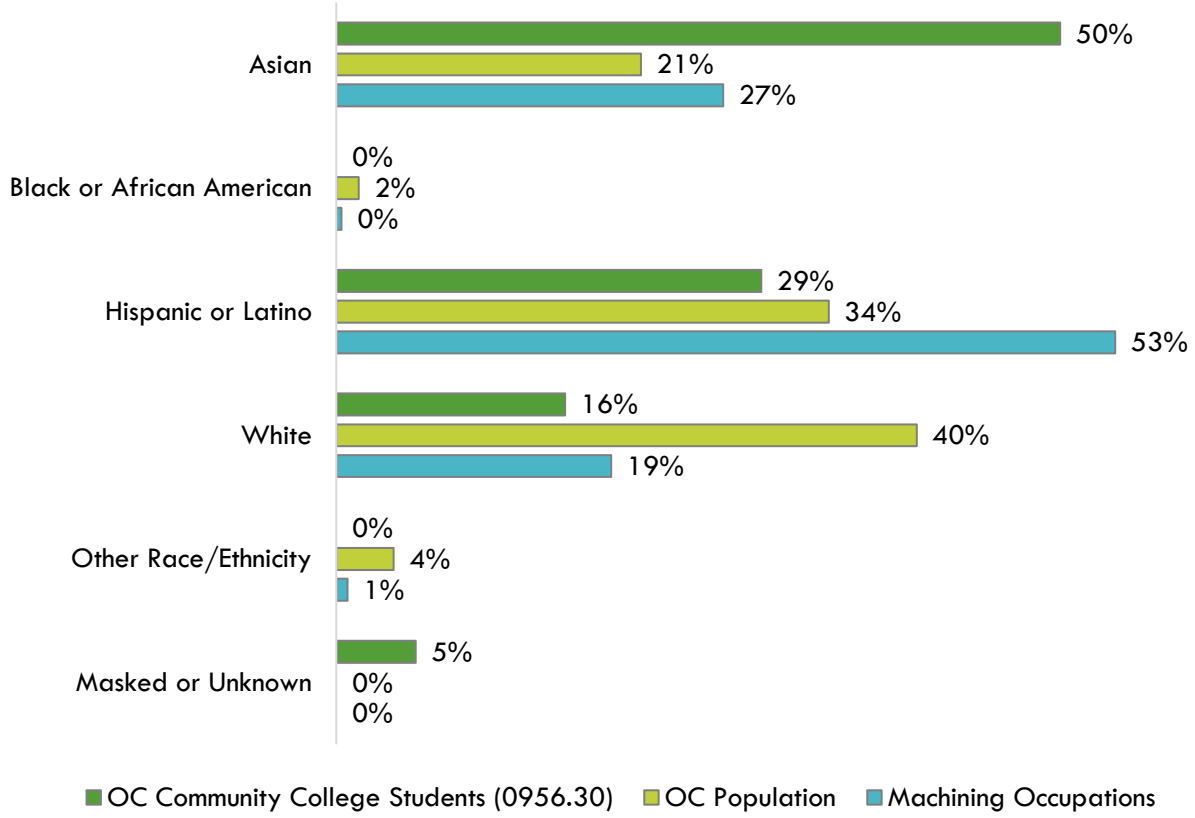
Ethnicity:

Exhibit 17 compares the ethnicity of Orange County community college students enrolled in machining and machine tools programs, the overall Orange County population, and occupation-specific data for the seven machining occupations included in this report.

Notably, a majority of workers (53%) in these machining occupations are Hispanic or Latino, which is significantly higher than the population (34%) and community college machining and machine tools students (29%). Conversely, half (50%) of all community college machining and machine tools students are Asian, which is significantly higher than the population (21%) and workers in the field (27%). Furthermore, though the plurality of individuals in the county population are white (40%), only 19% of workers in the field and 16% of community college machining and machine tools students are white.

Examining disaggregated data for each occupation (not shown), Hispanic or Latino individuals account for the majority of workers across four of the seven machining occupations: *extruding and drawing machine setters, operators, and tenders, metal and plastic** (83%), *cutting, punching, and press machine setters, operators, and tenders, metal and plastic* (72%), *grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic* (82%), and *multiple machine tool setters, operators, and tenders, metal and plastic* (70%). The occupation with the highest percentages of white (51%) and Asian (49%) workers is *drilling and boring machine tool setters, operators, and tenders, metal and plastic.*

Exhibit 15: Program and County Demographics by Ethnicity



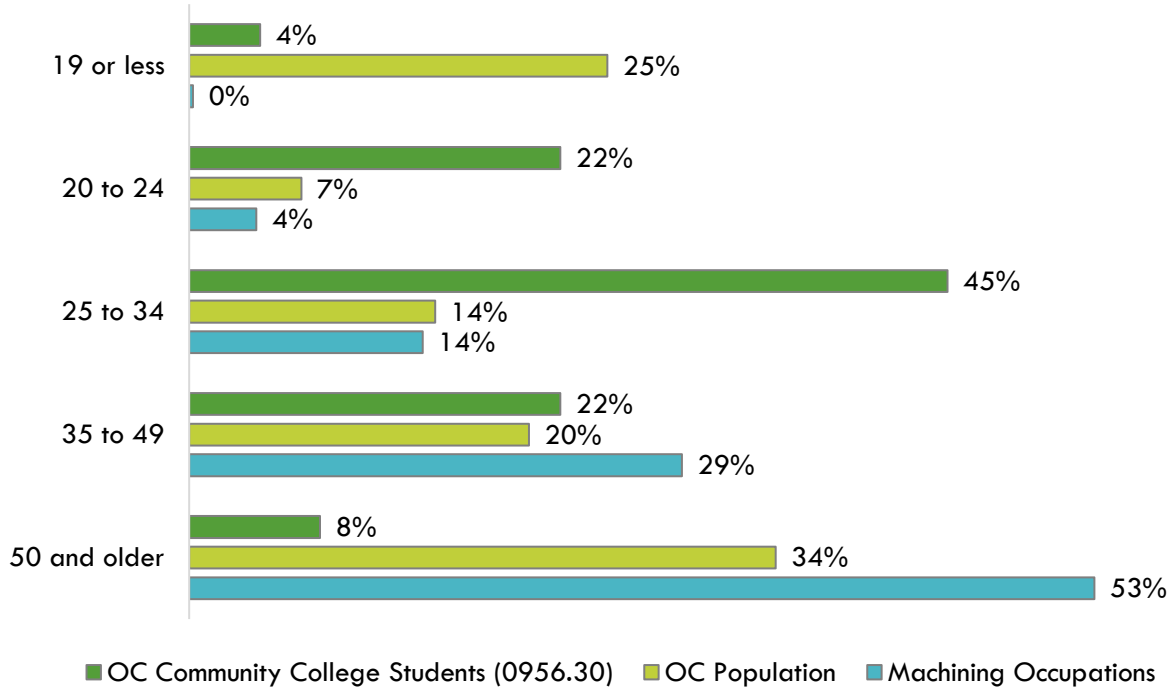
Age:

Exhibit 18 compares the age of Orange County community college students enrolled in machining and machine tools programs, the overall Orange County population, and occupation-specific data for the seven machining occupations included in this report.

The plurality of community college machining and machine tools students are 25 to 34 (45%), which is more than triple their representation in the population (14%) and amongst workers in the field (14%). Conversely, the majority of workers in the field are 50 and older (53%), which is significantly greater than this age group's share of the population (34%) and more than six-times their representation amongst community college machining and machine tools students (8%).

Examining disaggregated data for each occupation (not shown), individuals 35 or older account for the majority of workers in all machining occupations examined in this report, except *extruding and drawing machine setters, operators, and tenders, metal and plastic**, the only below-middle skill occupation included in this report. This occupation has the lowest entry-level wages ($16.91) of all seven machining occupations. Furthermore, though individuals 50 and older represent the majority of workers in four of the seven occupations, they account for all or the large majority of workers amongst *drilling and boring machine tool setters, operators, and tenders, metal and plastic* (100%) and *tool and die makers* (84%), which offer the third highest ($17.98) and overall highest ($28.48) entry-level wages of all seven machining occupations, respectively.

Exhibit 16: Program and County Demographics by Age



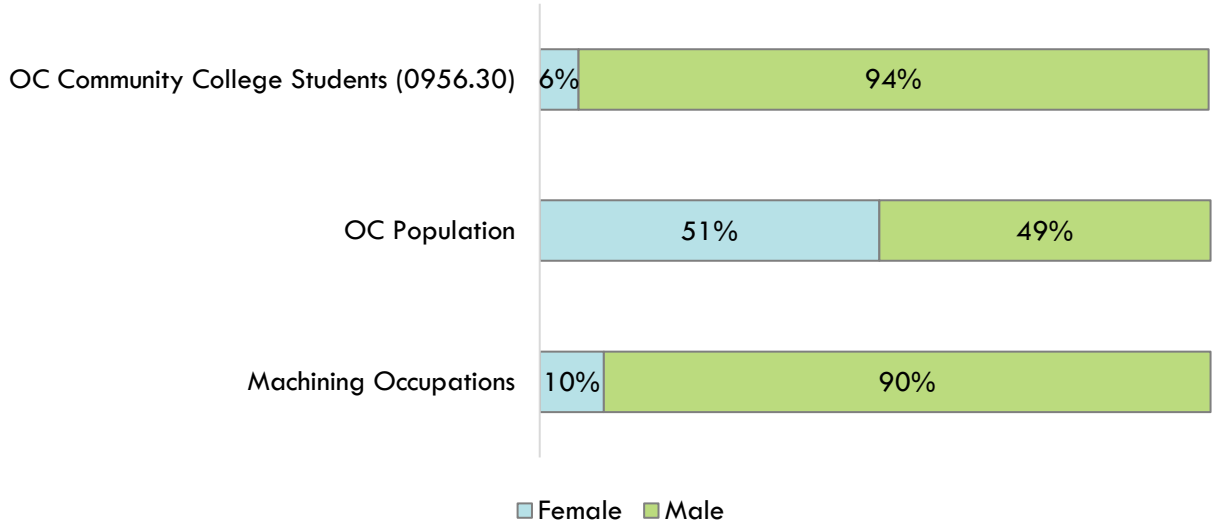
Sex:

Exhibit 19 compares the sex of Orange County community college students enrolled in machining and machine tools programs, the overall Orange County population, and occupation-specific data for these machining occupations.

Though the population is split nearly evenly between women and men, only 10% workers in the field and 6% of community college machining and machine tools students are women.

Examining disaggregated data for each occupation (not shown), men represent the majority of workers in five of the seven machining occupations, and they account for all workers in the remaining two occupations: *drilling and boring machine tool setters, operators, and tenders, metal and plastic* and *tool and die makers*. The occupations with the highest percentages of women are *cutting, punching, and press machine setters, operators, and tenders, metal and plastic* (19%) and *grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic* (19%). These two occupations offer the fourth highest ($17.95) and second lowest ($17.20) entry-level wages of all seven machining occupations, respectively.

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	The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data, last updated in September 2021, assesses the cost of housing, food, child care, health care, transportation, and taxes. For more information, see: https://insightcced.org/family-needs-calculator/ The living wage for one adult in Orange County is $20.63 per hour ($42,910.40 annually). This figure is used by the CCCCO to calculate the percentage of students that attained the regional living wage.
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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