Labor Market Analysis for Program Modification: 0956.00/Manufacturing and Industrial Technology (*Theme Park Technology Specialist Certificate*)

Orange County Center of Excellence, July 2024

C·O·E
CENTERS OF EXCELLENCE FOR LABOR MARKET RESEARCH

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 **7,067 annual job openings** throughout Los Angeles and Orange counties for these technician occupations, which **is more than the 990 awards conferred by educational institutions.**	
	Yes ☐	No ☑
California Insight Living Wage: (Entry-Level, 25th)[1]	*Comments:* **Nearly 76% of annual job openings** for these technician occupations **have entry-level hourly wages below the OC living wage of $20.63.**	
	Yes ☑	No ☐
Education:	*Comments:* Though the majority (92%) of annual openings for these occupations typically require a high school diploma or equivalent, **35% to 63% 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 six technician occupations:

- Below Middle-Skill – denoted with an asterisk (*) throughout this report.
  - *Coin, Vending, and Amusement Machine Servicers and Repairers (49-9091)**
  - *Maintenance and Repair Workers, General (49-9071)**
- Middle-Skill
  - *Electrical and Electronic Engineering Technologists and Technicians (17-3023)*
  - *Industrial Engineering Technologists and Technicians (17-3026)*
  - *Industrial Machinery Mechanics (49-9041)*
  - *Maintenance Workers, Machinery (49-9043)*

[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 However, this figure is outdated and does not reflect recent increases in the cost of living.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.

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 occupations included in this report align with program objectives. Additionally, students can obtain employment in these below middle-skill occupations 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 technician 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
Coin, Vending, and Amusement Machine Servicers and Repairers (49-9091)*	LA: *74*	LA: 0	OC: $18.88	High school diploma or equivalent	40%
	OC: 51	OC: 0			
	TTL: *125*	TTL: *0*			
Maintenance and Repair Workers, General (49-9071)*	LA: 3,805	LA: 0	OC: $18.40	High school diploma or equivalent	39%
	OC: 1,648	OC: 0			
	TTL: *5,453*	TTL: *0*			
Below Middle-Skill Total	**5,578**	**0**	**N/A**	**N/A**	**N/A**
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	LA: 282	LA: 541	OC: $28.78	Associate degree	63%
	OC: 172	OC: 125			
	TTL: *454*	TTL: *666*			
Industrial Engineering Technologists and Technicians (17-3026)	LA: 65	LA: 121	OC: $28.72	Associate degree	51%
	OC: 44	OC: *77*			
	TTL: *109*	TTL: *198*			
Industrial Machinery Mechanics (49-9041)	LA: 542	LA: 119	OC: $24.23	High school diploma or equivalent	41%
	OC: 266	OC: 6			
	TTL: *808*	TTL: *125*			

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Maintenance Workers, Machinery (49-9043)	LA: 73 OC: 45 TTL: *118*	*Accounted for Above*	OC: $23.02	High school diploma or equivalent	35%
Middle-Skill Total	**1,489**	**990**	**N/A**	**N/A**	**N/A**
Total	***7,067***	**990**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to these technician occupations is projected to increase 7% through 2027, resulting in 7,067 projected annual job openings.
- Hourly entry-level wages for these technician occupations range from $18.40 to $28.78 in Orange County; nearly 76% of annual job openings have entry-level wages below the California Insight living wage.
- There were 14,471 online job postings for these technician occupations over the past 12 months. The highest number of postings were for maintenance technicians, field service technicians, and maintenance mechanics.
- The typical entry-level education for these machining occupations ranges from a high school diploma or equivalent to an associate degree.
- Between 35% and 63% 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 937 awards conferred by 23 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions conferred an average of 53 awards from 2019 to 2021.
- Orange County community college students that exited manufacturing and industrial technology programs in the 2020-21 academic year had a median annual wage of $44,864 ($21.57 per hour) after exiting the program and 52% attained the regional living wage (California Insight).
- Throughout Orange County, 76% of manufacturing and industrial technology 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 six technician occupations from 2017 through 2027. Employment for these six technician occupations decreased 9% in Orange County from 2019 to 2020 due to the COVID-19 pandemic, which is 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 remained flat in 2017 but increased in 2018 and 2019. After a decrease in employment in 2020 and an increase in 2022, employment for these six occupations in Orange County is projected to increase 1% through 2027, experiencing a similar rate relative to all occupations in Los Angeles and Orange counties.

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

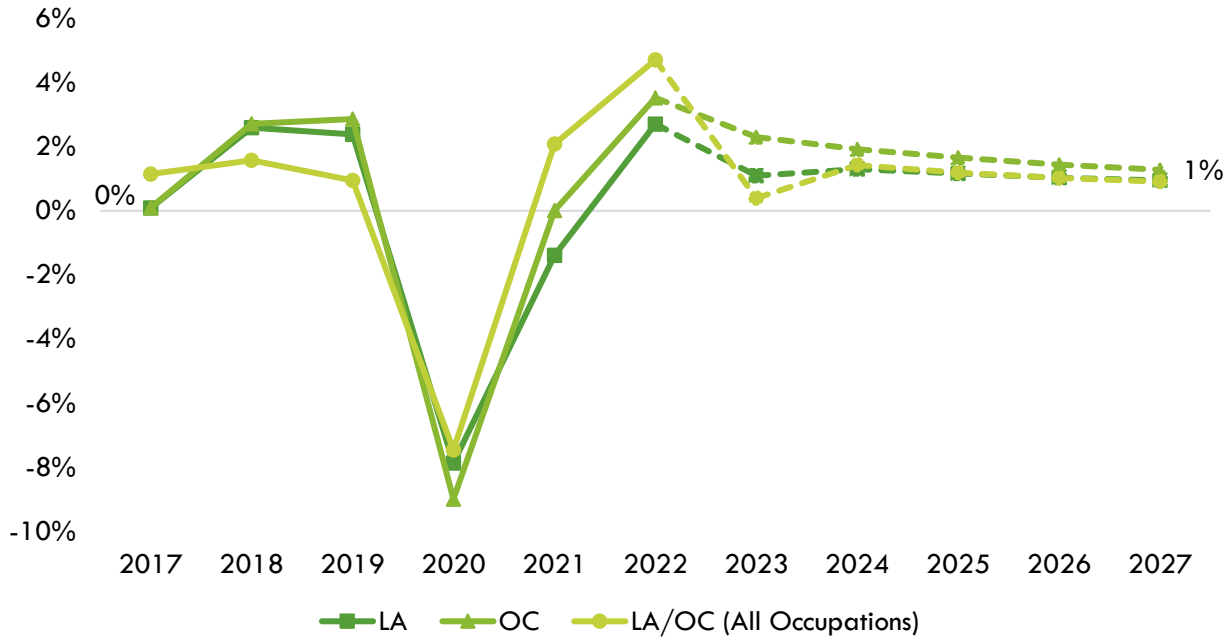


Exhibit 3 shows the five-year occupational demand projections for *coin, vending, and amusement machine servicers and repairers** and *maintenance and repair workers, general**, the two below middle-skill occupations included in this report. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase 7% through 2027. There is projected to be 5,578 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	36,799	39,113	2,314	6%	3,879
Orange	15,143	16,501	1,358	9%	1,699
Total	**51,942**	**55,614**	**3,672**	**7%**	**5,578**

Exhibit 4 shows the five-year occupational demand projections for the four middle-skill occupations analyzed in this report. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase 5% through 2027. There is projected to 1,489 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	10,179	10,524	345	3%	962
Orange	4,926	5,355	429	9%	526
Total	**15,105**	**15,879**	**774**	**5%**	**1,489**

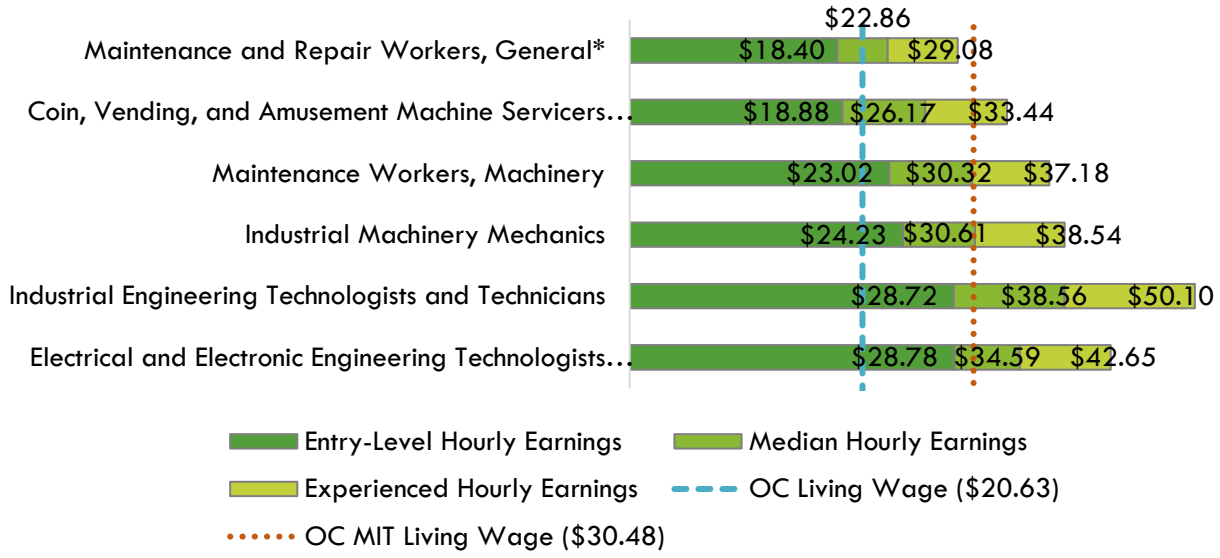
Wages:

The labor market endorsement in this report considers the entry-level hourly wages for these technician 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 76% 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 $18.40 and $28.78. Orange County's average wages of $27.49 are below the average statewide wage of $28.04 for these occupations. Exhibit 5 shows the wage range for each of the six technician occupations in Orange County and how they compare to the Insight and MIT living wages, sorted from lowest to highest entry-level wage.

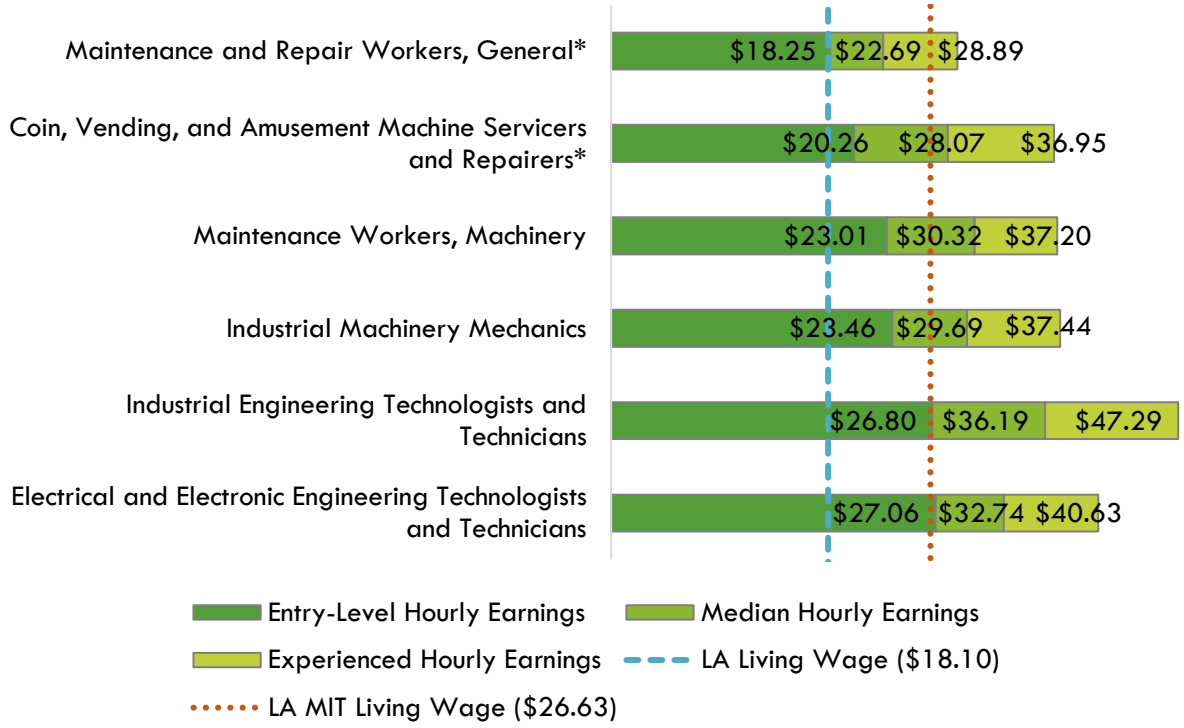
Exhibit 3: Wages by Occupation in Orange County



[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.

All annual openings for these technician 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 $18.25 and $27.06. Los Angeles County's average wages of $26.86 are below the average statewide wage of $28.04 for these occupations. Exhibit 6 shows the wage range for each of the six technician 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.

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

There were 14,471 online job postings related to the six technician occupations listed in the past 12 months. Of those, most were for *maintenance and repair workers, general** (77%), followed distantly by *industrial engineering technologists and technicians* (10%). Exhibit 7 shows the number of job postings by occupation.

Exhibit 5: Number of Job Postings by Occupation (n=14,471)

Occupation	Job Postings	Percentage of Job Postings
Maintenance and Repair Workers, General*	11,108	77%
Industrial Engineering Technologists and Technicians	1,433	10%
Electrical and Electronic Engineering Technologists and Technicians	963	7%
Industrial Machinery Mechanics	952	7%
Coin, Vending, and Amusement Machine Servicers and Repairers*	12	0%
Maintenance Workers, Machinery	3	0%
Total Postings	**3,211**	**100%**

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

Exhibit 6: Top Below Middle-Skill Employers by Number of Job Postings (n=11,120)

Employer	Job Postings	Percentage of Job Postings
Aerotek	233	2%
Greystar	150	1%
AvalonBay Communities	94	1%
Anza Management Company	89	1%
ManpowerGroup	81	1%
Fpi Management	80	1%
JWilliams Staffing	72	1%
Marriott International	68	1%
Disney	56	1%
Intersolutions	54	0%

The top employers in the region for the four middle-skill occupations, by number of job postings, are shown in Exhibit 9.

Exhibit 7: Top Middle-Skill Employers by Number of Job Postings (n=3,351)

Employer	Job Postings	Percentage of Job Postings
Aerotek	135	4%
Lacsd - Rimforest	48	1%
Randstad	48	1%
Symbotic	41	1%
Howmet Aerospace	39	1%
SpaceX	37	1%
Northrop Grumman	36	1%

Employer	Job Postings	Percentage of Job Postings
Grifols	35	1%
ManpowerGroup	33	1%
Acara Solutions	30	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for the two below middle-skill occupations, in Exhibit 10.

Exhibit 8: Top Skills for Below Middle-Skill Occupations by Number of Job Postings (n=11,120)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Plumbing (4,309)	Troubleshooting (Problem Solving) (3,691)	Microsoft Office (639)
Painting (3,126)	Communication (3,632)	Microsoft Excel (598)
HVAC (3,036)	Customer Service (3,170)	Microsoft Outlook (491)
Carpentry (2,730)	Management (2,163)	Inventory Control Systems (307)
Preventive Maintenance (2,090)	Lifting Ability (1,966)	Microsoft Word (217)
Power Tool Operation (1,589)	Operations (1,770)	Microsoft PowerPoint (123)
Hand Tools (1,485)	English Language (1,622)	Yardi (Property Management Software) (114)
Machinery (1,478)	Detail Oriented (1,588)	Operating Systems (108)
Drywall (Installation and Repair) (1,379)	Problem Solving (1,482)	Gmail (90)
Facility Repair and Maintenance (1,289)	Good Driving Record (1,371)	Google Drive (78)

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

Exhibit 9: Top Skills for Middle-Skill Occupations by Number of Job Postings (n=3,351)

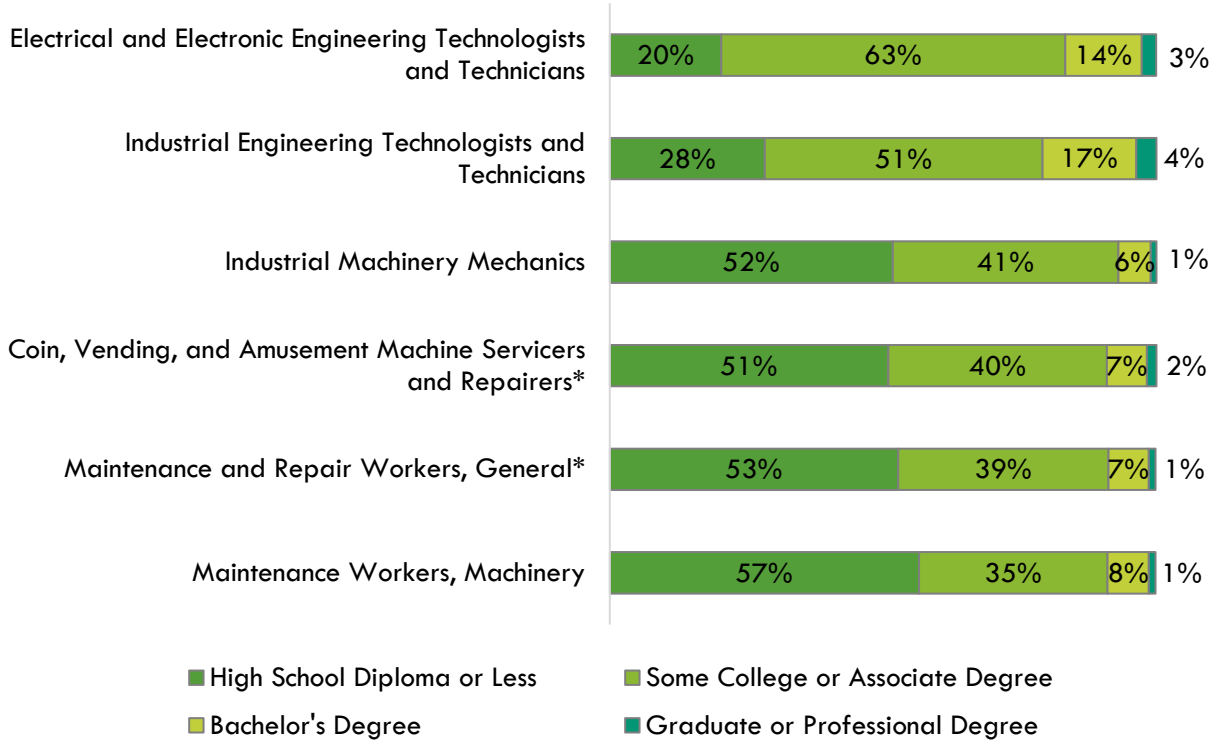
Top Specialized Skills	Top Soft Skills	Top Computer Skills
Hand Tools (490)	Troubleshooting (Problem Solving) (1,355)	Microsoft Excel (333)
Machinery (442)	Communication (982)	Microsoft Office (277)
Test Equipment (337)	Operations (847)	Microsoft Outlook (172)
Programmable Logic Controllers (335)	Management (548)	Microsoft PowerPoint (142)
Electromechanics (317)	Detail Oriented (521)	Microsoft Word (125)
Automation (304)	Lifting Ability (502)	SAP Applications (98)
Power Tool Operation (290)	Problem Solving (450)	Disassembler (58)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Good Manufacturing Practices (277)	English Language (396)	Spreadsheets (51)
Preventive Maintenance (272)	Computer Literacy (349)	AutoCAD (36)
Blueprinting (268)	Microsoft Excel (333)	Microsoft Access (36)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for all technician occupations examined in this report with the exception of *electrical and electronic engineering technologists and technicians* and *industrial engineering technologists and technicians,* both of which require an associate degree. However, national-level educational attainment data indicates between 39% to 40% of workers in the below middle-skill occupations and between 35% to 63% 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 45% of the postings for the below middle-skill occupations that listed a minimum education requirement in Los Angeles/Orange County, 96% (4,843) requested a high school diploma or an associate degree and 3% (131) requested a bachelor's degree.

In addition, of the 62% of the cumulative job postings for the middle-skill occupation that listed a minimum education requirement in Los Angeles/Orange County, 86% (1,794) requested a high school diploma or an associate degree and 13% (265) 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:

- Engineering Technology, General (requires Trigonometry) (0924.00)
- Electronics and Electric Technology (0934.00)
- Computer Electronics (0934.10)
- Industrial Electronics (0934.20)
- Telecommunications Technology (0934.30)
- Industrial Systems Technology and Maintenance (0945.00)
- Energy Systems Technology (0946.10)
- Manufacturing and Industrial Technology (0956.00)
- Industrial and Occupational Safety and Health (0956.70)
- Other Engineering and Related Industrial Technologies (0999.00)

The colleges with the most completions in the region are Pasadena, Mt. San Antonio, and Long Beach. Over the past 12 months, there were 2 other related program recommendation requests from regional community colleges.

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

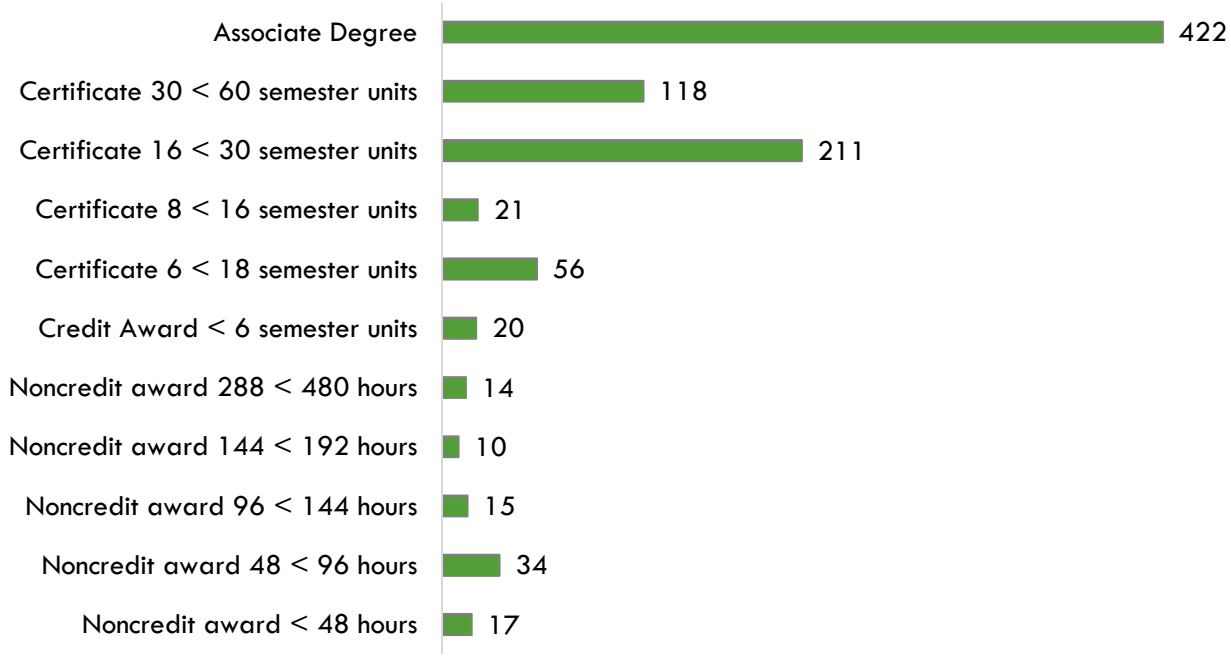
TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0924.00	Engineering Technology, General (requires Trigonometry)	Cerritos	15	6	15	12
		East LA	1	1	0	1
		Glendale	7	14	3	8
		Mt San Antonio	2	0	6	3
		Pasadena	216	238	211	222
		LA Subtotal	**241**	**259**	**235**	**245**
		Santa Ana	3	5	0	3
		OC Subtotal	**3**	**5**	**0**	**3**
Supply Subtotal/Average			**244**	**264**	**235**	**248**
0934.00	Electronics and Electric Technology	East LA	1	2	4	2
		El Camino	8	5	2	5
		Glendale	5	0	2	2
		LA City	4	0	0	1
		LA Pierce	4	17	14	12
		LA Southwest	9	0	4	4
		LA Valley	14	21	34	23
		Long Beach	50	42	79	57
		Mt San Antonio	48	39	152	80
		Pasadena	24	23	27	25

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Rio Hondo	0	1	2	1
		LA Subtotal	**167**	**150**	**320**	**212**
		Coastline	58	53	44	52
		Irvine	37	9	16	21
		Orange Coast	12	12	6	10
		Saddleback	14	22	19	18
		Santa Ana	8	0	0	3
		OC Subtotal	**129**	**96**	**85**	**103**
Supply Subtotal/Average			**296**	**246**	**405**	**316**
0934.10	Computer Electronics	East LA	34	7	24	22
		El Camino	6	10	9	8
		LA Trade	10	14	16	13
		Mt San Antonio	12	7	18	12
		LA Subtotal	**62**	**38**	**67**	**56**
		Orange Coast	5	4	2	4
		Saddleback	13	22	10	15
		OC Subtotal	**18**	**26**	**12**	**19**
Supply Subtotal/Average			**80**	**64**	**79**	**74**
0934.20	Industrial Electronics	LA Valley	0	23	0	8
		LA Subtotal	**0**	**23**	**0**	**8**
		-	-	-	-	-
		OC Subtotal	**-**	**-**	**-**	**-**
Supply Subtotal/Average			**0**	**23**	**0**	**8**
0934.30	Telecommunications Technology	LA Pierce	3	7	5	5
		LA Trade	5	9	3	6
		Long Beach	1	3	3	2
		Mt San Antonio	4	4	0	3
		LA Subtotal	**13**	**23**	**11**	**16**
		-	-	-	-	-
		OC Subtotal	**-**	**-**	**-**	**-**
Supply Subtotal/Average			**13**	**23**	**11**	**16**
0945.00	Industrial Systems Technology and Maintenance	LA Harbor	1	0	0	0
		LA Southwest	9	0	0	3
		LA Trade	61	59	88	69
		West LA	20	3	13	12
		LA Subtotal	**91**	**62**	**101**	**85**

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Santiago Canyon	16	2	0	6
		OC Subtotal	**16**	**2**	**0**	**6**
		Supply Subtotal/Average	**107**	**64**	**101**	**91**
0946.10	Energy Systems Technology	LA Trade	18	12	14	15
		Mt San Antonio	8	3	13	8
		Pasadena	5	6	9	7
		Rio Hondo	7	1	4	4
		Santa Monica	2	2	0	1
		LA Subtotal	**40**	**24**	**40**	**35**
		OC Subtotal	**-**	**-**	**-**	**-**
		Supply Subtotal/Average	**40**	**24**	**40**	**35**
0956.00	Manufacturing and Industrial Technology	Cerritos	0	1	1	1
		El Camino	0	0	4	1
		Glendale	2	0	1	1
		LA Trade	9	9	15	11
		LA Valley	9	7	0	5
		Mt San Antonio	14	4	13	10
		LA Subtotal	**34**	**21**	**34**	**30**
		Fullerton	38	20	18	25
		Irvine	0	4	2	2
		Saddleback	7	4	8	6
		Santa Ana	3	2	4	3
		Santiago Canyon	10	12	7	10
		OC Subtotal	**58**	**42**	**39**	**46**
		Supply Subtotal/Average	**92**	**63**	**73**	**76**
0956.70	Industrial and Occupational Safety and Health	LA Southwest	0	0	117	39
		LA Trade	0	5	5	3
		LA Subtotal	**0**	**5**	**122**	**42**
		OC Subtotal	**-**	**-**	**-**	**-**
		Supply Subtotal/Average	**0**	**5**	**122**	**42**
0999.00	Other Engineering and Related Industrial Technologies	Santa Monica	0	0	4	1
		LA Subtotal	**0**	**0**	**4**	**1**
		Coastline	30	42	21	31
		OC Subtotal	**30**	**42**	**21**	**31**
		Supply Subtotal/Average	**30**	**42**	**25**	**32**
		Supply Total/Average	**902**	**818**	**1,091**	**937**

Exhibit 14 shows the annual average community college awards by type from 2019-20 through 2021-22. The plurality of the awards are for associate degrees, followed distantly certificates between 16 and less than 30 semester units and certificates between 30 and less than 60 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. Of the 548 Orange County manufacturing and industrial technology students in the 2020-21 academic year, 52% (286) attended an NOCCCD college.

NOCCCD students that exited manufacturing and industrial technology programs in the 2020-21 academic year had slightly lower median annual earnings ($44,768 or $21.52 per hour) compared to all manufacturing and industrial technology students in Orange County ($44,864 or $21.57 per hour). In addition, an identical percentage of NOCCCD manufacturing and industrial technology students attained the living wage (52%) when compared to all manufacturing and industrial technology students in Orange County (52%).

Exhibit 13: Manufacturing and Industrial Technology (0956.00) Strong Workforce Program Metrics, 2020-21[4]

SWP Metric	NOCCCD	OC Region	California
SWP Students	286	548	3,716
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	48%	42%	35%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	65%	21%

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

SWP Metric	NOCCCD	OC Region	California
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	17	34	327
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	Insufficient Data	24	87
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	86%	76%	79%
Median Annual Earnings for SWP Exiting Students	$44,768 ($21.52)	$44,864 ($21.57)	$47,028 ($22.61)
Median Change in Earnings for SWP Exiting Students	10%	4%	31%
SWP Exiting Students Who Attained the Living Wage	52%	52%	67%

Non-Community College Supply:

To comprehensively analyze the regional supply, it is crucial to include data from other institutions offering technician training programs. Exhibit 16 displays the annual and two-year average awards granted by these institutions under the related Classification of Instructional Programs (CIP) codes:

- Engineering Technology/Technicians, General (15.0000)
- Electrical/Electronic Engineering Technologies/Technicians, Other (15.0399)
- Industrial Technology/Technician (15.0612)
- Manufacturing Engineering Technology/Technician (15.0613)
- Computer Engineering Technology/Technician (15.1201)
- Computer/Computer Systems Technology/Technician (15.1202)

No awards were granted under the following CIP codes:

- Applied Engineering Technologies/Technicians (15.0001)
- Telecommunications Technology/Technician (15.0305)
- Integrated Circuit Design Technology/Technician (15.0306)
- Industrial Production Technologies/Technicians, Other (15.0699)
- Industrial Safety Technology/Technician (15.0703)
- Process Safety Technology/Technician (15.0705)
- Industrial Mechanics and Maintenance Technology/Technician (47.0303)
- Energy Systems Installation and Repair Technology/Technician (47.0701)
- Hydroelectric Energy System Installation and Repair Technology/Technician (47.0705)
- Geothermal Energy System Installation and Repair Technology/Technician (47.0706)
- Building/Property Maintenance (46.0401)

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
15.0000	Engineering Technologies / Technicians, General	California State Polytechnic University-Pomona	1	3	2
		California State University-Long Beach	0	0	0
Supply Subtotal/Average			**1**	**3**	**2**
15.0399	Electrical / Electronic Engineering Technologies / Technicians, Other	Southern California Institute of Technology	1	0	1
		University of Antelope Valley	5	0	3
Supply Subtotal/Average			**6**	**0**	**3**
15.0612	Industrial Technology / Technician	California State University-Los Angeles	48	31	40
Supply Subtotal/Average			**48**	**31**	**40**
15.0613	Manufacturing Engineering Technology / Technician	California State University-Long Beach	0	0	0
Supply Subtotal/Average			**0**	**0**	**0**
15.1201	Computer Engineering Technology / Technician	California State University-Long Beach	4	6	5
Supply Subtotal/Average			**4**	**6**	**5**
15.1202	Computer / Computer Systems Technology / Technician	Learnet Academy Inc	4	2	3
		University of La Verne	0	0	0
Supply Subtotal/Average			**4**	**2**	**3**
Supply Total/Average			**63**	**42**	**53**

Regional Demographics

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

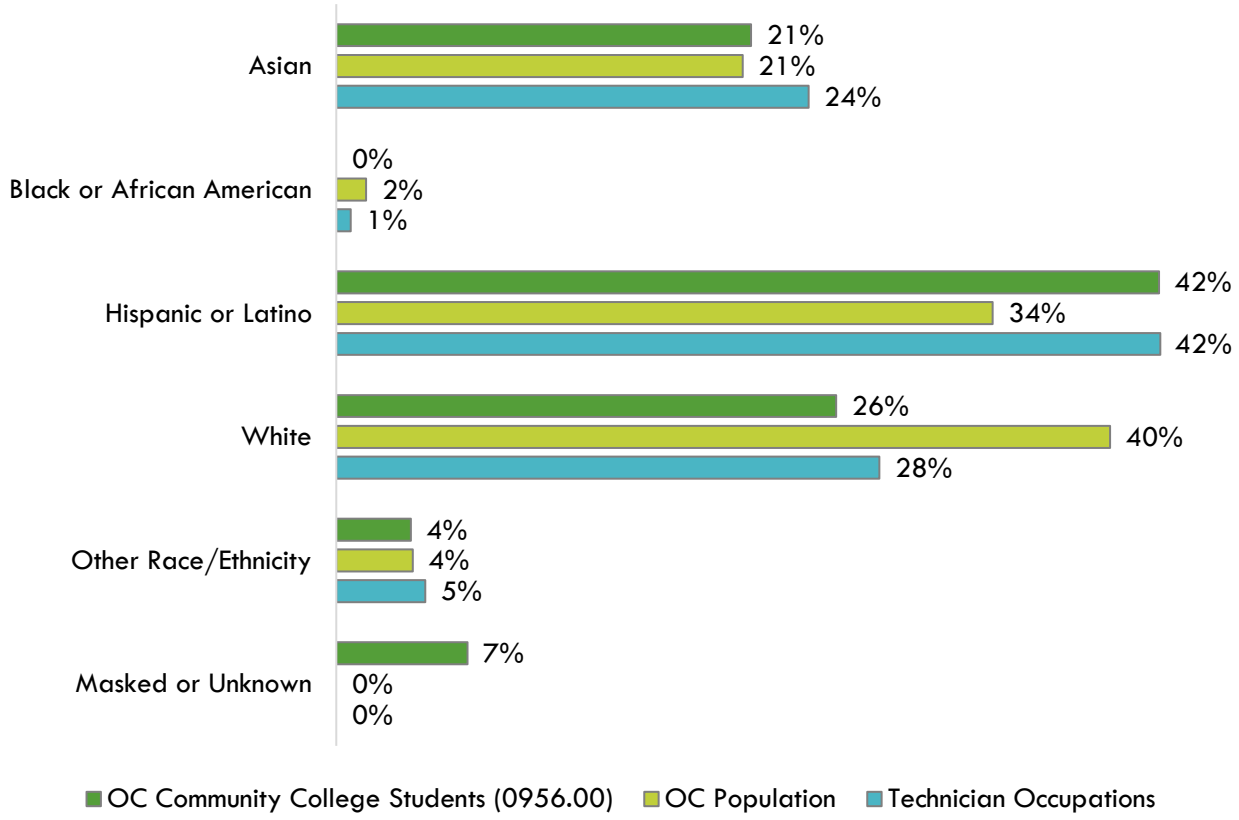
Ethnicity:

Exhibit 17 compares the ethnicity of Orange County community college students enrolled in manufacturing and industrial technology programs, the overall Orange County population, and occupation-specific data for the six technician occupations included in this report.

The plurality of the population is white (40%), which is significantly higher than workers in the field (28%) and community college manufacturing and industrial technology students (26%). Conversely, the plurality of workers in these occupations (42%) and community college manufacturing and industrial technology students (42%) are Hispanic or Latino, which is higher than the population (34%). In addition, the percentages of Asian individuals in these occupations (24%), in the population (21%), and amongst community college manufacturing and industrial technology students (21%) relatively align.

Examining disaggregated data for each occupation (not shown), the occupation with the highest percentage of white workers is *coin, vending, and amusement machine servicers and repairers** (72%), followed by Hispanic or Latino individuals (28%). Hispanic or Latino workers account for most workers in *maintenance and repair workers, general** (52%), followed by their white counterparts (34%). These two occupations are the only two below-middle skill occupations examined in this report and provide the lowest entry-level wages (ranging $18.40 – $18.88) amongst all 6 technician occupations.

Exhibit 15: Program and County Demographics by Ethnicity



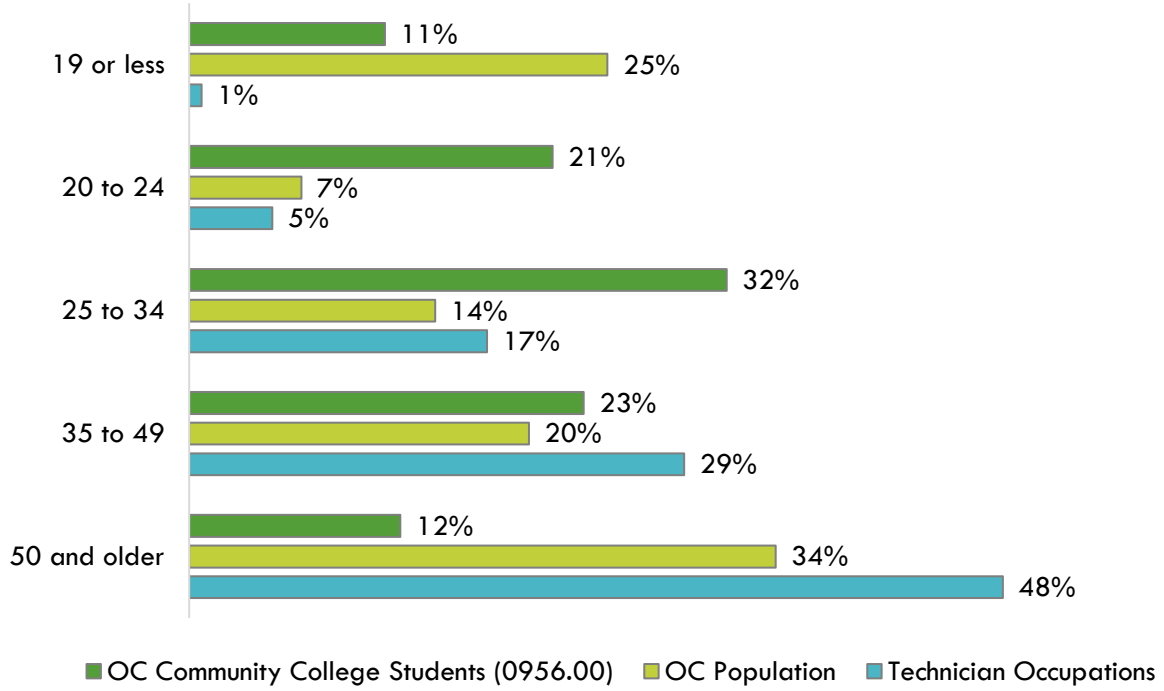
Age:

Exhibit 18 compares the age of Orange County community college students enrolled in manufacturing and industrial technology programs, the overall Orange County population, and occupation-specific data for the six technician occupations included in this report.

The majority of community college manufacturing and industrial technology students are 20 to 34 (53%), which is more than double their representation in the population (21%) and amongst workers in the field (22%). Conversely, almost half of all workers in the field are 50 and older (48%), which is significantly greater than this age group's share of the population (34%) and four times their representation amongst community college manufacturing and industrial technology students (12%).

Examining disaggregated data for each occupation (not shown), individuals 50 and older account for the plurality/majority of workers in five of the six technician occupations: *electrical and electronic engineering technologists and technicians* (45%), *industrial engineering technologists and technicians* (44%), *industrial machinery mechanics* (61%), *maintenance workers, machinery* (53%), and *maintenance and repair workers, general** (45%). The plurality of workers in *coin, vending, and amusement machine servicers and repairers** are 20 to 24. This occupation is one of the two below middle-skill occupations examined in this report and has the second lowest entry-level wages ($18.88) of all six technician occupations.

Exhibit 16: Program and County Demographics by Age



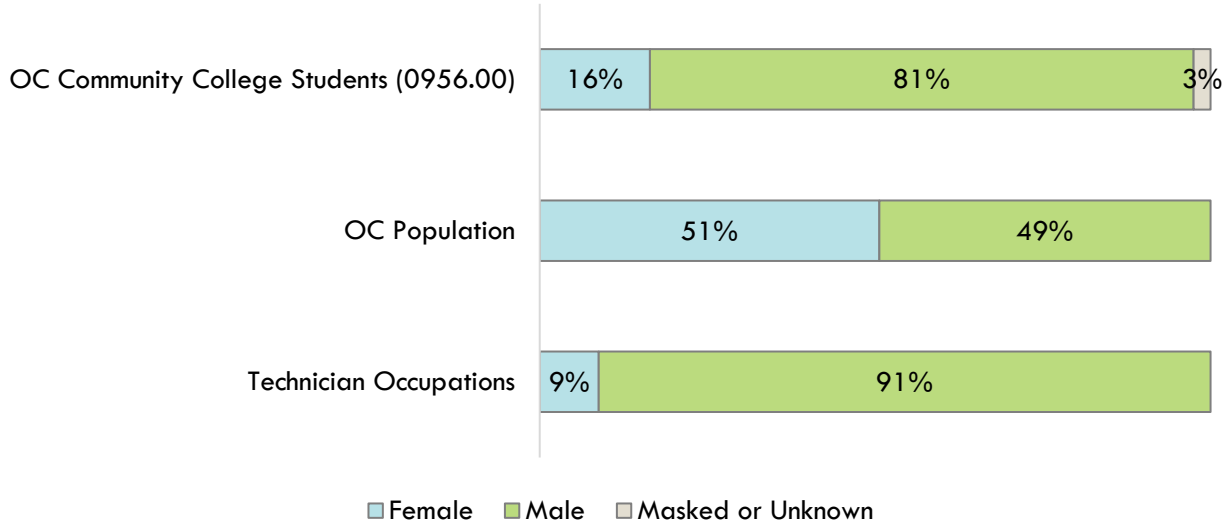
Sex:

Exhibit 19 compares the sex of Orange County community college students enrolled in manufacturing and industrial technology programs, the overall Orange County population, and occupation-specific data for these technician occupations.

Though the population is split nearly evenly between women and men, only 16% of community college manufacturing and industrial technology students and 9% workers in the field are women.

Examining disaggregated data for each occupation (not shown), men represent the majority of workers in all six technician occupations, and they account for almost all workers in *industrial machinery mechanics* (98%) and *maintenance and repair workers, general* (97%). The occupation with the highest percentage of women is *maintenance workers, machinery* (40%), which offers the third lowest entry-level wages ($23.02) of the six technician occupations.

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 2024, 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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FOR LABOR MARKET RESEARCH

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