

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met <input checked="" type="checkbox"/>	Endorsed: Some LMI Criteria Met <input type="checkbox"/>	Not LMI Endorsed <input type="checkbox"/>
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Program LMI Endorsement Criteria

	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Supply Gap:	<i>Comments:</i> There are projected to be 2,096 middle-skill annual job openings throughout Los Angeles and Orange counties for manufacturing technology occupations, which is more than the 902 awards conferred by educational institutions .	
California Insight Living Wage: (Entry-Level, 25 th) ¹	<i>Comments:</i> All middle-skill annual job openings for these manufacturing technology occupations have entry-level hourly wages above the OC living wage of \$20.63 .	
Education:	<i>Comments:</i> The majority (86%) of middle-skill annual openings for these manufacturing technology occupations typically require a high school diploma or equivalent; however, between 35% and 51% of workers in the field have completed some college or an associate degree as their highest level of education .	

Emerging Occupation(s)		
Yes <input type="checkbox"/>		No <input checked="" type="checkbox"/>
<i>Comments:</i> 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 the following five manufacturing technology occupations:

- Middle-Skill
 - *Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)*
 - *Industrial Engineering Technologists and Technicians (17-3026)*
 - *Mechanical Engineering Technologists and Technicians (17-3027)*
 - *First-Line Supervisors of Production and Operating Workers (51-1011)*
- Above Middle-Skill – denoted with a caret (^) throughout this report.

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 However, this figure is outdated and does not reflect recent increases in the cost of living.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

○ *Industrial Production Managers (11-3051)*[^]

Middle-skill occupations typically require a community college education while above middle-skill occupations typically require at least a bachelor's degree.

Based on the available data, there appears to be a supply gap for these middle-skill manufacturing technology occupations. In addition, typical education requirements for these occupations align with a community college education and typical entry-level wages are above the California Insight living wage. **Therefore, due to all 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 (25 th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	LA: 30	LA: 2			
	OC: 17	OC: 4	OC: \$23.98	Associate degree	51%
	TTL: 47	TTL: 6			
Industrial Engineering Technologists and Technicians (17-3026)	LA: 65	LA: 91			
	OC: 44	OC: 31	OC: \$28.72	Associate degree	51%
	TTL: 109	TTL: 122			
Mechanical Engineering Technologists and Technicians (17-3027)	LA: 83	LA: 394			
	OC: 48	OC: 49	OC: \$27.79	Associate degree	51%
	TTL: 130	TTL: 443			
First-Line Supervisors of Production and Operating Workers (51-1011)	LA: 1,234	LA: 144			
	OC: 575	OC: 187	OC: \$24.47	High school diploma or equivalent	35%
	TTL: 1,810	TTL: 331			
Middle-Skill Total	2,096	902	N/A	N/A	N/A
Industrial Production Managers (11-3051) ^{^*}	LA: 405	LA: 16,325			
	OC: 199	OC: 7,889	OC: \$40.76	Bachelor's degree	25%
	TTL: 604	TTL: 24,214			
Above Middle-Skill Total	604	24,214	N/A	N/A	N/A
Total	2,700	25,116	N/A	N/A	N/A

^{*}Supply for *industrial production managers*[^] is overstated because the related educational programs train for 28 other business management occupations that account for over 53,000 annual job openings. Supply for this occupation stems from business- and management-related programs. For these reasons, there is likely a supply gap for *industrial production managers*[^].

Demand:

- The number of jobs related to the middle-skill manufacturing technology occupations is projected to remain flat through 2027, resulting in 2,096 projected annual job openings.
- Hourly entry-level wages for the middle-skill manufacturing technology occupations range from \$23.98 to \$28.72 in Orange County; all annual job openings have entry-level wages above the California Insight living wage.
- There were 6,601 online job postings for the middle-skill manufacturing technology occupations over the past 12 months. The highest number of postings were for production supervisors, manufacturing technicians, and manufacturing supervisors.
- The typical entry-level education for the middle-skill manufacturing technology occupations ranges from a high school diploma or equivalent to an associate degree.
- Between 35% and 51% of workers in the middle-skill occupations have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 741 awards conferred by 19 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions conferred an average of 161 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 five manufacturing technology occupations from 2017 through 2027. Employment for these five manufacturing technology 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 decreased in 2017 but increased in 2018 and 2019 at varying rates. After a decrease in employment in 2020 and an increase through 2022, employment for these five occupations in Orange County is projected to remain flat through 2027, while all occupations in Los Angeles and Orange counties are projected to increase 1% during the same period.

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

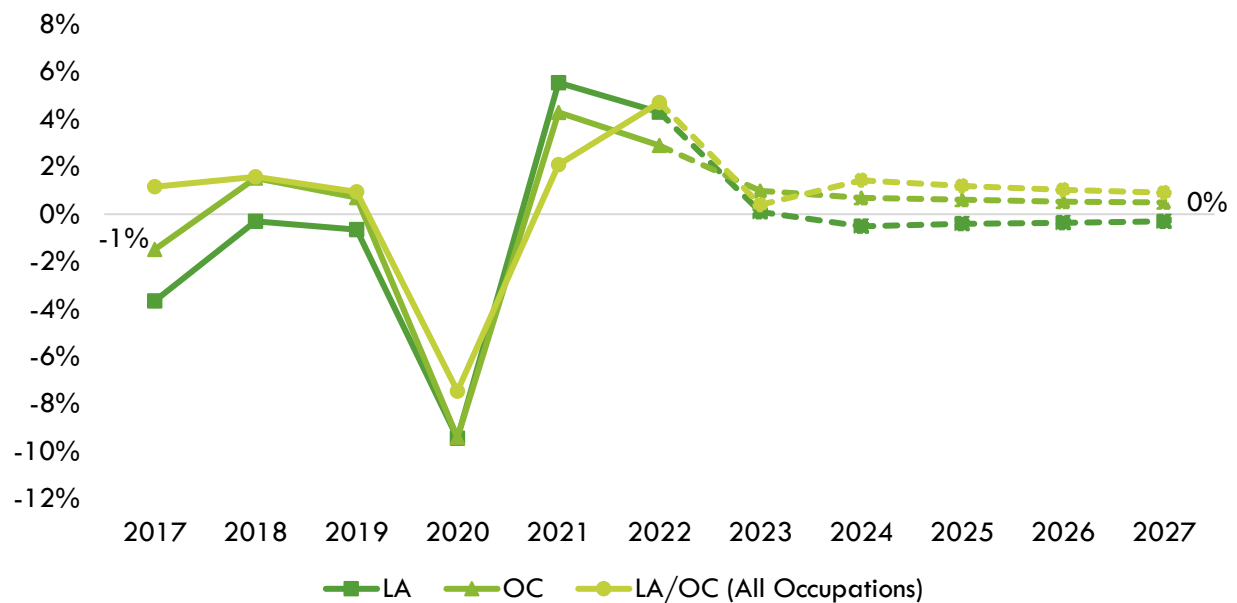


Exhibit 3 shows the five-year occupational demand projections for the four middle-skill manufacturing technology occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to remain relatively flat through 2027. There is projected to be 2,096 jobs available annually.

Exhibit 3: Middle-Skill Occupational Demand in Los Angeles and Orange Counties²

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	15,297	15,072	225	1.5%	1,412
Orange	6,733	6,970	237	3.5%	684
Total	22,030	22,042	11	0.1%	2,096

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 4 shows the five-year occupational demand projections for *industrial production managers*[^], the sole above middle-skill occupations analyzed in this report. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to remain relatively flat through 2027. There is projected to be 604 jobs available annually.

Exhibit 4: Above 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	6,049	5,959	(90)	(1.5%)	405
Orange	2,688	2767	79	2.9%	199
Total	8,737	8,726	(11)	(0.1%)	604

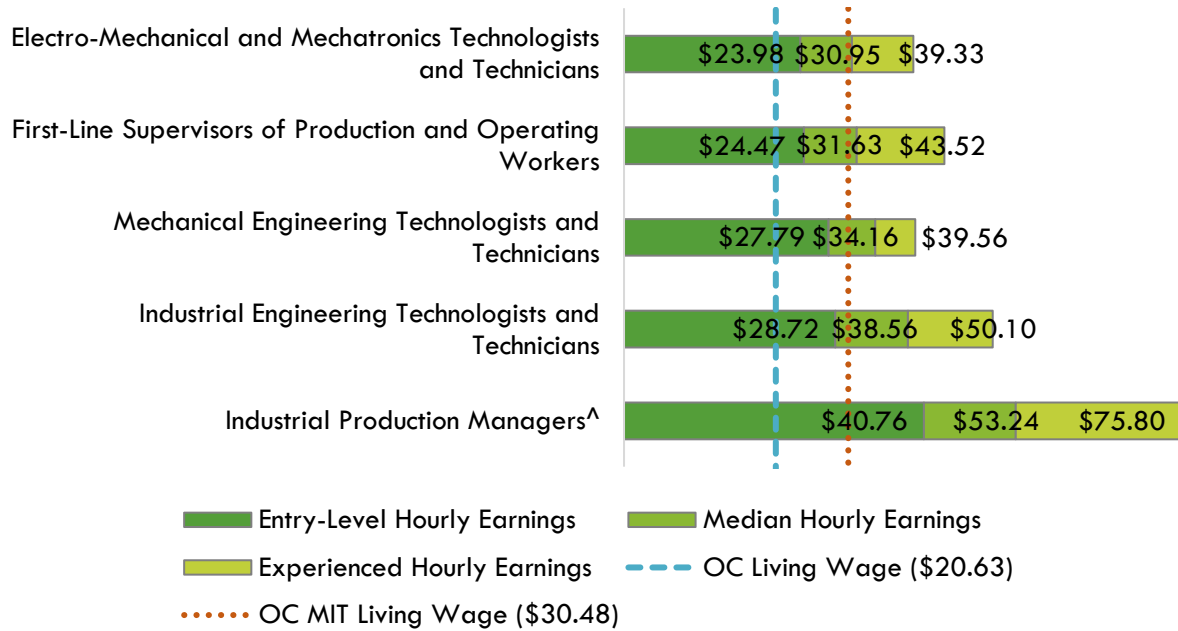
Wages:

The labor market endorsement in this report considers the entry-level hourly wages for these manufacturing technology 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.

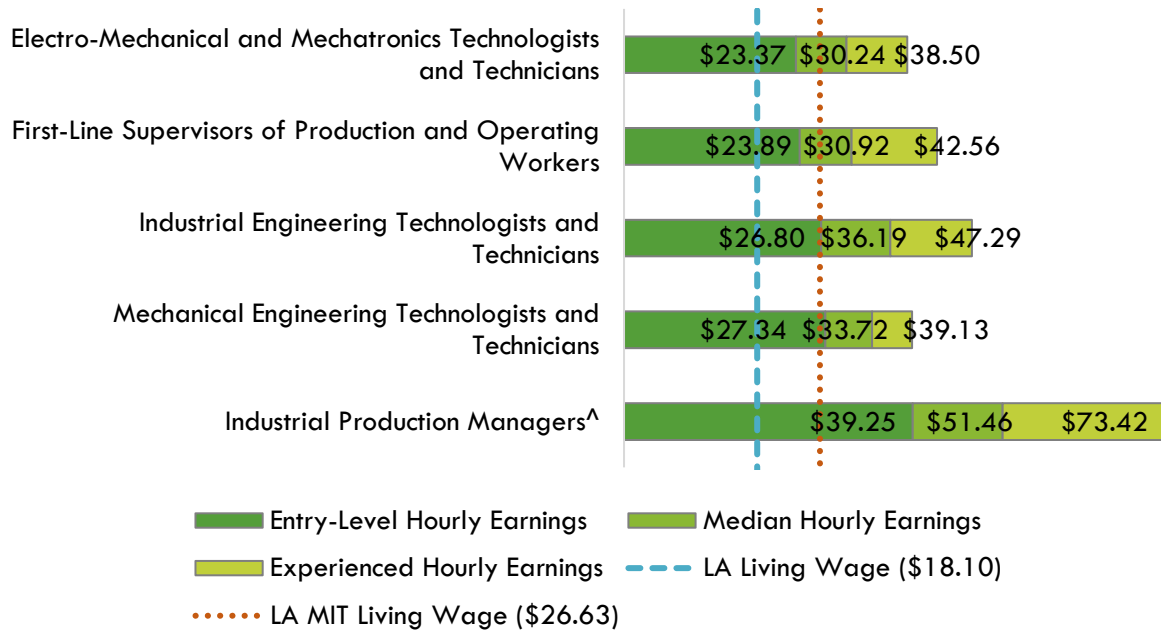
All annual openings for the four middle-skill manufacturing technology occupations have entry-level wages above the California Insight living wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages range between \$23.37 and \$28.72. Orange County's average wages of \$36.90 are slightly above the average statewide wage of \$36.42 for these four middle-skill occupations. Exhibit 5 shows the wage range for each of the five manufacturing technology occupations in Orange County and how they compare to the Insight and MIT living wages, sorted from lowest to highest entry-level wage.

Exhibit 5: Wages by Occupation in Orange County



All annual openings for the four middle-skill manufacturing technology 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 \$23.37 and \$27.34. Los Angeles County’s average wages of \$36.04 are slightly below the average statewide wage of \$36.42 for the four middle-skill manufacturing technology occupations. Exhibit 6 shows the wage range for each of the five manufacturing technology occupations in Los Angeles County how they compare to the Insight and MIT living wages, sorted from lowest to highest entry-level wage.

Exhibit 6: 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 10,936 online job postings related to the five manufacturing technology occupations listed in the past 12 months. Of those, the plurality was for *first-line supervisors of production and operating workers* (45%), followed by *industrial production managers*[^] (40%). Exhibit 7 shows the number of job postings by occupation.

Exhibit 7: Number of Job Postings by Occupation (n=10,936)

Occupation	Job Postings	Percentage of Job Postings
First-Line Supervisors of Production and Operating Workers	4,958	45%
Industrial Production Managers [^]	4,335	40%
Industrial Engineering Technologists and Technicians	1,436	13%
Mechanical Engineering Technologists and Technicians	137	1%
Electro-Mechanical and Mechatronics Technologists and Technicians	70	1%
Total Postings	10,936	100%

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

Exhibit 8: Top Middle-Skill Employers by Number of Job Postings (n=6,601)

Employer	Job Postings	Percentage of Job Postings
Aerotek	145	2%
The Judge Group	71	1%
Randstad	64	1%
Plains Ag	63	1%
SpaceX	62	1%
Volt	62	1%

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

Employer	Job Postings	Percentage of Job Postings
Whole Foods	60	1%
University of California	57	1%
Northrop Grumman	45	1%

The top employers for *industrial production managers*[^] - the sole above middle-skill occupation in this report - in the region, by number of job postings, are shown in Exhibit 9.

Exhibit 9: Top Above Middle-Skill Employers by Number of Job Postings (n=4,335)

Employer	Job Postings	Percentage of Job Postings
The Judge Group	103	2%
Claire's	98	2%
Northrop Grumman	37	1%
Disney	36	1%
Actalent	33	1%
Aerotek	33	1%
GPAC	25	1%
Jack in the Box	25	1%
CyberCoders	24	1%
ManpowerGroup	22	1%

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 manufacturing technology occupations in Exhibit 10.

Exhibit 10: Top Skills for the Middle-Skill Occupation by Number of Job Postings (n=6,601)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Project Management (671)	Communication (2,564)	Microsoft Excel (1,042)
Process Improvement (565)	Management (2,148)	Microsoft Office (890)
Good Manufacturing Practices (538)	Operations (2,007)	Microsoft Outlook (575)
Lean Manufacturing (526)	Leadership (1,680)	Microsoft PowerPoint (518)
Workflow Management (509)	Detail Oriented (1,309)	Microsoft Word (330)
Auditing (508)	Problem Solving (1,241)	SAP Applications (222)
Machinery (461)	Customer Service (1,097)	Microsoft Access (158)
Continuous Improvement Process (455)	Microsoft Excel (1,042)	Spreadsheets (156)
Production Process (455)	Troubleshooting (Problem Solving) (916)	Microsoft Visio (66)
Standard Operating Procedure (357)	Planning (913)	QuickBooks (Accounting Software) (64)

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for *industrial production managers*[^] in Exhibit 11.

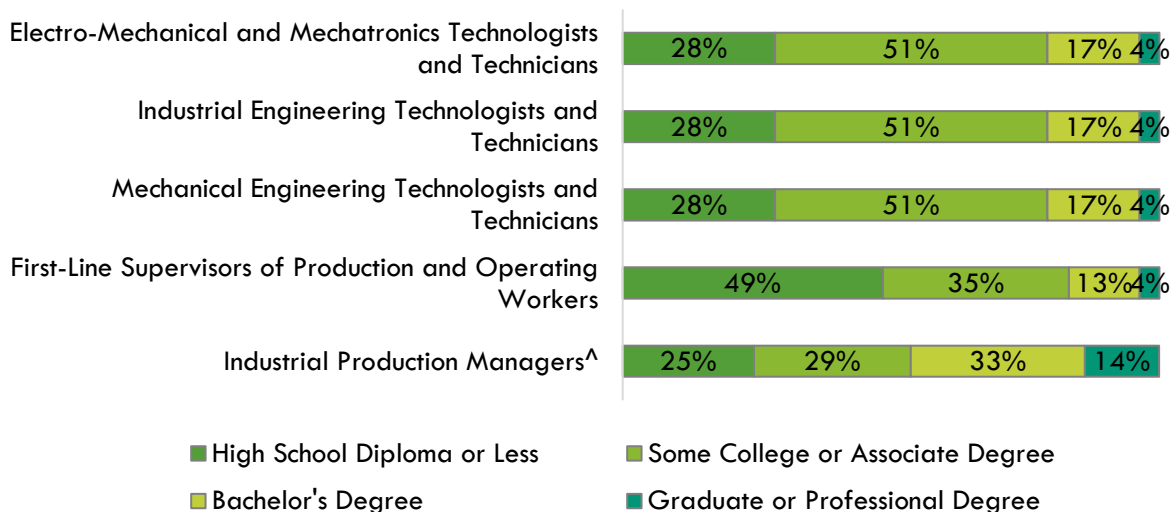
**Exhibit 11: Top Skills for the Above Middle-Skill Occupation
by Number of Job Postings (n=4,335)**

Top Specialized Skills	Top Soft Skills	Top Software and Computer Skills
Auditing (1,258)	Management (1,968)	Microsoft Excel (606)
Quality Management (1,057)	Communication (1,768)	Microsoft Office (571)
Quality Management Systems (693)	Leadership (1,668)	Microsoft PowerPoint (349)
Project Management (647)	Operations (1,487)	Microsoft Outlook (234)
Continuous Improvement Process (617)	Quality Assurance (1,378)	Microsoft Word (215)
Lean Manufacturing (553)	Problem Solving (1,079)	SAP Applications (129)
Process Improvement (528)	Quality Control (1,059)	Spreadsheets (93)
Good Manufacturing Practices (523)	Safety Assurance (836)	Microsoft Access (65)
Production Management (514)	Customer Service (819)	SQL (Programming Language) (51)
Corrective And Preventive Action (CAPA) (418)	Planning (818)	Microsoft Project (49)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *first-line supervisors of production and operating workers*, an associate degree for *electro-mechanical and mechatronics technologists and technicians*, *industrial engineering technologists and technicians*, and *mechanical engineering technologists and technicians*, and a bachelor's degree for *industrial production managers*[^]. However, national-level educational attainment data indicates between 35% to 51% of workers in the middle-skill occupations and 29% of workers in the above middle-skill occupation 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 12: National-level Educational Attainment for Occupations



Of the 60% of the postings for the middle-skill occupations that listed a minimum education requirement in Los Angeles/Orange County, 56% (2,242) requested a high school diploma or an associate degree and 40% (1,608) requested a bachelor's degree.

Conversely, of the 65% of the cumulative job postings for the above middle-skill occupation that listed a minimum education requirement in Los Angeles/Orange County, 75% (2,119) requested a bachelor's degree and 21% (605) requested a high school diploma or an associate 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:

- Business and Commerce, General (0501.00)
- Business Administration (0505.00)
- Business Management (0506.00)
- Management Development and Supervision (0506.30)
- Engineering Technology, General (requires Trigonometry) (0924.00)
- Industrial Electronics (0934.20)
- Electro-Mechanical Technology (0935.00)
- Manufacturing and Industrial Technology (0956.00)
- Industrial and Occupational Safety and Health (0956.70)
- Other Engineering and Related Industrial Technologies (0999.00)

No awards were conferred under the following related TOP codes:

- Electron Microscopy (0934.70)
- Instrumentation Technology (0943.00)

As evidenced in Exhibit 13, there is a substantially larger number of awards conferred under business-related TOP codes relative to their non-business counterparts. These programs are related to the above middle-skill occupation *industrial production managers*[^] and train for 28 other business management occupations that account for over 53,000 annual job openings. For these reasons, supply is overstated for *industrial production managers*[^].

The colleges with the most completions in the region are Pasadena, Coastline, and Cerritos. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Exhibit 13: 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
0501.00	Business and Commerce, General	Cerritos	5	4	1	3
		Glendale	46	61	73	60
		LA City	116	50	60	75
		LA Harbor	10	12	12	11
		LA Mission	0	0	1	0
		LA Pierce	17	13	24	18
		LA Southwest	29	29	24	27
		Long Beach	237	189	195	207
		Mt San Antonio	117	117	136	123
		Santa Monica	5	12	14	10
		West LA	44	67	83	65
		LA Subtotal		626	554	623

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average		
		Coastline	6	5	4	5		
		Saddleback	19	39	73	44		
		OC Subtotal	25	44	77	49		
		Supply Subtotal/Average	651	598	700	650		
0505.00	Business Administration	Cerritos	250	222	299	257		
		Citrus	399	416	386	400		
		Compton	29	31	22	27		
		East LA	247	391	309	316		
		El Camino	306	342	325	324		
		Glendale	241	217	221	226		
		LA City	91	151	112	118		
		LA Harbor	83	87	68	79		
		LA Mission	88	89	89	89		
		LA Pierce	208	255	266	243		
		LA Southwest	56	45	38	46		
		LA Trade	7	28	32	22		
		LA Valley	147	172	197	172		
		Long Beach	293	319	296	303		
		Mt San Antonio	269	337	281	296		
		Pasadena	1191	1240	859	1097		
		Rio Hondo	276	246	254	259		
		Santa Monica	334	337	370	347		
		West LA	156	134	127	139		
				LA Subtotal	4,671	5,059	4,551	4,760
				Coastline	592	432	410	478
				Cypress	244	232	206	227
				Fullerton	373	319	367	353
		Golden West	166	194	186	182		
		Irvine	349	299	383	344		
		Orange Coast	443	368	412	408		
		Saddleback	382	315	327	341		
		Santa Ana	220	198	187	202		
		Santiago Canyon	157	153	143	151		
		OC Subtotal	2,926	2,510	2,621	2,686		
		Supply Subtotal/Average	7,597	7,569	7,172	7,446		
0506.00		Cerritos	516	387	276	393		

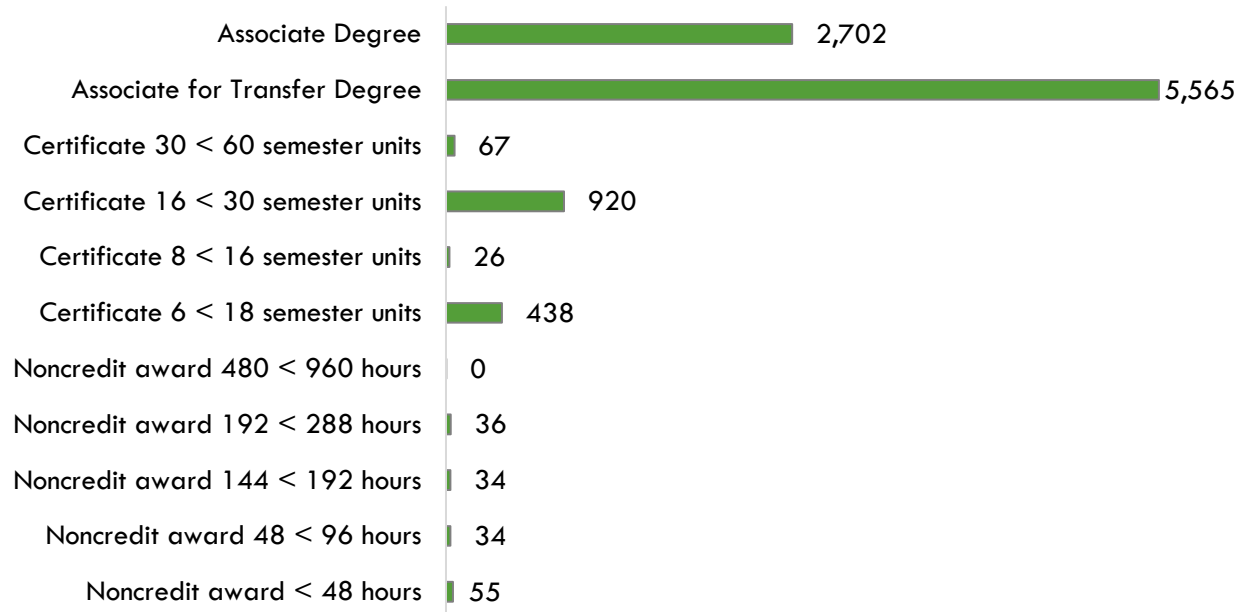
TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average		
0506.30	Business Management	East LA	18	17	18	18		
		El Camino	33	49	22	35		
		Glendale	13	15	28	19		
		LA City	39	18	16	24		
		LA Mission	1	4	6	4		
		LA Pierce	2	7	14	8		
		LA Valley	36	30	39	35		
		Long Beach	29	44	28	34		
		Mt San Antonio	145	150	188	161		
		LA Subtotal	832	721	635	729		
		Coastline	72	307	33	137		
		Cypress	3	7	1	4		
		Fullerton	12	11	19	14		
		Golden West	8	11	13	11		
		Irvine	14	5	23	14		
		North Orange Adult	36	19	32	29		
		Orange Coast	16	19	16	17		
		Santa Ana	71	40	39	50		
		Santiago Canyon	24	55	25	35		
		OC Subtotal	256	474	201	310		
		Supply Subtotal/Average			1,088	1,195	836	1,040
		0506.30	Management Development and Supervision	Cerritos	32	50	59	47
				LA Pierce	4	5	11	7
				LA Southwest	9	15	21	15
				LA Trade	4	8	12	8
				LA Valley	20	18	17	18
				Pasadena	3	10	6	6
Rio Hondo	25			18	16	20		
Santa Monica	19			19	30	23		
LA Subtotal	116			143	172	144		
Coastline	247			7	142	132		
Cypress	0			1	11	4		
Irvine	0			3	0	1		
Saddleback	27			53	38	39		
Santa Ana	11			9	9	10		

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Santiago Canyon	2	1	1	1
		OC Subtotal	287	74	201	187
		Supply Subtotal/Average	403	217	373	331
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
0934.20	Industrial Electronics	LA Valley	0	23	0	8
		LA Subtotal	0	23	0	8
		-	-	-	-	-
		OC Subtotal	-	-	-	-
		Supply Subtotal/Average	0	23	0	8
0935.00	Electro-Mechanical Technology	-	-	-	-	-
		LA Subtotal	-	-	-	-
		Santa Ana	8	0	4	4
		OC Subtotal	8	0	4	4
		Supply Subtotal/Average	8	0	4	4
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

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
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			10,113	9,976	9,540	9,876

Exhibit 14 shows the annual average community college awards by type from 2019-20 to 2021-22. The majority of the awards are for associate for transfer degrees, followed distantly by associate degrees and certificates between 16 and less than 30 hours.

Exhibit 14: 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 15: Manufacturing and Industrial Technology (0956.00) Strong Workforce Program Metrics, 2020-21⁴

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%
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 manufacturing technology 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 Technologies/Technicians, General (15.000)
- Industrial Technology/Technician (15.0612)
- Manufacturing Engineering Technology/Technician (15.0613)
- Automotive Engineering Technology/Technician (15.0803)
- Mechanical/Mechanical Engineering Technology/Technician (15.0805)
- Business/Commerce, General (52.0101)
- Business Administration and Management, General (52.0201)

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

No awards were conferred under the following CIP codes:

- Applied Engineering Technologies/Technicians (15.0001)
- Electromechanical/Electromechanical Engineering Technology/Technician (15.0403)
- Instrumentation Technology/Technician (15.0404)
- Robotics Technology/Technician (15.0405)
- Electromechanical Technologies/Technicians, Other (15.0499)
- Industrial Production Technologies/Technicians, Other (15.0699)
- Industrial Safety Technology/Technician (15.0703)
- Process Safety Technology/Technician (15.0705)
- Operations Management and Supervision (52.0205)

As evidenced in Exhibit 16, there is a substantially larger number of awards conferred under business-related CIP codes relative to their non-business counterparts. These programs are related to the above middle-skill occupation *industrial production managers*[^] and train for 28 other business management occupations that account for over 53,000 annual job openings. For these reasons, supply is overstated for *industrial production managers*[^].

The available data covers 2019 to 2021. During this period, non-community college institutions in the region conferred an average of 15,240 awards annually in related programs.

Exhibit 16: 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
15.0612	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
15.0803	Automotive Engineering	Art Center College of Design	43	52	48

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
	Technology / Technician	Hacienda La Puente Adult Education	25	31	28
Supply Subtotal/Average			68	83	76
15.0805	Mechanical / Mechanical Engineering Technology / Technician	California State Polytechnic University-Pomona	34	54	44
Supply Subtotal/Average			34	54	44
52.0101	Business / Commerce, General	Azusa Pacific University	86	70	78
		Biola University	18	26	22
		Loyola Marymount University	55	38	47
		Marymount California University	10	33	22
		Mount Saint Mary's University	0	0	0
		Pacific States University	0	0	0
		University of Southern California	1	1	1
Supply Subtotal/Average			170	168	169
52.0201	Business Administration and Management, General	Abraham Lincoln University	1	1	1
		America Evangelical University	1	8	5
		American Jewish University	12	5	9
		Angeles College	6	10	8
		Azusa Pacific University	147	142	145
		Bethesda University	47	57	52
		Biola University	137	122	130

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
		California Institute of Advanced Management	19	32	26
		California Intercontinental University	19	19	19
		California State Polytechnic University-Pomona	1,452	1,690	1,571
		California State University-Dominguez Hills	629	662	646
		California State University-Fullerton	2,500	2,588	2,544
		California State University-Long Beach	1,550	1,684	1,617
		California State University-Los Angeles	1,207	957	1,082
		California State University-Northridge	780	871	826
		Chapman University	544	554	549
		Claremont Graduate University	84	92	88
		Concordia University-Irvine	126	122	124
		Fremont College	24	15	20
		Hope International University	72	56	64

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
		InterCoast Colleges-Santa Ana	18	0	9
		InterCoast Colleges-West Covina	0	1	1
		Learnet Academy Inc	3	10	7
		Life Pacific University	15	17	16
		Los Angeles Pacific College	7	3	5
		Los Angeles Pacific University	0	16	8
		Loyola Marymount University	34	71	53
		Marymount California University	59	42	51
		Mount Saint Mary's University	53	33	43
		Pacific College	0	0	0
		Pacific Oaks College	19	16	18
		Pacific States University	4	6	5
		Pathways College	0	2	1
		Pepperdine University	641	598	620
		Platt College-Anaheim	14	9	12
		Platt College-Los Angeles	11	4	8
		Presbyterian Theological Seminary in America	0	0	0
		Saybrook University	0	1	1
		The Chicago School of Professional Psychology at Anaheim	0	4	2

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
		The Chicago School of Professional Psychology at Los Angeles	18	24	21
		The Master's University and Seminary	64	53	59
		Touro University Worldwide	0	0	0
		University of Antelope Valley	38	32	35
		University of California-Irvine	497	560	529
		University of California-Los Angeles	148	38	93
		University of La Verne	545	559	552
		University of Massachusetts Global	352	433	393
		University of Southern California	1,441	1,490	1,466
		University of the People	564	815	690
		University of the West	12	21	17
		Vanguard University of Southern California	51	66	59
		West Coast University-Orange County	0	0	0
		Westcliff University	407	574	491
		Whittier College	64	64	64
		Woodbury University	66	69	68
Supply Subtotal/Average			14,502	15,318	14,910
Supply Total/Average			14,823	15,657	15,240

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.

Note, disaggregated demographic data are identical for three of the five manufacturing technology occupations examined in this report: *electro-mechanical and mechatronics technologists and technicians*, *industrial engineering technologists and technicians*, and *mechanical engineering technologists and technicians*.

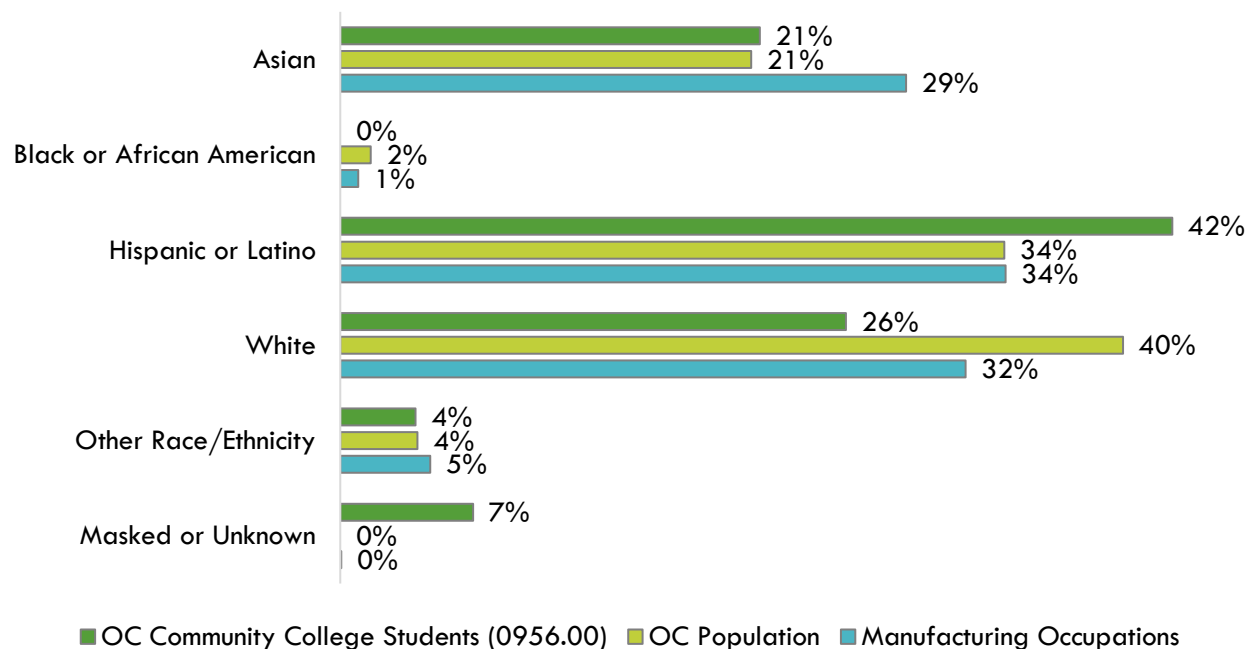
Ethnicity:

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 five manufacturing technology occupations included in this report.

The plurality of the population is white (40%), which is significantly higher than workers in the field (32%) and community college manufacturing and industrial technology students (26%). Conversely, the plurality of community college manufacturing and industrial technology students (42%) are Hispanic or Latino, which is significantly higher than the population and workers in the field (34% each). In addition, Asian individuals account 29% of workers in the field, which is higher than community college manufacturing and industrial technology students and the population (21% each).

Examining disaggregated data for each occupation (not shown), the occupation with the highest percentage of white workers is *industrial production managers*[^] (52%), followed distantly by Asian individuals (25%). This occupation is the only above middle-skill occupation included in this report; it has the highest entry-level wages (\$40.76) and education requirements (bachelor's degree) of all five manufacturing technology occupations. Hispanic or Latino workers account for the plurality of workers in *first-line supervisors of production and operating workers* (41%), followed by their white counterparts (36%). This occupation has the lowest education requirements (high school diploma or equivalent) and the second lowest entry-level wages (\$24.47) of the five manufacturing technology occupations.

Exhibit 17: Program and County Demographics by Ethnicity



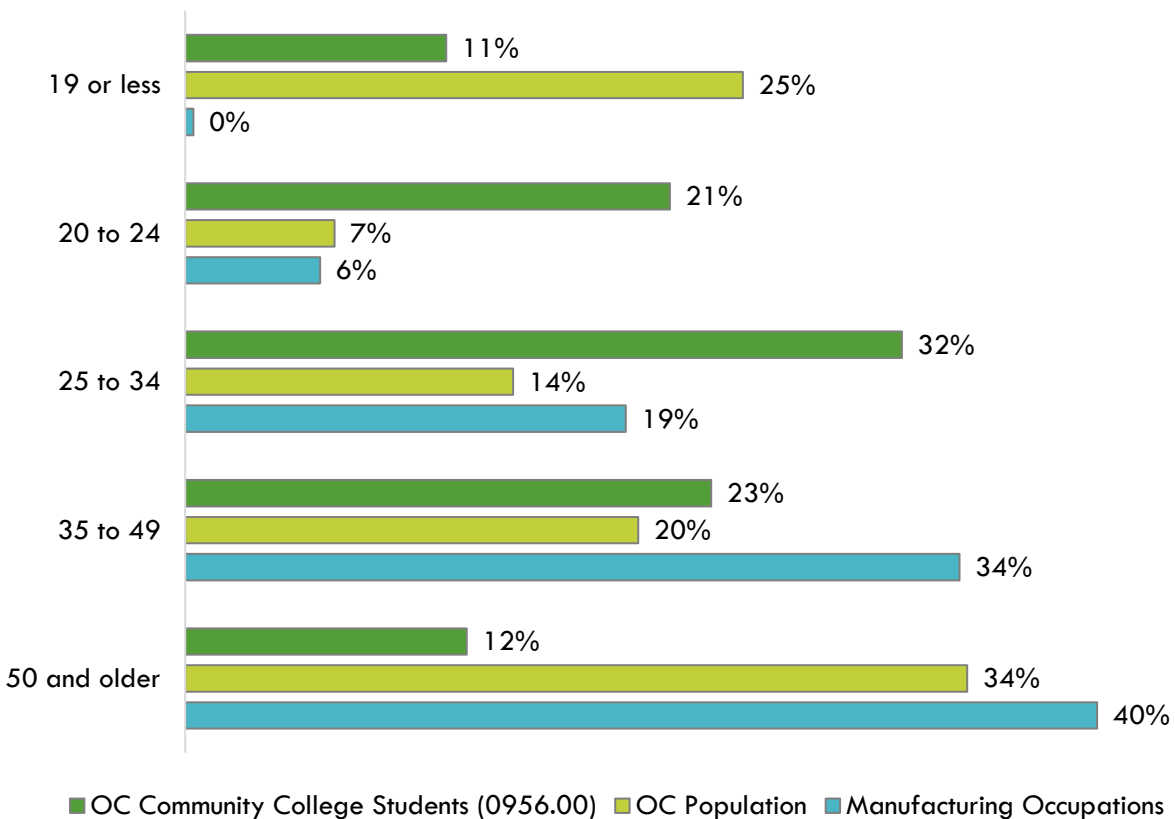
Age:

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 five manufacturing technology 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 (25%). Conversely, nearly three-fourth of workers in the field are 35 and older (74%), which is significantly greater than this age group's share of the population (54%) and more than double their representation amongst community college manufacturing and industrial technology students (35%).

Examining disaggregated data for each occupation (not shown), individuals 50 and older account for the plurality of workers in three of the five manufacturing technology occupations: *electro-mechanical and mechatronics technologists and technicians*, *industrial engineering technologists and technicians*, and *mechanical engineering technologists and technicians*. In addition, though the plurality of workers in *first-line supervisors of production and operating workers* (38%) and *industrial production managers*[^] (37%) are 35 to 49, they are followed closely by individuals 50 and older by a one-percent difference per occupation.

Exhibit 18: Program and County Demographics by Age



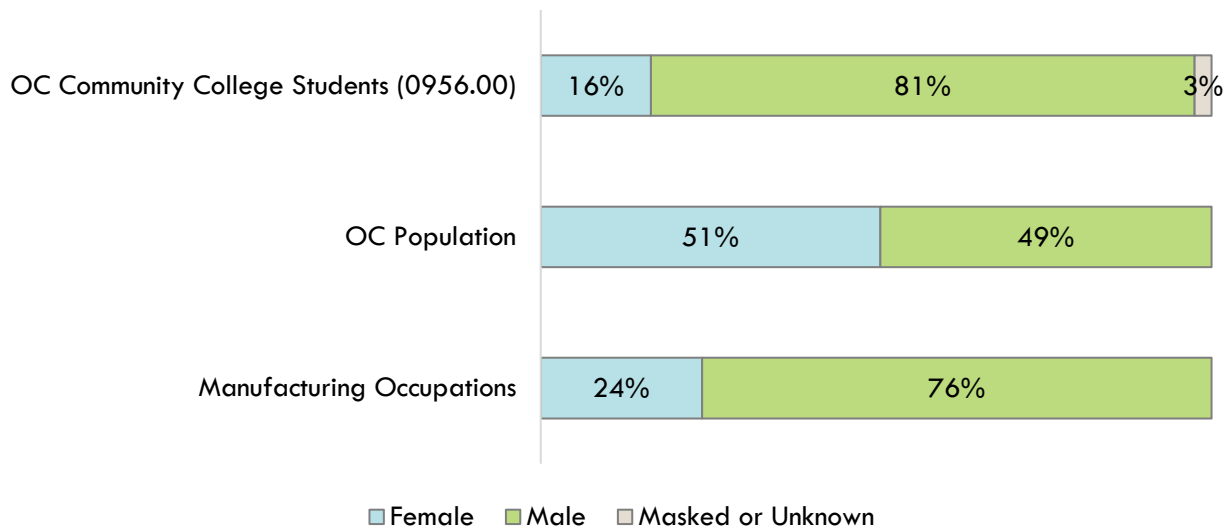
Sex:

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 manufacturing technology occupations.

Though the population is split nearly evenly between women and men, only 16% of community college manufacturing and industrial technology students and 24% workers in the field are women.

Examining disaggregated data for each occupation (not shown), men represent the majority of workers in all five manufacturing technology occupations. The occupation with the highest percentage of women is *industrial production managers*[^] (33%), which is the only above middle-skill occupation included in this report. This occupation has the highest entry-level wages (\$40.76) and education requirements (bachelor's degree) of all five manufacturing technology occupations.

Exhibit 19: 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	<p>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/</p>
Living Wage	<p>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://insightccd.org/family-needs-calculator/</p> <p>The living wage for one adult in Orange County is \$20.63 per hour (\$42,910.40 annually). This figure is used by the CCCCCO to calculate the percentage of students that attained the regional living wage.</p>
Typical Education and Training Requirements, and Educational Attainment	<p>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</p>
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	<p>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/</p>
Educational Supply	<p>The CCCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu</p> <p>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</p>
Student Metrics and Demographics	<p>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</p>

Data Type	Source
Population and Occupation Demographics	<p>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</p> <p>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</p>

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