Labor Market Analysis for Program Recommendation: 0945.00/Industrial Systems Technology and Maintenance *(Industrial Maintenance Technician)*

Orange County Center of Excellence, December 2023

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 is projected to be **824 annual job openings** throughout Los Angeles and Orange counties for *industrial machinery mechanics*, which **is more than the 169 awards conferred by educational institutions.**	
	Yes ☑	No ☐
Living Wage: (Entry-Level, 25th)	*Comments:* **The entry-level wage for *industrial machinery mechanics* is $24.22, which is above the OC living wage of $20.63.**	
	Yes ☑	No ☐
Education:	*Comments:* The typical entry-level education for *industrial machinery mechanics* is a **high school diploma or equivalent. However, more than one-third 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 the following middle-skill occupation:

- Industrial Machinery Mechanics (49-9041)

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 *industrial machinery mechanics* in the region. Additionally, more than one-third of workers in the field have completed some college or an associate degree as their highest level of education and entry-level wages for this occupation are above the living wage. **Therefore, due to all of the 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 *industrial machinery mechanics*.

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
Industrial Machinery Mechanics (49-9041)	LA: 564	LA: 163	OC: $24.22	High school diploma or equivalent	41%
	OC: 260	OC: 6			
Total	**824**	**169**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs for *industrial machinery mechanics* is projected to increase by 4% through 2027. There is projected to be 824 annual job openings.
- The entry-level hourly wage for *industrial machinery mechanics* is $24.22 in Orange County, which is above the living wage of $20.63.
- There were 1,106 online job postings for *industrial machinery mechanics* over the past 12 months. The highest number of postings were for maintenance mechanics, industrial maintenance mechanics, and manufacturing maintenance mechanics.
- The typical entry-level education for *industrial machinery mechanics* is a high school diploma or equivalent.
- Approximately 41% of workers in the field have completed some college or an associate degree as their highest level of education.

Supply:

- There was an average of 125 awards conferred by nine (9) community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- One non-community college institution conferred an average of 44 awards from 2019 to 2021.
- Orange County community college students that exited industrial systems technology and maintenance programs in the 2020-21 academic year had a median annual wage of $96,608 after exiting the program and 100% attained the regional living wage.
- There was insufficient data to determine the percentage of Orange County students that are working in a job closely related to their field of study.
    - Throughout California, 66% of students that exited their industrial systems technology and maintenance 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 *industrial machinery mechanics* from 2017 through 2027. Employment for *industrial machinery mechanics* declined 3% from 2019 to 2020 in Orange County which is less than the 7% decline across all occupations due to the COVID-19 pandemic. Employment in this occupation is projected to grow at a similar rate when compared to all occupations through 2027.

Exhibit 2: Annual Percent Change in Jobs for Industrial Machinery Mechanics, 2017-2027

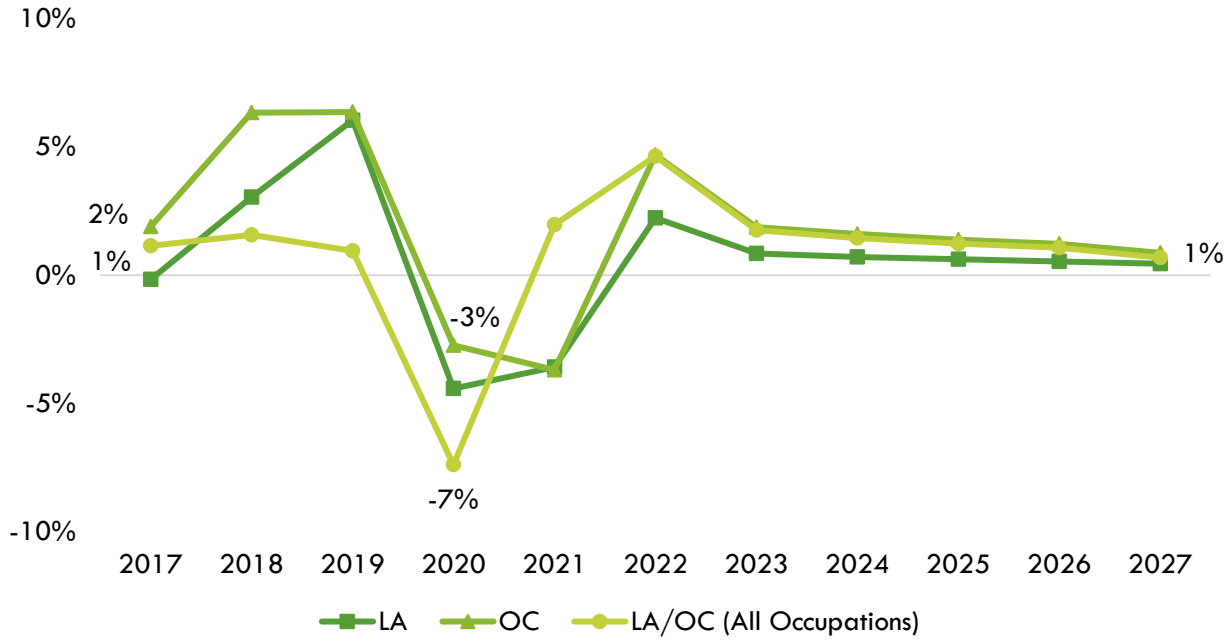


Exhibit 3 shows the five-year occupational demand projections for *industrial machinery mechanics*. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase by 4% through 2027. There is projected to be 824 jobs available annually. Of those, 68% (564) are projected to be in Los Angeles County.

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

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	5,914	6,103	189	3%	564
Orange	2,481	2,658	177	7%	260
Total	**8,395**	**8,761**	**366**	**4%**	**824**

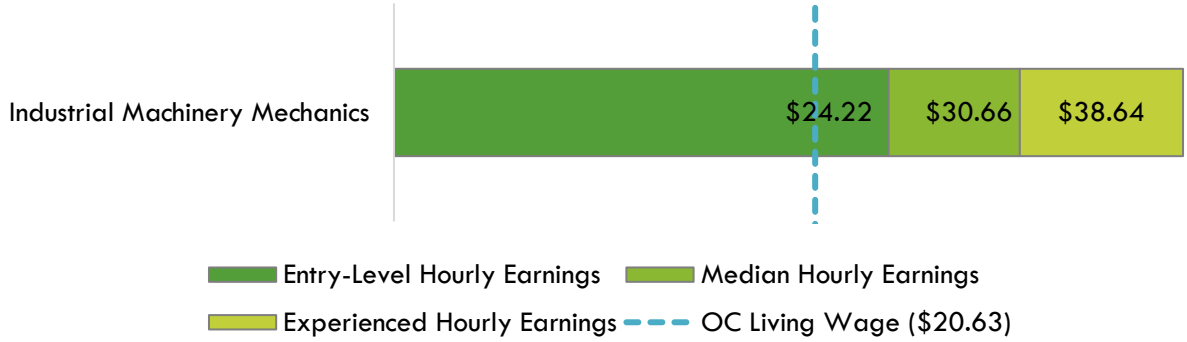
[1] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

The labor market endorsement in this report considers the entry-level hourly wage for *industrial machinery mechanics* in Orange County, as it relates 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.

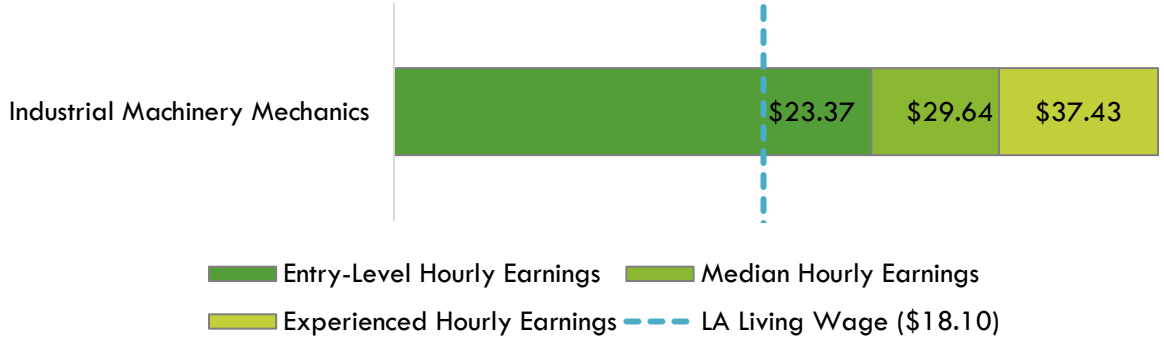
The typical entry-level hourly wage for *industrial machinery mechanics* is $24.22, which is above the living wage for one adult ($20.63 in Orange County). The experienced hourly wage is $38.64, which is also above the living wage. Orange County's average wage ($33.01) is above the average statewide wage of $32.73 for this occupation. Exhibit 4 shows the wage range for *industrial machinery mechanics* in Orange County and how it compares to the regional living wage.

Exhibit 4: Wages by Occupation in Orange County



The typical entry-level hourly wage for *industrial machinery mechanics* is $23.37, which is above the living wage for one adult ($18.10 in Los Angeles County). The experienced hourly wage is $37.43, which is also above the living wage. Los Angeles County's average wage ($31.99) is below the average statewide wage of $32.73 for this occupation. Exhibit 5 shows the wage range for *industrial machinery mechanics* in Los Angeles County and how it compares to the regional living wage.

Exhibit 5: 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.*[2] *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 1,106 online job postings related to *industrial machinery mechanics* listed in the past 12 months, as shown in Exhibit 6.

Exhibit 6: Number of Job Postings by Occupation (n=1,106)

Occupation	Job Postings	Percentage of Job Postings
Industrial Machinery Mechanics	1,106	100%

The top employers for *industrial machinery mechanics* in the region, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=1,106)

Employer	Job Postings	Percentage of Job Postings
Aerotek	72	7%
The Coca-Cola Company	45	4%
Randstad	37	3%
Cargill	34	3%
ManpowerGroup	26	2%
Aerojet Rocketdyne	23	2%
Bowlero Corporation	17	2%
International Paper	16	1%
Southland Employment	14	1%
Precision Castparts	10	1%
Golden State Foods	10	1%
Raytheon Technologies	9	1%

[2] 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 specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for *industrial machinery mechanics* in Exhibit 8.

Exhibit 8: Top Skills by Number of Job Postings (n=1,106)

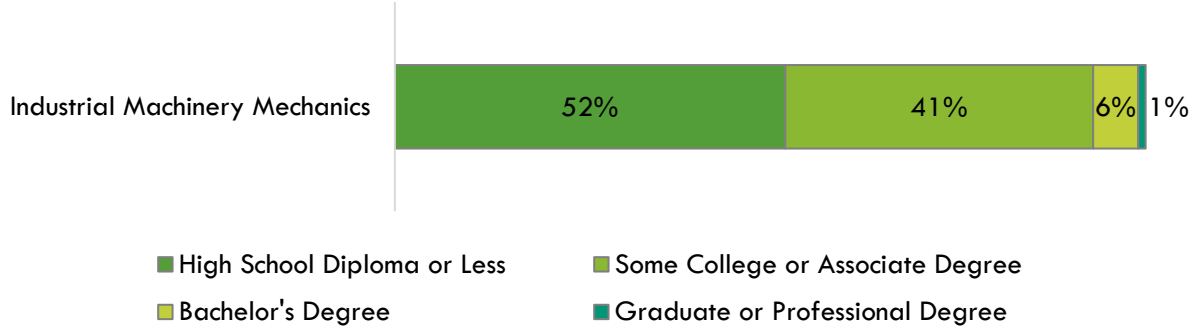
Top Specialized Skills	Top Soft Skills	Top Computer Skills
Machinery (403)	Troubleshooting (582)	Microsoft Excel (52)
Preventive Maintenance (322)	Communication (256)	SAP Applications (34)
Hand Tools (256)	Operations (233)	Microsoft Office (33)
Hydraulics (235)	Lifting Ability (185)	Inventory Control Systems (29)
Industrial Repair and Maintenance (207)	Packaging and Labeling (160)	Microsoft Outlook (29)
Plumbing (183)	Management (147)	Microsoft Word (18)
Programmable Logic Controllers (181)	Computer Literacy (142)	Microsoft PowerPoint (15)
Power Tool Operation (177)	Problem Solving (124)	Disassembler (11)
Forklift Truck (163)	Customer Service (95)	Protractor (Software) (10)
Blueprinting (144)	Planning (92)	Inventory Management System (7)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *industrial machinery mechanics*. The national-level educational attainment data indicates that 41% of workers have completed some college or an associate degree as their highest level of education. Exhibit 9 shows the educational attainment for this occupation.

Of the 49% of the cumulative job postings for *industrial machinery mechanics* that listed a minimum education requirement in Los Angeles/Orange County, 94% (512) requested a high school diploma or an associate degree, 5% (28) requested a bachelor's degree, and 1% (3) requested a master's degree or higher.

Exhibit 9: National-level Educational Attainment for Industrial Machinery Mechanics



Educational Supply

Community College Supply:

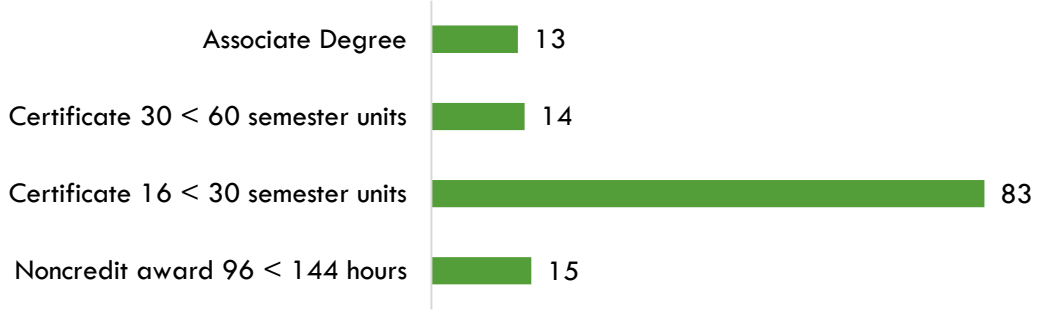
Exhibit 10 shows the annual and three-year average number of awards conferred by community colleges in the related TOP codes: Industrial Systems Technology and Maintenance (0945.00) and Energy Systems Technology (0946.10). The college with the most completions in the region is LA Trade-Tech. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Exhibit 10: 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
0945.00	Industrial Systems Technology and Maintenance	LA Harbor	1	-	-	0
		LA Southwest	9	-	-	3
		LA Trade-Tech	61	59	88	69
		West LA	20	3	13	12
		LA Subtotal	**91**	**62**	**101**	**85**
		Santiago Canyon	16	2	-	6
		OC Subtotal	**16**	**2**	**-**	**6**
		Supply Subtotal/Average	**107**	**64**	**101**	**91**
0946.10	Energy Systems Technology	LA Trade-Tech	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	-	1
		LA Subtotal	**40**	**24**	**40**	**35**
		Supply Subtotal/Average	**40**	**24**	**40**	**35**
		Supply Total/Average	**147**	**88**	**141**	**125**

Exhibit 11 shows the annual average community college awards by type from 2019-20 through 2021-22. The plurality (83) of the awards are for certificates of 16 to less than 30 semester units.

Exhibit 11: Annual Average Community College Awards by Type, 2019-2022



Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for industrial systems technology and maintenance programs in North Orange County Community College District (NOCCCD), the Orange County Region, and California. Of the 854 industrial systems technology and maintenance students in California, only 5% (42) attended an Orange County community college.

Orange County students that exited industrial systems technology and maintenance programs in the 2020-21 academic year had median annual earnings of $96,608 and 100% attained the living wage. There was insufficient data to determine the percentage of students employed in their field of study.

California students that exited industrial systems technology and maintenance programs in the 2020-21 academic year had median annual earnings of $49,756 and 73% attained the living wage. Moreover, 66% of industrial systems technology and maintenance students that exited their program in 2019-20 reported that they are working in a job closely related to their field of study.

Exhibit 12: Industrial Systems Technology and Maintenance (0945.00) Strong Workforce Program Metrics, 2020-21[3]

SWP Metric	NOCCCD	OC Region	California
SWP Students	N/A	42	854
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	N/A	Insufficient Data	45%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	Insufficient Data	93%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	Insufficient Data	132
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	N/A	Insufficient Data	Insufficient Data
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	N/A	Insufficient Data	66%
Median Annual Earnings for SWP Exiting Students	N/A	$96,608 ($46.44)	$49,756 ($23.92)
Median Change in Earnings for SWP Exiting Students	N/A	87%	33%
SWP Exiting Students Who Attained the Living Wage	N/A	100%	73%

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

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for *industrial machinery mechanics*. Exhibit 13 shows the annual and two-year average number of awards conferred by one institution in the related Classification of Instructional Programs (CIP) Code: Mechanical/Mechanical Engineering Technology/Technician (15.0805).

Due to different data collection periods, the most recent two-year period of available data is from 2019 to 2021. Between 2019 and 2021, one non-community college institution in the region conferred an average of 44 awards annually in related training programs.

Exhibit 13: Regional Non-Community College Awards, 2019-2021

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
15.0805	Mechanical/ Mechanical Engineering Technology/Technician	California State Polytechnic University-Pomona	34	54	44
		Supply Total/Average	**34**	**54**	**44**

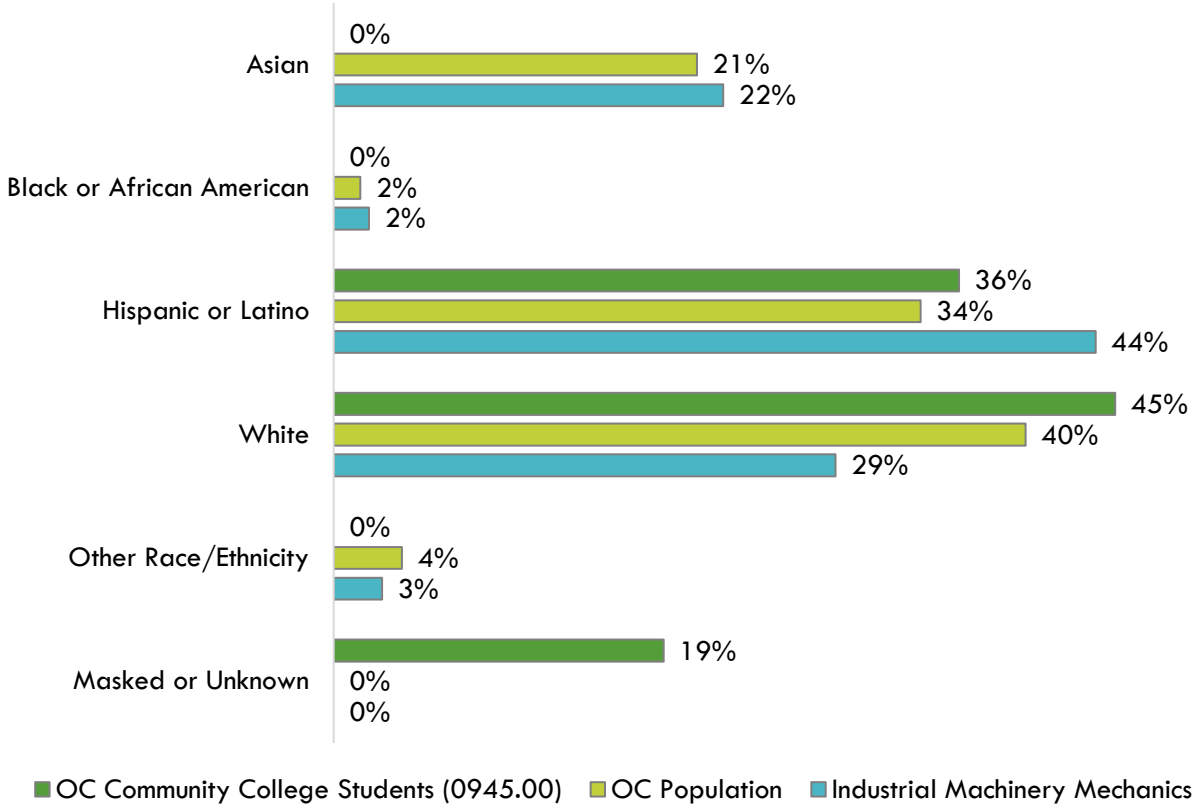
Regional Demographics

This section analyzes demographic data for Orange County community college students enrolled in industrial systems technology and maintenance programs compared to the OC population, as well occupational data, for the purpose of identifying potential diversity and equity issues that can be addressed by community college programs.

Ethnicity:

Exhibit 14 shows the ethnicity of Orange County community college students enrolled in industrial systems technology and maintenance programs compared to the overall Orange County population, as well as industrial machinery mechanics. Nearly half (44%) of workers are Hispanic or Latino, which is higher than the population (34%) and the number of community college industrial systems technology and maintenance students (36%). The next largest group of workers employed in this occupation are white (29%), which is significantly lower than the population (40%) and community college industrial systems technology and maintenance students (45%). Notably, 19% of data is masked or unknown.

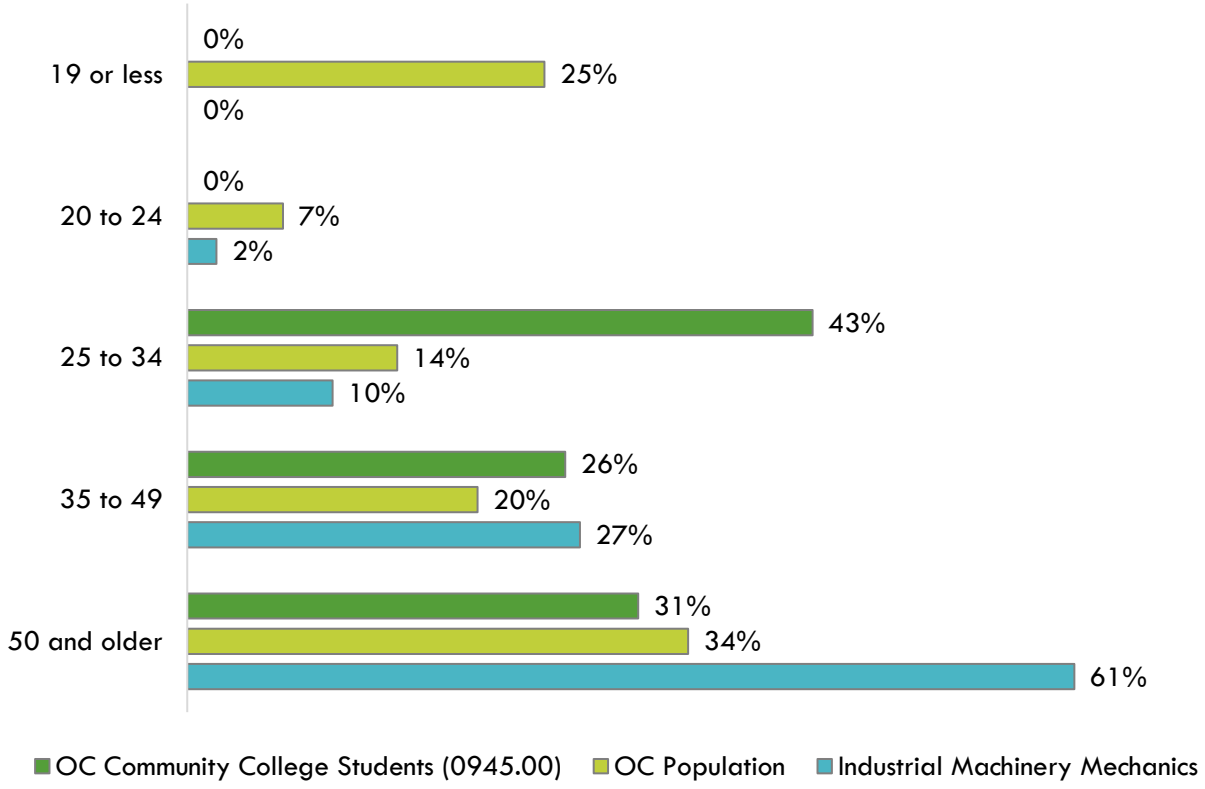
Exhibit 14: Program and County Demographics by Ethnicity



Age:

Exhibit 15 shows the age of Orange County community college students enrolled in industrial systems technology and maintenance programs compared to the overall Orange County population, as well as *industrial machinery mechanics*. The plurality (61%) of workers in this occupation are age 50 and older, followed by 27% of workers age 35 to 49. Notably, more than two-fifths (43%) of community college industrial systems technology and maintenance students are age 25 to 34, which is significantly higher than the population (14%) and the percentage of workers in this occupation (10%).

Exhibit 15: Program and County Demographics by Age

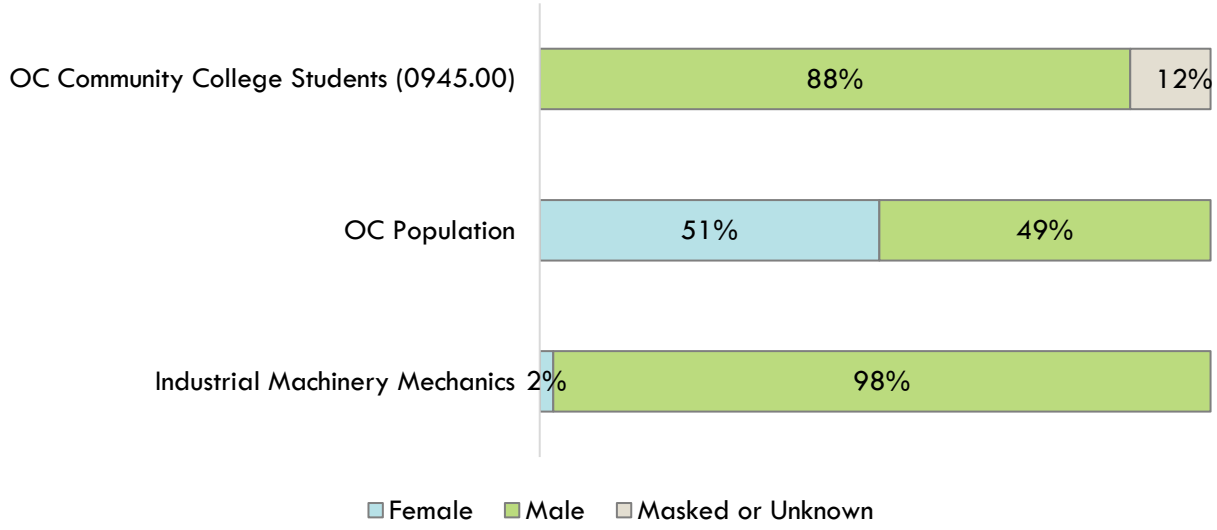


Sex:

Exhibit 16 shows the sex of Orange County community college students enrolled in industrial systems technology and maintenance programs compared to the overall Orange County population as well as *industrial machinery mechanics*.

Though the population is split nearly evenly, the majority of community college industrial systems technology and maintenance students (88%) and *industrial machinery mechanics* (98%) are men.

Exhibit 16: 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 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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