

# Manufacturing Technician

*Inland Empire/Desert Region (Riverside and San Bernardino counties combined)*

## Summary

- Employment for the manufacturing technician occupational group is expected to **increase by 3% between 2018 and 2023** in the Inland Empire/Desert region. A total of **7,803 job openings** will be available over the five-year timeframe.
- The **entry-level wage** for the manufacturing technician occupational group is **above the MIT Living Wage estimate of \$12.39 per hour** for a single adult living in the Inland Empire/Desert region.
- **There appears to be an opportunity for program growth** based on the annual average number of program credentials issued for the selected community college program in the region (**18 annual average community college credentials**), and the annual openings for the manufacturing technician occupational group across the region (**1,561 average annual openings**).

## Introduction

The California Community College manufacturing and industrial technology (TOP 0956.00) program prepares students for employment in the manufacturing industry. Manufacturing and industrial technology provides instruction of engineering principles and technical skills for manufacturing products and related industrial processes. This program includes shaping and forming operations, materials handling, instrumentation and controls, and quality control, as well as computer-aided manufacturing and robotics. This program also includes optimization theory, industrial and manufacturing planning, and related management skills (Taxonomy of Programs, 2012). The following occupations are analyzed in this report and are collectively referred to as the manufacturing technician occupational group in this report:

- Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic
- Computer-Controlled Machine Tool Operators, Metal and Plastic
- Electrical and Electronics Repairers, Commercial and Industrial Equipment
- Industrial Engineering Technicians
- Industrial Machinery Mechanics
- Inspectors, Testers, Sorters, Samplers, and Weighers
- Machinists
- Tool and Die Makers

## Job Opportunities

In 2018, there were 14,204 jobs in the manufacturing technician occupational group in the Inland Empire/Desert region. This occupational group is projected to increase employment by 3% by 2023. Employers in the region will need to hire 7,803 workers over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 1 displays five-year projections for the manufacturing technician occupational group in the Inland Empire/Desert Region.

*Exhibit 1: Five-year projections for the manufacturing technician occupational group*

2018 Jobs	2023 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
14,204	14,614	3%	7,803	1,561	27%

Source: EMSI 2019.2

## Earnings

The entry-level wage for the manufacturing technician occupational group is above the MIT Living Wage estimate of \$12.39 per hour for a single adult living in the Inland Empire/Desert region (Glasmeier, 2019). Median wages are sufficient for two working adults and one child (\$14.75 per hour, per adult, or \$30,680 annually for each adult). Exhibit 2 displays wage information for the manufacturing technician occupational group in the Inland Empire/Desert region.

*Exhibit 2: Earnings, 25<sup>th</sup> to 75<sup>th</sup> percentile, Median, and Annual Average*

Manufacturing Technician Occupational Group	Entry to Experienced Hourly Wage Range*	Median Wage*	Average Annual Earnings
Electrical and Electronics Repairers, Commercial and Industrial Equipment	\$25.36 to \$36.53	\$31.05	\$63,400
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	\$21.87 to \$38.33	\$30.54	\$63,800
Industrial Engineering Technicians	\$20.63 to \$35.67	\$27.30	\$59,600
Industrial Machinery Mechanics	\$21.11 to \$32.17	\$25.67	\$55,200
Tool and Die Makers	\$19.13 to \$29.80	\$23.28	\$51,300
Machinists	\$15.59 to \$23.61	\$18.80	\$41,000
Inspectors, Testers, Sorters, Samplers, and Weighers	\$14.03 to \$24.07	\$18.02	\$40,800
Computer-Controlled Machine Tool Operators, Metal and Plastic	\$13.87 to \$22.94	\$17.73	\$39,000

Source: EMSI 2019.2

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, and experienced is 75<sup>th</sup> percentile wage.

## Job Postings, Employers, Skills, and Education

Exhibit 3 displays the number of job ads posted during the last 12 months along with the regional and statewide average time to fill for the manufacturing technician occupational group in the Inland Empire/Desert region. On average, local employers fill online job postings for the manufacturing technician occupational group within 39 days. This regional average is three days shorter than the statewide average, indicating that it is may be slightly easier for local employers to find qualified candidates. N/A indicates that there were too few job postings to obtain time to fill information.

*Exhibit 3: Job ads and time to fill, Apr 2018 – Mar 2019*

<b>Manufacturing Technician Occupational Group</b>	<b>Job Ads</b>	<b>Regional Average Time to Fill (Days)</b>	<b>California Average Time to Fill (Days)</b>
Industrial Engineering Technicians	851	42	48
Inspectors, Testers, Sorters, Samplers, and Weighers	808	35	39
Industrial Machinery Mechanics	567	43	44
Computer-Controlled Machine Tool Operators, Metal and Plastic	299	36	40
Machinists	262	38	42
Tool and Die Makers	69	43	48
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	51	41	46
Electrical and Electronics Repairers, Commercial and Industrial Equipment	0	N/A	47
<b>Total</b>	<b>2,907</b>	<b>39</b>	<b>42</b>

Source: Burning Glass – Labor Insights

Exhibit 4 displays the employers posting the most job ads for the manufacturing technician occupational group during the last 12 months in the Inland Empire/Desert region. N/A indicates that there were too few job postings to obtain employer information.

*Exhibit 4: Employers posting the most job ads, Apr 2018 – Mar 2019*

Manufacturing Technician Occupational Group	Employers
Industrial Engineering Technicians (n=630)	<ul style="list-style-type: none"> <li>• Amazon</li> <li>• FedEx</li> </ul>
Inspectors, Testers, Sorters, Samplers, and Weighers (n=514)	<ul style="list-style-type: none"> <li>• Carpenter Company</li> <li>• General Atomics Aeronautical Systems</li> </ul>
Industrial Machinery Mechanics (n=424)	<ul style="list-style-type: none"> <li>• Niagara Bottling, LLC</li> <li>• The Kroger Company</li> </ul>
Computer-Controlled Machine Tool Operators, Metal and Plastic (n=162)	<ul style="list-style-type: none"> <li>• AMTEC Precision Products, Inc.</li> <li>• Luxfer Superform</li> </ul>
Machinists (n=153)	<ul style="list-style-type: none"> <li>• General Atomics Aeronautical Systems</li> <li>• Dover Corporation</li> </ul>
Tool and Die Makers (n=59)	<ul style="list-style-type: none"> <li>• Carlisle Interconnect Technologies</li> <li>• SkillsetGroup Inc.</li> </ul>
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic (n=25)	<ul style="list-style-type: none"> <li>• Hera Technologies, LLC</li> <li>• Luxfer Superform</li> </ul>
Electrical and Electronics Repairers, Commercial and Industrial Equipment (n=0)	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 5 displays a sample of specialized, employability, and software and programming skills that employers are seeking when looking for workers to fill positions in the manufacturing technician occupational group. Specialized skills are occupation-specific skills that employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is commonly referred to as “soft skills.” The skills requested in job postings may be utilized as a helpful guide for curriculum development. N/A indicates that there were too few job postings to obtain skill information.

Exhibit 5: Sample of in-demand skills from employer job, Apr 2018 – Mar 2019

Manufacturing Technician Occupational Group	Specialized Skills	Employability Skills	Software and Programming Skills
Industrial Engineering Technicians (n=720)	<ul style="list-style-type: none"> <li>• Repair</li> <li>• Predictive/ Preventative Maintenance</li> <li>• Machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Physical Abilities</li> <li>• Communication Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Office</li> </ul>
Inspectors, Testers, Sorters, Samplers, and Weighers (n=682)	<ul style="list-style-type: none"> <li>• Quality Assurance and Control</li> <li>• Micrometers</li> <li>• Data Entry</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Detail-Oriented</li> <li>• Computer Literacy</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Office</li> </ul>
Industrial Machinery Mechanics (n=535)	<ul style="list-style-type: none"> <li>• Repair</li> <li>• Welding</li> <li>• Predictive/ Preventative Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Physical Abilities</li> <li>• Communication Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Office</li> </ul>
Computer-Controlled Machine Tool Operators, Metal and Plastic (n=276)	<ul style="list-style-type: none"> <li>• Micrometers</li> <li>• Lathes</li> <li>• Calipers</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Physical Abilities</li> <li>• Detail-Oriented</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Office</li> </ul>
Machinists (n=242)	<ul style="list-style-type: none"> <li>• Computer Numerical Control (CNC)</li> <li>• Lathes</li> <li>• Repair</li> </ul>	<ul style="list-style-type: none"> <li>• Detail-Oriented</li> <li>• Organizational Skills</li> <li>• Computer Literacy</li> </ul>	<ul style="list-style-type: none"> <li>• SolidWorks</li> <li>• Microsoft Outlook</li> </ul>
Tool and Die Makers (n=62)	<ul style="list-style-type: none"> <li>• Repair</li> <li>• Lathes</li> <li>• Grinders</li> </ul>	<ul style="list-style-type: none"> <li>• Physical Abilities</li> <li>• Troubleshooting</li> <li>• Detail-Oriented</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic (n=45)	<ul style="list-style-type: none"> <li>• Machining</li> <li>• Lathes</li> <li>• Geometric Dimensions and Tolerances (GD&amp;T)</li> </ul>	<ul style="list-style-type: none"> <li>• Detail-Oriented</li> <li>• Communication Skills</li> <li>• Editing</li> </ul>	<ul style="list-style-type: none"> <li>• Mastercam</li> <li>• Microsoft Office</li> <li>• SolidWorks</li> </ul>
Electrical and Electronics Repairers, Commercial and Industrial Equipment (n=0)	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 6 displays the work experience and entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers

with “some college, no degree” and an “associate degree” according to the U.S. Census (2016-17), and the minimum advertised education requirement from employer job ads. N/A indicates there were too few job postings to determine the minimum advertised education requirements from employer job ads.

*Exhibit 6: Work experience, typical entry-level education, educational attainment, and minimum advertised education requirements, Apr 2018 – Mar 2019*

Manufacturing Technician Occupational Group	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
			Number of Job Ads (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Industrial Engineering Technicians	Associate degree	53%	430	84%	12%	4%
Inspectors, Testers, Sorters, Samplers, and Weighers	High school diploma or equivalent	38%	389	75%	8%	17%
Industrial Machinery Mechanics	High school diploma or equivalent	42%	306	91%	9%	-
Computer-Controlled Machine Tool Operators, Metal and Plastic	High school diploma or equivalent	43%	100	97%	3%	-
Machinists	High school diploma or equivalent	40%	110	95%	5%	-
Tool and Die Makers	Postsecondary nondegree award	48%	9	100%	-	-
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	High school diploma or equivalent	43%	19	68%	32%	-
Electrical and Electronics Repairers, Commercial and Industrial Equipment	Postsecondary nondegree award	50%	0	N/A	N/A	N/A

Source: EMSI 2019.2, Burning Glass – Labor Insights

\*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

## Student Completions and Program Outcomes

Exhibit 7 displays the average annual regional California Community College (CCC) credentials conferred during the three academic years between 2014 and 2017, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, along with the enrollment from the most recent year available on LaunchBoard. Credentials are the combined total of associate degrees and certificates issued during the timeframe, divided by three in order to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year. The relevant TOP code is from the Taxonomy of Programs manual, and the corresponding program titles used at each college (in *italics*) is sourced from the Chancellor's Office Curriculum Inventory (COCI). Please note, a credential is not always equal to a single person in search of a job opening since a student may earn more than one credential, such as an associate degree in addition to a certificate.

*Exhibit 7: Annual average community college credentials and enrollment for the manufacturing and industrial technology program in the Inland Empire/Desert region*

<b>0956.00 – Manufacturing and Industrial Technology</b>	<b>CCC Enrollment, Academic Year 2016-17</b>	<b>CCC Annual Average Credentials, Academic Years 2014-17</b>
<b>Mt. San Jacinto</b>	18	
<b>Norco – <i>Industrial Automation/</i></b>	133	
Associate Degree		2
Certificate 18 to < 30 semester units		10
Certificate 6 to < 18 semester units		3
<b>San Bernardino – <i>Computer Numerical Control – CAD &amp; CAM</i></b>	10	
Certificate 30 to < 60 semester units		2
<b>Total CCC Enrollment, Academic Year 2016-17</b>	<b>161</b>	
<b>Total Annual Average CCC Credentials, Academic Years 2014-17</b>		<b>18</b>

Source: LaunchBoard, MIS Data Mart, COCI

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor’s Office Management Information Systems (MIS) by community colleges, which comes from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from records provided by California’s Employment Development Department’s Unemployment Insurance database. Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2017). Data from the latest academic year for each metric is provided in Exhibit 8.

*Exhibit 8: Manufacturing and industrial technology strong workforce program outcomes*

<b>Strong Workforce Program Metrics: 0956.00 – Manufacturing and Industrial Technology Academic Year 2015-16, unless noted otherwise</b>	<b>Inland Empire/Desert Region</b>	<b>California Median</b>
Course enrollments (2016-17)	161	93
Completed 12+ units in one year (2016-17)	51	28
Employed in fourth fiscal quarter after exit	80%	77%
Median annual earnings*	\$31,894	\$36,282
Job closely related to the field of study (2014-15)	N/A	69%
Median change in earnings	192%	60%
Attained a living wage	57%	70%
Economically disadvantaged students* (2016-17)	72%	59%

Source: LaunchBoard

\*Data for these metrics is available in Community College Pipeline. All others are available in Strong Program Workforce Metrics.



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## **Appendix: Occupation definitions, sample job titles, five-year projections for manufacturing technician occupations**

*Occupation Definitions (SOC) code), Education and Training Requirement, Community College Educational Attainment*

### **Industrial Engineering Technicians (17-3026)**

Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.

**Sample job titles:** Engineering Technician, Industrial Engineering Analyst, Industrial Engineering Technician, Manufacturing Technician, Methods Engineer, Process Documentation and Methods Analyst, Process Engineer, Process Technician, Production Staff Worker, Quality Control Engineering Technician (QC Engineering Technician)

*Entry-Level Educational Requirement: Associate degree*

*Training Requirement: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 53%*

### **Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)**

Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.

**Sample job titles:** Control Technician, Electrical and Instrument Mechanic, Electrical and Instrument Technician (E&I Tech), Electrical Maintenance Technician, Electrical Technician, I&C Tech (Instrument and Control Technician), Instrument and Electrical Technician (I&E Tech), Repair Technician, Service Technician, Technical Support Specialist

*Entry-Level Educational Requirement: Postsecondary nondegree award*

*Training Requirement: More than twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 50%*



### **Industrial Machinery Mechanics (49-9041)**

Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.

**Sample job titles:** Fixer, Industrial Machinery Mechanic, Industrial Mechanic, Loom Fixer, Machine Adjuster, Maintenance Mechanic, Maintenance Technician, Master Mechanic, Mechanic, Overhauler

*Entry-Level Educational Requirement: High school diploma or equivalent*

*Training Requirement: More than twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 42%*

### **Computer-Controlled Machine Tool Operators, Metal and Plastic (51-4011)**

Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.

**Sample job titles:** Brake Press Operator; Computer Numerical Control Lathe Operator (CNC Lathe Operator); Computer Numerical Control Machine Operator (CNC Machine Operator); Computer Numerical Control Machinist (CNC Machinist); Computer Numerical Control Mill Operator (CNC Mill Operator); Computer Numerical Control Operator (CNC Operator); Computer Numerical Control Set-Up and Operator (CNC Set-Up and Operator); Machine Operator; Machine Set-Up, Operator; Machinist

*Entry-Level Educational Requirement: High school diploma or equivalent*

*Training Requirement: Between one and twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 43%*



### **Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic (51-4012)**

Develop programs to control machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.

**Sample job titles:** CAD CAM Programmer (Computer-Aided Design Computer-Aided Manufacturing Programmer), Computer Numerical Control Machine Operator (CNC Machine Operator), Computer Numerical Control Machining Center Operator (CNC Machining Center Operator), Computer Numerical Control Machinist (CNC Machinist), Computer Numerical Control Operator (CNC Operator), Computer Numerical Control Programmer (CNC Programmer), Machine Shop Lead Man, Machining Manager, Process Engineer, Programmer

*Entry-Level Educational Requirement: Postsecondary nondegree award*

*Training Requirement: Between one and twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 43%*

### **Machinists (51-4041)**

Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.

**Sample job titles:** Gear Machinist, Journeyman Machinist, Machine Operator, Machine Repair Person, Machinist, Maintenance Machinist, Maintenance Specialist, Production Machinist, Set-Up Machinist, Tool Room Machinist

*Entry-Level Educational Requirement: High school diploma or equivalent*

*Training Requirement: More than twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 40%*

### **Tool and Die Makers (51-4111)**

Analyze specifications, lay out metal stock, set up and operate machine tools, and fit and assemble parts to make and repair dies, cutting tools, jigs, fixtures, gauges, and machinists' hand tools.

**Sample job titles:** Aircraft Tool Maker, Carbide Tool Die Maker, Die Maker, Jig and Fixture Builder, Jig and Fixture Repairer, Tool and Die Machinist, Tool and Die Maker, Tool Repairer, Toolmaker, Trim Die Maker

*Entry-Level Educational Requirement: Postsecondary nondegree award*

*Training Requirement: More than twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 48%*

### **Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)**

Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.

**Sample job titles:** Inspector, Picker / Packer, Quality Assurance Auditor, Quality Assurance Inspector, Quality Assurance Technician, Quality Auditor, Quality Control Inspector, Quality Control Technician, Quality Inspector, Quality Technician

*Entry-Level Educational Requirement: High school diploma or equivalent*

*Training Requirement: Between one and twelve months of on-the-job training*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 38%*



Table 1: 2018 to 2023 job growth, wages, education, training, and work experience required for the manufacturing technician occupational group, Inland Empire/Desert Region

Occupation (SOC)	2018 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	4,901	12	0%	593	\$14.03 to \$24.07	\$18.02	\$40,800	High school diploma or equivalent & 1 to 12 months	None
Machinists (51-4041)	3,284	104	3%	359	\$15.59 to \$23.61	\$18.80	\$41,000	High school diploma or equivalent & more than 12 months	None
Industrial Machinery Mechanics (49-9041)	3,038	213	7%	310	\$21.11 to \$32.17	\$25.67	\$55,200	High school diploma or equivalent & more than 12 months	None
Computer-Controlled Machine Tool Operators, Metal and Plastic (51-4011)	1,207	30	2%	126	\$13.87 to \$22.94	\$17.73	\$39,000	High school diploma or equivalent & 1 to 12 months	None
Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)	734	30	4%	71	\$25.36 to \$36.53	\$31.05	\$63,400	Postsecondary nondegree award & more than 12 months	None
Industrial Engineering Technicians (17-3026)	429	7	2%	39	\$20.63 to \$35.67	\$27.30	\$59,600	Associate's degree & none	None
Tool and Die Makers (51-4111)	351	(4)	(1%)	33	\$19.13 to \$29.80	\$23.28	\$51,300	Postsecondary nondegree award & more than 12 months	None
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic (51-4012)	259	20	8%	30	\$21.87 to \$38.33	\$30.54	\$63,800	Postsecondary nondegree award & 1 to 12 months	None
<b>Total</b>	<b>14,204</b>	<b>410</b>	<b>3%</b>	<b>1,561</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

Source: EMSI 2019.2

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, experienced is 75<sup>th</sup> percentile wage.