Mechatronics

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

This workforce demand report uses state and federal job projection data developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.

Summary

The Community College
Electro-Mechanical Technology
(TOP 0935.00)
Program

Provides training for the following Community College-level Occupations:

- Electro-Mechanical and Mechatronics Technologists and Technicians
(SOC 17-3024)

- Electrical and Electronics Repairers, Commercial and Industrial Equipment
(25-2011)

Over the next five years (2020-2025), community college-level mechatronics employment is projected to

Increase Employment
6%

58
combined
Annual Job Openings

Median Hourly Wage
$28.57 - $34.29
above the $24.36 hourly Self-sustainability Standard

45 Total Annual Awards
In Programs Related to Electro-Mechancial Technology

4
Program Awards in Electro-Mechanical Technology Programs

41
Program Awards in Programs Related to Mechatronics

The Inland Empire/Desert Centers of Excellence
Cautiously Recommends
Electro-Mechanical Technology Program Expansion to meet the need for more workers in the region

Introduction

This report provides regional occupational demand and wage research, and postsecondary program outcomes related to mechatronics training. The California Community College electro-mechanical technology (TOP 0935.00) program provides training for mechatronics jobs. This program prepares students for

employment through instruction related to the design, development, testing, and maintenance of electro-mechanical and servo-mechanical devices and systems (Taxonomy of Programs, 2012). The result of the interdisciplinary nature of this field is that mechatronics-related programs are assigned to various TOP codes. For this reason, the supply section in this report includes completions for all programs that train mechatronics workers in the region. According to the footnotes in the most recent Taxonomy of Programs manual, "All Mechatronics training programs should be aligned to TOP 0935.00" (Taxonomy of Programs, 2012, pg. 113).

The knowledge, skills, and abilities trained by electro-mechanical programs lead to three distinct occupations and one emerging occupation, collectively referred to as the mechatronics occupational group in this report. The mechatronics occupational group is separated into community college-level and bachelor's degree-level occupations to illuminate job opportunities for individuals with varying education levels.

The **community college-level occupations** in this report represent the entry-level employment opportunities in the mechatronics field and typically require an associate degree or a postsecondary nondegree award before entering employment. Between 48% and 51% of incumbent workers in these occupations have a community college-level education, some college or an associate degree, as their highest level of educational attainment. The community college-level occupations included in the mechatronics occupational group are:

- Electro-Mechanical and Mechatronics Technologists and Technicians (SOC 17-3024)
- Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)

The **bachelor's degree-level occupations** in this report typically require workers to obtain a four-year degree before entering employment. Approximately 14% of workers in this occupation have a community college-level education, some college or an associate degree, as their highest level of educational attainment. The bachelor's degree-level occupation included in the mechatronics occupational group is:

- Engineers, All Other (SOC 17-2199)
    - Mechatronics Engineers (17-2199.05)*

*The Federal Standard Occupation Classification (SOC) system classifies mechatronic engineers (SOC 17-2199.05) as an emerging occupation within the broader occupational code, engineers, all other (17-2199). Precise jobs counts and wages are not available for emerging occupation. A list of common job titles within Engineers, All Other is available at the end of this report. Demand for mechatronics engineers is approximated through an online job ad search for this emerging occupation.

This report's educational supply and employment demand portions focus solely on the community college-level jobs students are likely to obtain after completing a community college electro-mechanical technology program in the Inland Empire/Desert Region.

Job Counts and Projections

In 2020, there were 1,762 total mechatronics jobs in the region. Employment for the community college-level mechatronics occupational group is projected to increase by 6% through 2025, with 58 combined annual job openings expected annually. Engineers, all other are expected 86 annual job openings, increasing employment by 6% over the next five years. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers age 55 years and greater in the region.

Exhibit 1: Five-year projections for the mechatronics occupational group, 2020-2025

Occupation	2020 Jobs	2025 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Electrical and Electronics Repairers, Commercial and Industrial Equipment	576	608	6%	263	53	17%
Electro-Mechanical and Mechatronics Technologists and Technicians	46	50	7%	26	5	23%
Community College-level Total	**622**	**657**	**6%**	**289**	**58**	**18%**
Occupation	**2020 Jobs**	**2025 Jobs**	**5-Yr % Change (New Jobs)**	**5-Yr Openings (New + Replacement Jobs)**	**Annual Openings (New + Replacement Jobs)**	**% of workers age 55+**
Engineers, All Other*	1,139	1,204	6%	430	86	34%
Bachelor's Degree-level Total	**1,139**	**1,204**	**6%**	**430**	**86**	**34%**

Source: Emsi 2022.1

*Engineers, All Other includes the emerging, mechatronics engineers occupation among other engineering roles that cannot be quantified alone at this time. Demand for mechatronics engineers alone is likely overstated.

An online job advertisement search for mechatronics jobs was conducted to reveal the details about the employers seeking these workers, including the time it takes to fill positions, earnings information, and in-demand skills. To determine the demand for bachelor's degree-level mechatronics opportunities, the job search focuses on the emerging occupation, mechatronics engineers (17-2199.05), because this occupation is specialized to mechatronics, unlike the broader occupation engineers all other (17-2199).

Over the previous 12 months, there were no jobs ads for electrical and electronics repairers, commercial and industrial equipment, and only two advertisements posted for mechatronics engineers in the region. To ensure there were sufficient advertisements to obtain reliable advertisement information, the job search for these occupations was expanded to include all advertisements posted in California. Despite the increased search area, the statewide job advertisement search for electrical and electronics repairers, commercial and industrial equipment yielded zero results.

Exhibit 2 shows the number of job ads posted during the last 12 months and the regional and statewide average time to fill this job. On average, regional employers spent 30 days filling online job advertisements for electro-mechanical and mechatronics technologists and technicians, six days shorter than employers throughout the state. Time to fill information reveals that regional employers likely face fewer challenges filling open positions than other employers in California.

Exhibit 2: Job ads and time to fill

Occupation	Job Ads	Regional Average Time to Fill (Days)	Statewide Average Time to Fill (Days)
Mechatronics Engineers*	340	-	43
Bachelor's Degree-level Total	**340**	**-**	**43**
Electro-Mechanical and Mechatronics Technologists and Technicians	97	30	36
Electrical and Electronics Repairers, Commercial and Industrial Equipment*	0	-	-
Community College-level Total	**97**	**30**	**36**
Total	**437**	**30**	**37**

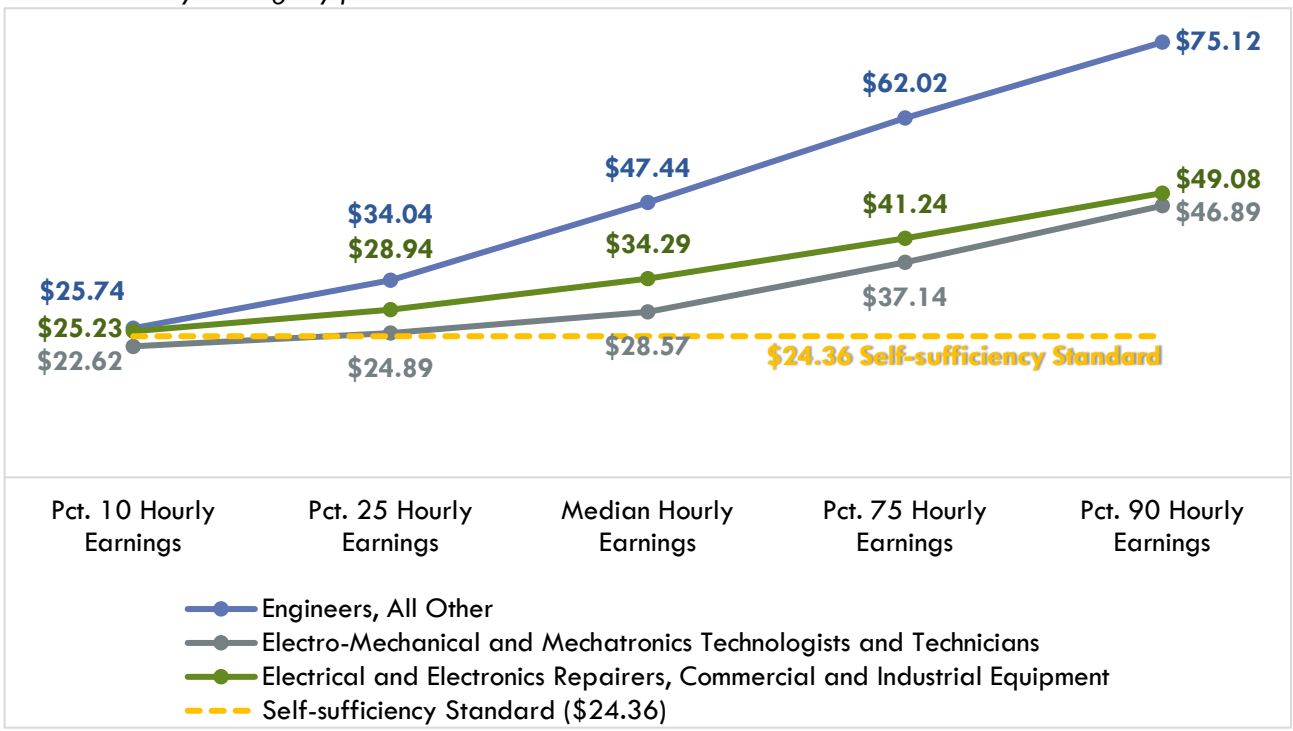
Source: Burning Glass – Labor Insights
*Statewide job advertisement information

Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide self-sustainable income. The University of Washington estimates that a self-sufficient hourly rate for a single adult with one school-age child is $24.36 per hour or $51,452 annually in Riverside County; $23.73 per hour or $50,119 annually in San Bernardino County (Pearce, 2021). For this study, the higher hourly earnings requirement in Riverside County is adopted as the self-sufficiency standard for the two-county region.

Exhibit 3 displays the hourly earnings for the mechatronics occupational group in the Inland Empire/Desert Region. The median hourly earnings for the community college-level occupational group are between $28.57 and $34.29, above the regional self-sufficiency standard. The hourly earnings for engineers, all other and electrical and electronics repairers, commercial and industrial surpass the regional self-sufficiency standard at the 10th percentile, indicating that at least the top 90% of workers earn a self-sustainable wage. The hourly earnings for electro-mechanical and mechatronics technologists and technicians exceed the self-sufficiency standard at the 25th percentile.

Exhibit 3: Hourly earnings by percentile



Source: Emsi 2022.1

Benefits information, typically provided by the occupational guides developed by the California Labor Market Information Division, is not available for the mechatronics occupational group (Detailed Occupational Guides, 2022).

Advertised Salary from Online Job Ads

Exhibit 4 displays online job ad salary data for the mechatronics occupational group over the last 12 months. Online job ad salary information reveals that employers are willing to pay the mechatronics occupational group an average annual salary between $55,000 and $106,000, above the region's $51,452 annual ($24.36 hourly) self-sufficiency standard. Consider the salary information with caution since only 12% (54 out of 437) of online job advertisements for these occupations provided salary information. The salary figures are

prorated to reflect full-time, annual earnings status. Job ad data was not available for the electrical and electronics repairers, commercial and industrial equipment occupation.

Exhibit 4: Advertised salary information

Occupation	Real-Time Salary Information					
	Number of job ads	Less than $35,000	$35,000 to $49,999	$50,000 to $74,999	More than $75,000	Average Annual Salary
Bachelor's Degree-level						
Mechatronics Engineers*	26	-	-	19%	81%	$106,000
Community College-level						
Electro-Mechanical and Mechatronics Technologists and Technicians	28	3%	54%	29%	14%	$55,000

Source: Burning Glass – Labor Insights
*Statewide job advertisement information

Employers, Skills, Education, and Work Experience

Exhibit 5 displays the employers posting the most job ads for the mechatronics occupational group over the last 12 months. Showing employer names provides some insight into where students may find employment after completing a program. XPO Logistics posted the most advertisements for the mechatronics occupational group in the Inland Empire/Desert Region, accounting for 19% of total regional advertisements. XPO Logistics sought mechatronics workers to repair and maintain the robotics used in materials transportation. Job ad data was not available for the electrical and electronics repairers, commercial and industrial equipment occupation.

Exhibit 5: Employers posting the most job ads for the mechatronics occupational group

Occupation	Top Employers	
Bachelor's Degree-level		
Mechatronics Engineers* *(n=340)*	• Tesla, Inc. • Rivian Automotive, Inc. • KLA Corporation • Johnson & Johnson	• Meta Platforms, Inc. • Actalent • SpaceX • Intuitive Surgical, Inc.
Community College-level		
Electro-Mechanical and Mechatronics Technologists and Technicians *(n=97)*	• XPO Logistics • GXO Logistics	• Applus IDIADA • WITRON Service

Source: Burning Glass – Labor Insights
*Statewide job advertisement information

Exhibit 6 lists a sample of specialized, employability, and software and programming skills employers seek when looking for workers to fill the mechatronics occupational group positions. Specialized skills are occupation-specific skills that employers request for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job ads may be utilized to guide curriculum development. Job ad data was not available for the electrical and electronics repairers, commercial and industrial equipment occupation.

Exhibit 6: Sample of in-demand skills from employer job ads

Occupation	Specialized skills	Employability skills	Software and Programming skills
Bachelor's Degree-level			
Mechatronics Engineers* *(n=338)*	• Mechanical Engineering • Robotics • Prototyping • Manufacturing Processes • Finite Element Analysis	• Communication Skills • Teamwork/ Collaboration • Troubleshooting • Problem Solving • Creativity	• SolidWorks • Python • MATLAB • C++
Community College-level			
Electro-Mechanical and Mechatronics Technologists and Technicians *(n=94)*	• Robotics • Equipment Repair • Calibration • Programmable Logic Controller (PLC) Programming	• Troubleshooting • Preventive Maintenance • Physical Abilities • Problem Solving • Communication Skills	• Microsoft Office

Source: Burning Glass – Labor Insights
*Statewide job advertisement information

Exhibit 7 displays the typical entry-level education, educational attainment, and minimum advertised education requirements for the mechatronics occupational group. According to the Bureau of Labor Statistics, between 48% and 51% of incumbent workers in this field hold a community college-level of educational attainment; "some college, no degree" and an "associate degree." Approximately 56% of employer job advertisements for electro-mechanical and mechatronics technologists and technicians sought candidates with at least a high school diploma or vocational training, and about 7% of employers preferred an associate degree. Typical entry-level education requirement and community college-level educational attainment information is not available for mechatronics engineers since this is an emerging occupation.

Exhibit 7: Typical entry-level education, educational attainment, and minimum advertised education requirements

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Real-Time Minimum Advertised Education Requirement			
			Number of Job Ads	High school or vocational training	Associate degree	Bachelor's degree or higher
Bachelor's Degree-level						
Mechatronics Engineers**	-	-	*313*	2%	1%	97%
Community College-level						
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate degree	51%	*70*	56%	7%	37%
Electrical and Electronics Repairers, Commercial and Industrial Equipment**	Postsecondary nondegree award	48%	*0*	N/A	N/A	N/A

Source: Emsi 2021.4, Burning Glass – Labor Insights
*Percentage of incumbent workers with a Community College Award or Some Postsecondary Coursework
**Statewide job advertisement information

Exhibit 8 displays the work experience typically required to enter each occupation and the real-time work experience requirements from employer job ads. The majority of employers posting job advertisements for electro-mechanical and mechatronics technologists and technicians sought candidates with zero to two years of previous work experience, while most employers posting advertisements for mechatronics engineers sought candidates with three to five years of previous work experience.

Exhibit 8: Work experience required and real-time work experience requirements

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of job ads	0 – 2 years	3 – 5 years	6+ years
Bachelor's Degree-level					
Mechatronics Engineers*	-	*262*	17%	57%	26%
Community College-level					
Electro-Mechanical and Mechatronics Technologists and Technicians	None	*75*	72%	27%	1%

Source: Burning Glass – Labor Insights
*Statewide job advertisement information

Student Completions and Programs Outcomes

This section contains completion data for the California Community College mechatronics programs, which are currently coded under the following: electro-mechanical technology (TOP 0935.00), electrical, electronic, and electro-mechanical drafting (TOP 0953.30), electrical systems and power transmission (TOP 0934.40), and industrial systems technology and maintenance (TOP 0945.00), and manufacturing and industrial technology (TOP 0956.00) in the region. Combined, regional programs generated a potential supply of 45 qualified mechatronics workers annually. The Taxonomy of Programs manual states, "All Mechatronics programs should be moved to TOP 0935.00" (Taxonomy of Programs, 2012, p. 113).

Chaffey College is the only regional community college to offer an electro-mechanical technology (TOP 0935.00) program. In the 2020-21 academic year, Chaffey College issued four awards total across its mechatronics training programs. Exhibit 9 displays the awards issued in regional electro-mechanical technology programs in the 2020-2021 academic year.

Exhibit 9: Awards issued in regional electro-mechanical technology programs, 2020-21

TOP 0935.00 – Electro-Mechanical Technology	Award Type	Awards, Academic Year 2020-2021
Chaffey		**4**
Mechatronics	Associate Degree	0
Mechatronics Level I	Certificate 16 < 30 semester units	2
Mechatronics Level II	Certificate 8 < 16 semester units	2
Total		**4**

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 10. The outcome methodology is available in the appendix section of this report.

Exhibit 10: 0935.00 – Electro-mechanical technology strong workforce program outcomes

Strong Workforce Program Metrics: 0935.00 – Electro-Mechanical Technology Academic Year 2018-19, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2019-20)	149	458
Completed 9+ career education units in one year (2019-20)	64%	51%
Perkins Economically disadvantaged students (2019-20)	85%	85%
Students who earned a degree, certificate, or attained apprenticeship (2019-20)	-	30
Transferred to a four-year institution (transfers)	-	33
Job closely related to the field of study (2017-18)	100%	100%
Median annual earnings (all exiters)	$45,306	$47,172

Strong Workforce Program Metrics: 0935.00 – Electro-Mechanical Technology Academic Year 2018-19, unless noted otherwise	Inland Empire/Desert Region	California
Median change in earnings (all exiters)	73%	76%
Attained a living wage (completers and skills-builders)	73%	70%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

For a complete analysis of mechatronics educational supply in the region, programs similar in nature to mechatronics but assigned to different TOP codes were analyzed. The programs included in the supply analysis have been limited to those that provide training directly related to mechatronics. Exhibit 11 displays the mechatronics-related program titles and TOP codes and the types of awards offered by the colleges in the region.

Exhibit 11: Regional mechatronics and automation programs

College	Program Title	Program Code (TOP Code)	Award Offered
Chaffey	Industrial Electrical Technology	Electrical Systems and Power Transmission (0934.40)	A.S. Degree
	Industrial Electrical Technology Level I	Electrical Systems and Power Transmission (0934.40)	Certificate of Achievement requiring 16 to less than 30-semester units
	Industrial Electrical Technology Level II	Electrical Systems and Power Transmission (0934.40)	Certificate of Achievement requiring 30 to less than 60-semester units
	Industrial Electrical Technology Level III	Electrical Systems and Power Transmission (0934.40)	Certificate of Achievement requiring 30 to less than 60-semester units
	Mechatronics	Electro-Mechanical Technology (0935.00)	A.S. Degree
	Mechatronics Level I	Electro-Mechanical Technology (0935.00)	Certificate of Achievement requiring 16 to less than 30-semester units
	Mechatronics Level II	Electro-Mechanical Technology (0935.00)	Certificate of Achievement requiring 8 to less than 16-semester units
Norco	Industrial Automation	Manufacturing and Industrial Technology (0956.00)	A.S. Degree; Certificate of Achievement requiring 16 to less than 30-semester units; Noncredit Program
	Supply Chain Automation	Manufacturing and Industrial Technology (0956.00)	A.S. Degree; Certificate of Achievement: 30 to less than 60-semester units
San Bernardino Valley	Industrial Automation	Industrial Systems Technology and Maintenance (0945.00)	Certificate of Achievement requiring 30 to less than 60-semester units
	Smart Systems Automation Technology	Electrical, Electronic, and Electro-Mechanical Drafting (0953.30)	Noncredit Program

Source: COCI, Community College Catalogs 2021-22

Exhibit 12 displays the average annual credentials conferred from mechatronics training programs in the Inland Empire/Desert Region. Please note that the combination of completions from various training programs is intended to help assess the potential supply of mechatronics workers and does not provide an exact measure of trained mechatronics workers. These completion numbers do not reflect all competitions for each TOP code included, just the programs related to mechatronics within each TOP code.

Exhibit 12: Annual average community college credentials for programs related to mechatronics

Programs Related to Mechatronics	CCC Annual Average Credentials, Academic Years 2018-21
0934.40 – Electrical Systems and Power Transmission	
Chaffey	
Associate Degree	7
Certificate 30 to < 60 semester units	9
Certificate 18 to < 30 semester units	16
Electrical Systems and Power Transmission Total	**32**
0956.00 – Manufacturing and Industrial Technology	
Norco	
Associate Degree	4
Certificate 16 to < 30 semester units	5
Manufacturing and Industrial Technology Total	**9**
0945.00 – Industrial Systems Technology and Maintenance	
San Bernardino Valley	
Certificate 30 to < 60 semester units	0
Industrial Systems Technology and Maintenance Total	**0**
Mechatronics Programs Total	**41**

Source: LaunchBoard, MIS Data Mart, COCI

Recommendation

Community college electro-mechanical technology programs provide the knowledge, skills, and abilities that prepare students for employment as electrical and electronics repairers, commercial and industrial equipment and electro-mechanical and mechatronics technologists and technicians. Employment for the community college-level mechatronics occupational group is projected to increase by 6% through 2025, with 58 combined annual job openings are expected annually. The median hourly earnings for the mechatronics occupational group are between $28.57 to $34.29, above the regional self-sufficiency standard.

Five regional community college programs that provide training relevant to the mechatronics occupational group. Electro-mechanical technology programs provide the training most closely associated with mechatronics. In the 2020-21 academic year, Chaffey College issued four awards in their electro-mechanical technology programs. Over the last three academic years, there were 41 awards issued from four regional programs related to mechatronics and automation. Combined, regional programs generated 45 qualified

mechatronics workers annually. In the 2017-18 academic year, 100% of exiting students reported holding a job closely related to the field of study.

While community college-level mechatronics jobs offer self-sustainable earnings, the Centers of Excellence cautiously recommends expanding electro-mechanical programs due to low annual job openings for these workers. Well qualified exiting students may face strong competition from regional and commuting incumbent workers for relatively low job opportunities. Colleges considering this program should have a strong partnership with mechatronics employers and document their demand for workers and the skills needed for students to work in this field shortly after exiting the program.

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Appendix: Occupation definitions, sample job titles, five-year projections, and earnings for mechatronics occupations

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

Bachelor's Degree-level Occupations

Engineers, All Other (17-2199)

All engineers not listed separately.

Sample job titles: Energy Engineers, Except Wind and Solar, Mechatronics Engineers, Microsystems Engineers, Photonics Engineers, Robotics Engineers, Nanosystems Engineers, Wind Energy Engineers, Solar Energy Systems Engineers.

Entry-Level Educational Requirement: Bachelor's degree
Work Experience Required: None
Training Requirement: None
Incumbent workers with a Community College Award or Some Postsecondary Coursework: 14%

Mechatronic Engineers (17-2199.05)

Research, design, develop, or test automation, intelligent systems, smart devices, or industrial systems control.

Sample job titles: Automation Engineer, Automation Specialist, Controls Engineer, Design Engineer, Development Engineer, Engineer, Equipment Engineer, Project Engineer

Community College-level Occupations

Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)

Operate, test, maintain, or adjust unmanned, automated, servomechanical, or electro-mechanical equipment. May operate unmanned submarines, aircraft, or other equipment to observe or record visual information at sites such as oil rigs, crop fields, buildings, or for similar infrastructure, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.

Sample job titles: Designer, Electro-Mechanic, Electro-Mechanical Technician (E/M Technician), Electronic Technician, Engineering Specialist, Engineering Technician, Maintenance Technician, Mechanical Technician, Process Control Tech, Product Test Specialist

Entry-Level Educational Requirement: Associate degree
Work Experience Required: None
Training Requirement: None
Incumbent workers with a Community College Award or Some Postsecondary Coursework: 51%

Electrical and Electronics Repairers, Commercial and Industrial Equipment (47-2094)

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

Sample job titles: Control Technician, E and I Mechanic (Electrical and Instrument Mechanic), E and I Mechanic (Electrical and Instrumentation Mechanic), Electrical and Instrument Technician (E and I Tech), Electrical Maintenance Technician, Electronic Technician, I and C Tech (Instrument and Control Technician), Instrument and Electrical Technician (I and E Tech), Repair Technician, Scale Technician

Entry-Level Educational Requirement: Postsecondary nondegree award
Work Experience Required: None
Training Requirement: More than twelve months on-the-job training
Incumbent workers with a Community College Award or Some Postsecondary Coursework: 48%

Appendix: Methodology

Exhibits 9 and 12 display the average annual California Community College (CCC) awards conferred during the three academic years between 2018 and 2021 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year.

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 come 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. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2021a). 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, 2021a).

Job advertisement data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job advertisements often do not reveal employers' hiring intentions; it is unknown if employers plan to hire one or multiple workers from a single online job ad or if they are collecting resumes for future hiring needs. A closed job ad may not be the result of a hired worker.

Table 1. 2020 to 2025 job growth, wages, entry-level education, training, and work experience required for the mechatronics occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino counties combined)

Occupation (SOC)	2020 Jobs	5-Year Change (New Jobs)	5-Year % Change (New Jobs)	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10th to 90th percentile)	Median Hourly Wage (50th percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Engineers, All Other (17-2199)	1,139	65	6%	86	$25.74 to $75.12	$47.44	$109,000	Bachelor's degree & None	None
Mechatronic Engineers (17-2199.05)	-	-	-	-	-	-	-	-	-
Bachelor's Degree-level Total	**1,139**	**65**	**6%**	**86**	**-**	**-**	**-**	**-**	**-**
Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)	576	32	6%	53	$25.53 to $49.08	$34.29	$73,900	Postsecondary nondegree award & 12 months	None
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	46	3	7%	5	$22.62 to $46.89	$28.57	$67,200	Associate's degree & None	None
Community College-level Total	**622**	**35**	**6%**	**58**	**-**	**-**	**-**	**-**	**-**
Total	**1,762**	**100**	**6%**	**144**	**-**	**-**	**-**	**-**	**-**

Source: Emsi 2022.1