

BUILDING CAREER PATHWAYS IN THE TRANSIT INDUSTRY: WORKFORCE INITIATIVE NOW-LOS ANGELES

October 1, 2018

A brief overview of Workforce Initiative Now-Los Angeles and in-depth analysis of occupations within the initiative's career pathways and corresponding postsecondary educating and training programs in Los Angeles County, California.



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<http://doingwhatmatters.cccco.edu/StrongWorkforce.aspx>

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Transportation Workforce Institute (TWI). TWI ensures a well-trained and diverse transportation workforce by collaborating with industry, education, and workforce development partners to create competency- and standards-based curriculum, programs, and services that meet immediate- and long-term employer needs while connecting diverse communities and citizens through transportation projects and workforce development efforts.

Data Sources

Multiple and varied data sources were utilized in the preparation of this report and are included in Appendix H. Two sources were primarily relied upon which we would like to specifically acknowledge here. First, Economic Modeling Specialists, Inc. (EMSI)—and their economic, industry, occupation, and education program reports—was extensively used throughout the report. Second, the Southern California Association of Governments’ (SCAG) *2016 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) was extensively utilized for Appendices A and B.

Transportation and Warehousing Report Series

This is one of several reports prepared by TWI examining industries and occupations in the transportation industry nationally and in Los Angeles and Orange Counties, California. All reports are available on TWI’s website at: <http://twi.lattc.edu/reports-publications/>.

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INTRODUCTION

Los Angeles County is one of the most populated counties in the United States. Home to a little more than 10 million residents¹, it is also projected to grow by nearly 550,000 new residents by 2030². If it were a state, it would be the seventh most populated state in the U.S. The county covers 4,084 square miles³ and includes 88 incorporated cities ranging in size from Vernon (population 123) to Los Angeles (population 4 million)⁴. [More information on Los Angeles County and population demographics is provided in Appendix A.]

Los Angeles County has an extensive and complex transit network comprised of numerous agencies. Los Angeles Metropolitan Transportation Authority (Metro) is the third largest transit agency in the nation. The City of Los Angeles Department of Transportation (LADOT) and the Southern County Regional Rail Authority (Metrolink) also make the list of the 50 largest transit agencies nationally. Several agencies also appear on the list of 50 largest bus agencies in urbanized areas in the U.S. Metro ranks second in the nation both in terms of passenger trips and miles and rounding out the list are Long Beach Transit, LADOT, Santa Monica's Big Blue Bus, and Foothill Transit⁵. [A detailed description of the Los Angeles County transit network is provided in Appendix B.]

This transit network is increasingly important as the population grows, as it ages, and as many households struggle with affordability and forgo owning vehicles. For example, the number of residents over 65 is projected to grow by 58 percent and comprise 25 percent of the total county population by 2040. Many of these residents will likely need mobility assistance, greatly increasing the capacity requirements of the region's transit and demand response transportation network.

Moreover, housing market prices and instability has resulted in increased poverty and significant affordability issues in the county. Low-income households tend to have less access to vehicles and, overall, higher public transportation needs. For instance, Los Angeles County has the third largest number of zero-vehicle households in the U.S.⁶ The majority of these zero car households are low income (68.2%).

The transit network is extremely important for ensuring Los Angeles County continues to be a vibrant and thriving place to reside through its investment, business growth, reduced traffic congestion, travel and vehicle ownership cost savings, and air pollution emissions reductions. This importance is not lost on residents of Los Angeles County who recently passed multiple sales tax increases to expand transportation funding. Most significantly, Measure M (passed in November 2016) indefinitely generates roughly \$860 million a year for major transportation projects.

Given the size and scope of the transit industry in Los Angeles County, there is substantial demand for new and replacement positions as it expands and creates new jobs and experiences attrition and retirements. These workforce demands will be further exacerbated by the implementation of transportation projects made possible through Measure M.

Therefore, Workforce Initiative Now-Los Angeles (WIN-LA) was envisioned to address these and other workforce development challenges the industry faces. WIN-LA is designed to create career pathways for high-demand and/or hardest-to-fill occupations in the transit industry.

The intent of this report is to more fully understand nine, initial high-demand/hard-to-fill occupations identified by WIN-LA, including:

- current and projected workforce statistics to ascertain near-term employment potential of these occupations;
- basic requirements of the occupations, generally, and in the transit industry in Los Angeles County, specifically; and
- education and training availability to identify programs and services that can support career pathway development.

¹ Economic Modeling Specialists, Inc. Demographic Overview of Los Angeles County Report. Data run April 3, 2018.

² Demographic Research Unit, California Department of Finance. 2017. County Population Projections (2010-2060).

³ LAcounty.gov

⁴ Discoverlosangeles.com

⁵ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 30: 50 Largest Bus Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

⁶ Adie Tomer, (2011). *Transit access and zero vehicle households*. Report prepared on behalf of the Brookings Institution as part of the Metropolitan Infrastructure Initiative Series and Metropolitan Opportunity Series.

WORKFORCE INITIATIVE NOW-LOS ANGELES (WIN-LA)

Overview

There is substantial demand for new and replacement positions as the industry is experiencing attrition, new job growth rates (for some occupations in the double digits), and as it anticipates substantial retirements from its aging workforce (where nearly half of the workforce will be eligible to retire within the next 10 years).

The expansion and evolution of intelligent transportation technologies means education and training providers also need to expand existing programs to develop new skill sets.

Additionally, there is demand for a workforce that mirrors the growing ethnic diversification in Los Angeles County, particularly in each community transit operates within. Thus, the industry needs more qualified workers and successful models of pre-employment and incumbent worker education that maximizes participation of diverse populations, ensures employment readiness of new entrants, and promotes the retention and up-skilling of existing workers once hired. To confound these workforce challenges, there will be significant demand for additional staff to support transit expansion projects made possible through Measure M.

Workforce Initiative Now-Los Angeles (WIN-LA) was launched to address many of these workforce challenges. WIN-LA, led by Los Angeles Metropolitan Transportation Authority (Metro), is designed to create career pathways in construction and non-construction areas of administration, operations/maintenance, and professional services within Metro and throughout the transit industry in Los Angeles County. WIN-LA provides support to participants in areas such as life skills development, skill set enhancement, and educational attainment services including training. WIN-LA is being implemented in collaboration with employers; training entities; community colleges;

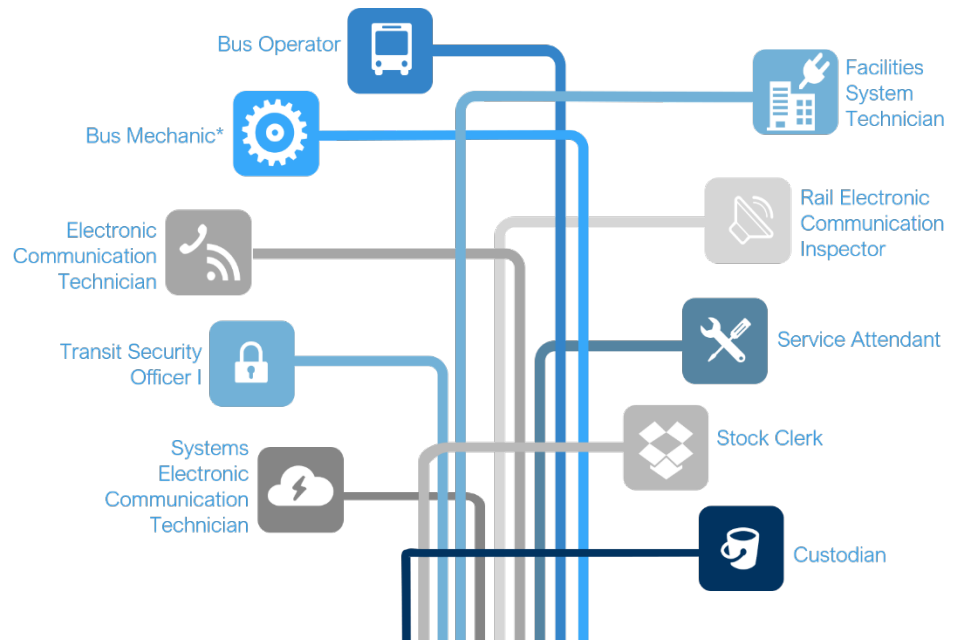
community-based organizations; unions, trades, and apprenticeship entities; and other stakeholders throughout the county. WIN-LA's model is comprised of five, integrated workforce and community-development strategies and activities: Employer-Driven, Career-Pathway-Focused, Retention Support, Collaborative Impact, and Sustainable Community Development.

WIN-LA Career Pathways

WIN-LA has identified 9 occupations for immediate career pathway development because they are high-demand and/or hard-to-fill occupations:

- Bus Operator
- Custodian
- Electronic Communication Technician
- Facilities System Technician
- Rail Electronic Communication Inspector
- Service Attendant
- Stock Clerk
- Systems Electronic Communication Technician
- Transit Security Officer I

Figure 1
WIN-LA Career Pathway Occupations



This report also includes a tenth occupation, *Bus Mechanic, because education and training for this occupation is accepted for Service Attendant positions. The remainder of this report focuses on these occupations.

Table 1 provides, at a glance, typical employment information on each pathway occupation and corresponding education and training providers.

For purposes of this report, we focused on education and training programs provided by universities, community colleges, and regional occupational centers in Los

Angeles County. Not included is on-the-job training provided by employers, other postsecondary training providers, and programs and services provided by community-based organizations. Therefore, data in this report is a partial reflection of postsecondary education and training available for each occupation.

Table 1
WIN-LA Career Pathway Occupations: Position Title, Description, Employment Requirements, and Education and Training Providers

Transit Position Titles, Descriptions, and Minimum Requirements (Metro)			Education and Training Programs
Basic Function	Years Experience	Education	
(Bus) Mechanic (C): Under close supervision, performs basic preventive and remedial diagnostics and troubleshooting, along with performing maintenance and repairs of transit and/or automotive vehicles, and assists other mechanics in more complex assignments.	2 years' experience as a heavy equipment or automotive mechanic OR	HS diploma, GED, or equivalent. Successful completion of a 2-year, full-time training program in automotive technology or heavy-duty truck maintenance and repair from an accredited trade or vocation school OR 1-year full-time vocational (30 semester units) and 1-year experience as a heavy equipment or automotive mechanic	<ul style="list-style-type: none">2-Year Diesel Degree Program: Citrus College, Los Angeles Trade Technical CollegeUp to 2-Year Diesel Certificate Program: Citrus College, Los Angeles Trade Technical CollegeUp to 1-Year Diesel Training: Harbor Occupational CenterSee also education and training programs listed for Service Attendant position below
Bus Operator: Under close supervision, operates public transit buses, collects fares, transports passengers, and performs safety inspection of bus equipment.	6-months working with public or customer service experience	HS diploma, GED, or equivalent.	<ul style="list-style-type: none">Short-Term Training Program: Los Angeles Valley College
Custodian: Under moderate supervision, maintains Gateway Building, divisions, and stations in clean and orderly condition.	1-year	HS diploma, GED, or equivalent.	<ul style="list-style-type: none">Short-Term Training: Abram Friedman Occupational Center, East Los Angeles Occupational Center, Harbor Occupational Center, West Los Angeles College
Electronic Communication Technician: Under moderate supervision, installs, maintains, troubleshoots, and repairs communications and electronic equipment used on buses and other vehicles.	3-years OR	HS diploma, GED, or equivalent. 2-year accredited electronics trade school or college graduate	<ul style="list-style-type: none">4-Year Apprenticeship Program: Electrical Training Institute2-Year Degree Program: Antelope Valley College, Cerritos College, Glendale Community, Long Beach City College, Los Angeles Harbor College, Los Angeles Southwest College, Los Angeles Trade-Technical College, Los Angeles Valley College, Mt. San Antonio College, Pasadena City College, Pierce College, Rio Hondo College
Facilities System Technician: Under moderate supervision, performs a variety of skilled and semi-skilled repairs, installation and maintenance procedures relating to mechanical and electrical components and systems of Metro's Bus & Rail facilities and Gateway Headquarters building.	4-years (or apprenticeship) or 3-years AND	HS diploma, GED, or equivalent. Completion of 2-years or more full-time training or education in Industrial Technology, Electrical Maintenance, or similar program at a recognized trade school or apprenticeship program may be substituted for 1-year of experience	<ul style="list-style-type: none">4-Year Degree Program: California State University, Los Angeles4-Year Apprenticeship Program: Electrical Training InstituteOther Apprenticeship Programs: Operating Engineers, Local 12, Operating and Maintenance Engineers, Local 5012-Year Degree Program: Antelope Valley College, Los Angeles Trade-Technical College1-2 Year Certificate Program: Antelope Valley College, Cerritos College, Los Angeles Trade-Technical CollegeShort-Term Training: East Los Angeles Occupation Center, Harbor Occupational Center, Maxine Waters Employment Preparation Center
Rail Electronic Communication Inspector: Under moderate supervision, performs inspection, testing, installation, maintenance, and repair of electronic equipment on the right-of-way, public area, and other Metro locations.	4-years, journey-level OR	HS diploma, GED, or equivalent. Up to 2-years, full-time at recognized electronics trade school or apprenticeship program may substitute for equivalent experience	<ul style="list-style-type: none">4-Year Apprenticeship Program: Electrical Training Institute2-Year Degree Program: Antelope Valley College, Cerritos College, Glendale Community, Long Beach City College, Los Angeles Harbor College, Los Angeles Southwest College, Los Angeles Trade-Technical College, Los Angeles Valley College, Mt. San Antonio College, Pasadena City College, Pierce College, Rio Hondo CollegeUp to 2-Year Certificate Program: Antelope Valley College, Cerritos College, East Los Angeles College, El Camino College, Glendale Community College; Long Beach City College, Los Angeles City College,
	Note: This occupation has the same experience and education requirements as Systems Electronic Communication Technician		

Table 1**WIN-LA Career Pathway Occupations: Position Title, Description, Employment Requirements, and Education and Training Providers**

Transit Position Titles, Descriptions, and Minimum Requirements (Metro)			Education and Training Programs
Basic Function	Years Experience	Education	
			Los Angeles Harbor College, Los Angeles Trade-Technical College, Los Angeles Valley College, Mt. San Antonio College, Pasadena City College, Pierce College, Rio Hondo College
Service Attendant: Under close supervision, performs unskilled servicing and cleaning of revenue and non-revenue equipment, including automobiles, buses, rail cars, and non-revenue rail equipment.	1-year full-time (40 hrs/wk) experience which provides familiarity with commercial housekeeping, janitorial, or vehicle servicing procedures	HS diploma, GED, or equivalent.	<ul style="list-style-type: none">2-Year Degree Program: Antelope Valley College, Cerritos College, Citrus College, College of the Canyons, Compton College, East Los Angeles College, El Camino College, Los Angeles Trade-Technical College, Pasadena City College, Pierce College, Rio Hondo CollegeUp to 2-Year Certificate Program: Antelope Valley College, Cerritos College, Citrus College, College of the Canyons, Compton College, East Los Angeles College, El Camino College, Los Angeles Trade-Technical College, Pasadena City College, Pierce College, Rio Hondo CollegeUp to 1-Year Certificate Program: Antelope Valley College, Cerritos College, Citrus College, Compton College, East Los Angeles College, El Camino College, Los Angeles Trade-Technical College, Pasadena City College, Pierce College, Rio Hondo CollegeShort-term Training: Abram Friedman Occupational Center, Baldwin Park Adult & Community Education, Hacienda La Puente Adult Education, Harbor Occupational Center, La Puente Valley ROP, Maxine Waters Employment Preparation Center, Southern California Regional Occupation CenterSee also education and training programs listed for Bus Mechanic position above
Stock Clerk: Under moderate supervision, receives, stores, monitors, orders, issues, and maintains computerized inventory records of vehicle parts and other materials.	1-year OR successful completion of employer-sponsored training	HS diploma, GED, or equivalent.	<ul style="list-style-type: none">Up to 1-Year Certificate Program: East Los Angeles College, Los Angeles Harbor CollegeShort-term Training: Los Angeles Harbor College
Systems Electronic Communication Technician: Under moderate supervision; installs, maintains, repairs and modifies advanced communications systems carrying voice, data and video information.	4-years (or apprenticeship) OR	HS diploma, GED, or equivalent. Up to 2-years full-time training or education in DC, AC, semiconductor devices, AM/FM radio theory, advanced communication, and digital electronics may substitute for 2-years' experience	<ul style="list-style-type: none">4-Year Apprenticeship Program: Electrical Training Institute2-Year Degree Program: Antelope Valley College, Cerritos College, Glendale Community, Long Beach City College, Los Angeles Harbor College, Los Angeles Southwest College, Los Angeles Trade-Technical College, Los Angeles Valley College, Mt. San Antonio College, Pasadena City College, Pierce College, Rio Hondo CollegeUp to 2-Year Certificate Program: Antelope Valley College, Cerritos College, East Los Angeles College, El Camino College, Glendale Community College; Long Beach City College, Los Angeles City College, Los Angeles Harbor College, Los Angeles Southwest College, Los Angeles Trade-Technical College, Los Angeles Valley College, Mt. San Antonio College, Pasadena City College, Pierce College, Rio Hondo College
	Note: This occupation has the same experience and education requirements as Rail Electronic Communication Inspector		
Transit Security Officer I: Under moderate supervision, provides security for agency employees and property.		HS diploma, GED, or equivalent. California Guard Card	<ul style="list-style-type: none">2-Year Degree Program: Cerritos College, Citrus CollegeUp to 1-Year Certificate Program: Cerritos College, Citrus CollegeShort-Term Training: Abram Friedman Occupational Center, East Los Angeles Skills Center, East San Gabriel Valley Regional Occupational Program, La Puente Valley ROP

Figure 2 provides a “snapshot” of workforce statistics, education and training programs, and program completion information for all 10 occupations. The first three columns

number of jobs posted to the number of unique postings. It is an indication of how hard all industries are trying to fill these occupations. The Job Posting Intensity for all other

occupations and companies in Los Angeles County is 4-to-1. Any Job Posting Intensity ratio less than 4:1 suggests other employers/companies may not be trying as hard to hire for the same position. Conversely a a Job Posting Intensity ration higher than 4:1 suggests employers/companies are trying harder to hire for the same position. Job posting data was analyzed for an eight-month period; January to September 2018.

Figure 2 also reveals, generally, the number of postsecondary credential completers is not keeping pace with employment demand (see Awards to Openings column). One exception is for Rail Communication Inspectors. However, individuals trained for this occupation also meet education/training requirements for other electronics- or electrical-related positions where demand greatly exceeds supply. Figure 2 reveals for several occupations there may











be a mis-match between award completions and award type availability (see Awards to Award Type column). This may indicate individuals may be disproportionately completing one type of program (a certificate program) than another (a degree program). Whereas program duration to typical position requirements are more similar (see Duration to Position Requirements column). For example, an occupation may require 1-year of education likewise a majority of education/training program completions are 1-year in duration. Further analysis of program types/lengths offered by area community colleges to align to employment requirements is recommended.

in Figure 2 (Job Growth Rate, Job Posting Intensity, and Workforce Nearing Retirement) provide an indication of current and near-term, future employment demand. The next three columns (Awards to Openings, Awards to Award Type, and Duration to Position Requirements) provide an indication of sufficiency in numbers of individuals completing education and training programs and the match or mismatch between program completions, education/training program types/duration, and typical employment requirements.

Generally, Figure 2 reveals demand for most occupations, within all industry sectors in Los Angeles, will remain relatively stable or have some growth in the near-term future. Only two, Bus Operator and Rail Electronic Communication Inspector could experience higher increases due to anticipated retirements. Concerning Job Posting Intensity, the ratio in this column reflects the

The remainder of this report provides a “supply and demand” summary for each WIN-LA career pathway occupation. A brief description of each occupation, workforce statistics, and available education and training is included. A detailed profile for each pathway occupation is provided in Appendix C.

Figure 2
WIN-LA Career Pathway Occupations
Demand and Supply

OCCUPATION	JOB GROWTH RATE	JOB POSTING INTENSITY	WORKFORCE NEARING RETIREMENT	AWARDS TO OPENINGS	AWARDS TO AWARD TYPE	DURATION TO POSITION REQUIREMENTS
 Bus Mechanics	↑ 4.8%	4:1	< 25%	60:581		
 Bus Operators	↔ 0.0%	5:1	32.2%	0:8160		
 Custodians	↑ 3.8%	3:1	31.6%	N/A	N/A	N/A
 Electronics Communications Technician	↑ 2.4%	N/A	< 25%	0:6183	N/A	N/A
 Facilities Systems Technician	↔ 0.0%	4:1	~ 25%	220:4341		
 Rail Communications Inspectors	↑ 4.7%	4:1	> 33%	310:194		
 Service Attendants	↔ 0.9%	5:1	< 25%	870:2267		
 Stock Clerks	↔ 2.3%	4:1	< 25%	0:3487	N/A	
 Systems Electronics Comm Techs	↑ 1.7%	6:1	< 25%	310:1779		
 Transit Security Officer	↑ 4-7%	10:1	~ 25%	171:8996		

Data on postsecondary certificate and degree programs are derived from multiple sources (refer to Postsecondary Programs Completers Data in Appendix H) and from a survey conducted with community colleges in Los Angeles County in spring 2018. Appendix F provides a list of postsecondary education and training providers, that appear in this report, and the programs they offer.



Bus Mechanic

Bus Mechanics diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engine. Bus Mechanics work on a vehicle's electrical system, make major engine repairs, or retrofit engines with emission control systems to comply with pollution regulations. Other, common job titles related to this occupation are: Mechanic, Diesel Mechanic, Diesel Technician, Fleet Mechanic, General Repair Mechanic, Service Technician, and Transit Mechanic.

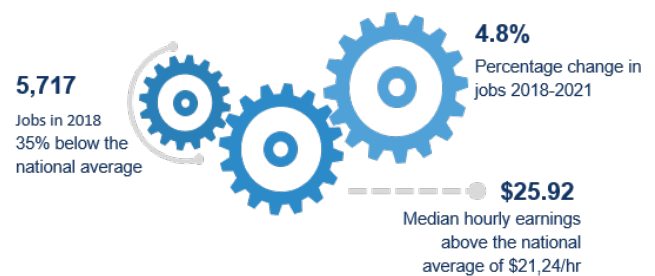
Typical work experience and education requirements for Bus Mechanics at transit agencies and companies are 2-years-experience as a heavy equipment or automotive mechanic. Completion of a 2-year degree or training in automotive technology or heavy-duty truck maintenance and repair from an accredited trade or vocation school or 1-year full-time education/training and 1-year experience as a heavy equipment or automotive mechanic may substitute for experience. A high school diploma, GED, or equivalent is required.

Workforce Statistics

The standard occupational title and code (SOC) associated with Bus Mechanics is Bus and Truck Mechanics and Diesel Engine Specialists (49-3031). There are 5,717 Bus and Truck Mechanics and Diesel Engine Specialists jobs in Los Angeles County in 2018; of these 71 are in the transit industry⁷. Most jobs are in government agencies (note: municipal transit agencies may be classified as government agencies), general automotive repair, motor vehicle parts and supplies, general and specialized freight trucking, schools, vehicle rental companies, and solid waste collection.



Figure 3
Bus Mechanic Employment
(Bus & Truck Mechanics/Diesel Engine Specialists)



Source: Economic Modeling Specialists (EMS) Inc.

The number of jobs for Bus and Truck Mechanics and Diesel Engine Specialists is well below (35%) the national average and median hourly wage, \$25.92, is slightly above the national median wage of \$21.24. The number of jobs is expected to increase 4.8% in the next three-years which equals the national growth rate.

There were 6,698 total job postings for this occupation from January 2018 to September 2018, of which 1,510 were unique. These numbers result in a Posting Intensity of 4-to-1, meaning that for every 4 postings there is 1 unique job posting. This is close to the Posting Intensity for all other occupations and companies in Los Angeles County (4-to-1), indicating employers/companies are putting average effort toward hiring for this position. The median posting duration was 44 days compared to the regional average of 32 days for all occupations in Los Angeles.

Less than a quarter of the workforce is nearing or is at retirement age, therefore it is not likely large numbers of new hires will result from retirements in the near-term future⁸.

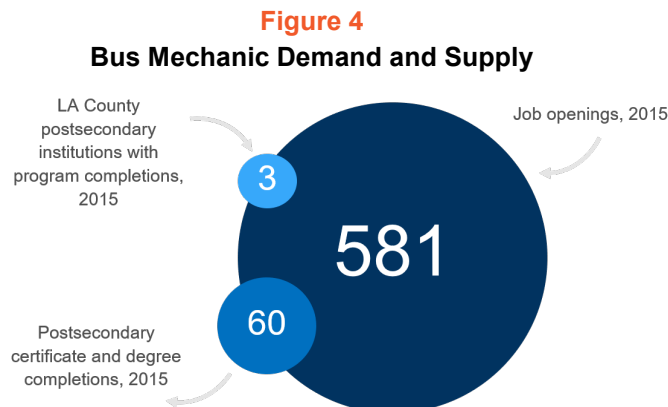
⁷ Jobs in the following subsectors of the transit industry: a. Bus and Other Motor Vehicle Transit Systems, b. Mixed Mode Transit Systems, c. Other Urban Transit Systems, and/or d. All Other Transit and Ground Passenger Transportation

⁸ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

Education and Training for Bus Mechanics

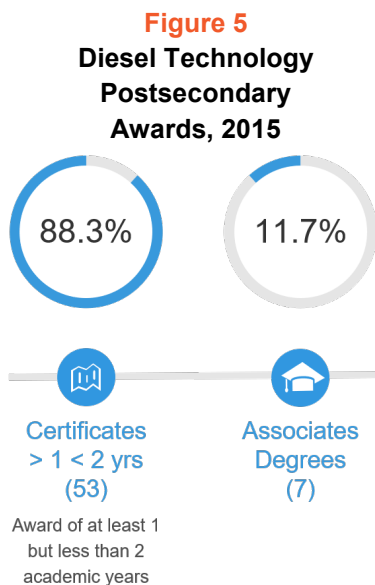
Diesel Technology Credential Programs and Completions

Three postsecondary diesel and heavy equipment maintenance technology providers had program completers in the past 13 years. The same three institutions, collectively, had 60 program completions for 581 job openings in 2015 (refer to Figure 4).



Source: Economic Modeling Specialists (EMSI) Inc.

Most of the 60 credentials awarded were from certificate programs less than one academic year in duration (88.3%). A total of 53 certificates were awarded. The remaining credentials completed (11.7%) were associates degrees (refer to Figure 5).



Source: Economic Modeling Specialists (EMSI) Inc.

Postsecondary education and training institutions with diesel technology credential completions in 2015, and the number of certificates and degrees each awarded, are

provided in Table 2.

Table 2

Diesel Technology Program Completions, by Institution, 2015

Institution	Certificates (2015)	Degrees (2015)	Total Completions (2015)
Los Angeles Trade-Technical College	43	7	50
Citrus College	8	0	8
Long Beach City College	2	0	2
Total	53	7	60

Source: Economic Modeling Specialists (EMSI) Inc.

Community College Diesel Technology Programs

According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 2 community colleges with 5 active diesel technology certificate and degree programs categorized as follows:

- Associate of Science Degree (AS): 2
- Certificate 18 > units: 3

The breakdown of community college programs, by type, are depicted in Figure 6.



Sources: California Community Colleges Chancellor's Office Curriculum Inventory and Los Angeles County community colleges

Programs at each of these community colleges, including number of units for certificate programs, are depicted in Table 3.

Table 3**Community College Certificate and Degree Programs in Diesel Technology**

College	Program	Degrees		Certificates 18+ sem units
		AA	AS	
Citrus College	• Medium and Heavy Diesel Truck Technology		X	39
Los Angeles Trade-Technical College	• Diesel and Related Technology		X	45
	• Diesel and Related Technology-Adjunct			28

Sources: California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

**Other Diesel Technology Training Programs**

In addition to certificate and degree programs in diesel technology, other programs and services currently offered in the region include: industry-sponsored and apprenticeship training at Los Angeles Trade-Technical College and other diesel technology-related programs/services at Los Angeles Harbor College.

Within the next three years, West Los Angeles College is planning to develop a diesel technology certificate program and noncredit courses.

Additionally, one Regional Occupational Center in Los Angeles County offers a diesel training program (refer to Table 4).

Table 4**Diesel Technology Training Programs**

Training Provider	Program Name	Duration
Harbor Occupational Center	• Automotive Technology-Diesel1 and 2	Unavailable

Automotive Technology Programs

Many transit agencies and companies also accept automotive training for meeting education and training requirements for this occupation. Therefore, refer to the Service Attendants section of this report for more information on automotive education and training programs available in Los Angeles County.

**Bus Operator**

Bus Operators drive buses typically on regular route operations. They may assist passengers boarding the bus and collect fares or monitor passes.

Other, common job titles related to this occupation are: Bus Driver, Transit Bus Driver, Transit Coach Operator, Transit Operator.

Typical work experience requirements for this position is 6 months working with the public or customer service experience. Because this position is considered hard-to-fill, some employers do not require any work experience. Nearly all transit employers provide sponsored-training for Bus Operators. A high school diploma, GED, or equivalent is required.

**Workforce Statistics**

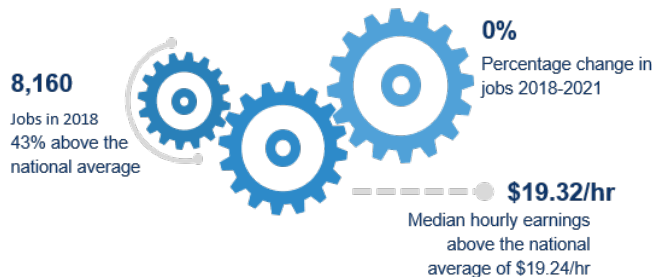
The standard occupational title and code associated with Bus Operators is Bus Drivers, Transit and Intercity (53-3021). There were 8,160 Bus Drivers, Transit and Intercity, jobs in Los Angeles County in 2018; 43% above the national average for this occupation. Of these jobs, 1,093 were in the transit industry. The number of Bus Drivers, Transit and Intercity, jobs is not expected to increase in the next three years. The median hourly for this occupation is \$19.32/hour, slightly above the national average of \$19.24/hour (refer to Figure 7).

There were 955 total job postings for this occupation from

January 2018 to September 2018, of which 212 were unique. These numbers result in a Posting Intensity of 5-to-1, meaning that for every 5 postings there is 1 unique job posting. This is close to the Posting Intensity for all other occupations and companies in Los Angeles County (4-to-1), indicating employers/companies are putting average effort toward hiring for this position. The median posting duration was 47 days compared to the regional average of 32 days for all occupations in Los Angeles.

Forty-one percent of the workforce is nearing or at retirement age. When these older workers retire, there will likely be a large demand for new workers.

Figure 7
Bus Operator Employment
(Bus Drivers, Transit and Intercity)



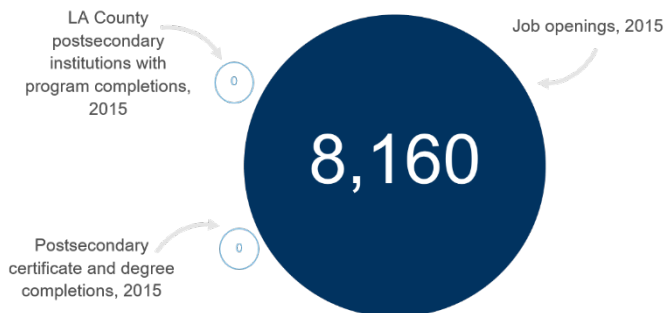
Source: Economic Modeling Specialists (EMSI) Inc.

Education and Training for Bus Operators

Community College Bus Operator Programs

Currently, there are no community colleges offering degree or certificate programs for Bus Operators. West Los Angeles College is planning to develop a program within the next three years.

Figure 8
Bus Operator Demand and Supply



Source: Economic Modeling Specialists (EMSI) Inc.

Los Angeles Valley College offers a Metro Bridge Program (i.e., a noncredit, short-term bus operator training) and Los Angeles Harbor College offers other short-term truck and bus driving training/services.



Custodian

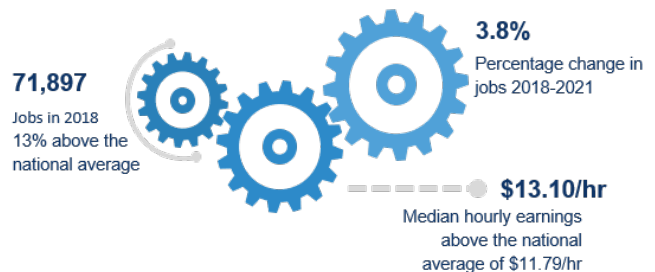
Custodians keep buildings in clean and orderly condition; perform heavy cleaning duties such as cleaning floors, shampooing rugs, washing walls and glass; and removing rubbish. Other duties may include performing routine maintenance activities and notifying management of need for repairs⁹. Other, common job titles related to this occupation are: Building Custodian, Heavy Duty Custodian, Custodial Worker, Institutional Custodian, and Building Services Technician.

Typical work experience requirements for Custodians at transit agencies and companies is 1-year full-time, equivalent work. In some cases, training may substitute for all or some work experience. A high school diploma, GED, or equivalent is required.

Workforce Statistics

The standard occupational title and code associated with Custodians is Janitors and Cleaners, Except Maids and Housekeeping Cleaners (37-2011). There were 71,897 Janitors and Cleaners jobs in Los Angeles County in 2018; 13% below the national average for this occupation. There is insufficient data on the number employed in the transit industry. The number of Janitors and Cleaners jobs is expected to increase slightly (3.8%) in the next three years. The median hourly wages for this occupation is \$13.10/hour, slightly above the national average of \$11.79/hour.

Figure 9
Custodian Employment
(Janitors and Cleaners)



Source: Economic Modeling Specialists (EMSI) Inc.

⁹ ONet Online. Summary Report for 437-2011.00– Janitors and Cleaners, Except Maids and Housekeeping Cleaners. On the internet at

<https://www.onetonline.org/link/summary/37-2011.00>. Downloaded April 5, 2018.

Most Janitors and Cleaners are employed by janitorial services companies with schools, colleges, and universities being the next largest category of employers.

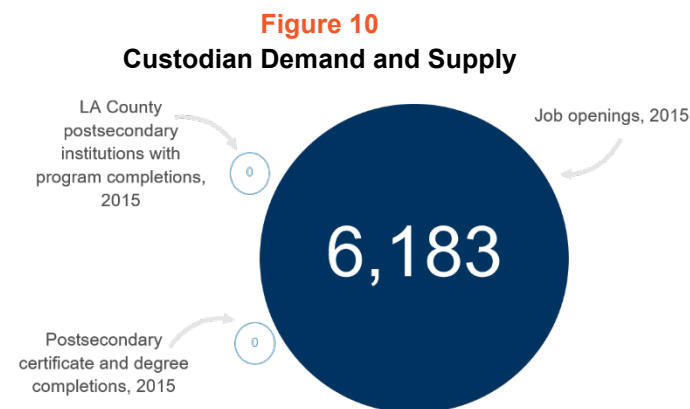
There were 9,226 total job postings for this occupation from January 2018 to September 2018, of which 3,153 were unique. These numbers result in a Posting Intensity of 3-to-1, meaning that for every 3 postings there is 1 unique job posting. This is lower than the Posting Intensity for all other occupations and companies in the region (4-to-1), indicating that employers/companies may not be trying as hard to hire for this position. The median posting duration was 31 days compared to the regional average of 32 days for all occupations in Los Angeles.

Nearly 1/3rd (31.6 percent) of the workforce is nearing or are at retirement age. When these older workers retire, there will likely be a large demand for new workers.

Education and Training for Custodians

Community College Custodian Programs

West Los Angeles College has a Custodial Technician Preparation short-term, noncredit, certificate program. However, data on program completions from this program is unavailable.



Source: Economic Modeling Specialists (EMS) Inc.

Other Custodian Training Programs

There are several organizations that offer custodial training programs in Los Angeles County, outlined in Table 5. However, information on the duration of these training programs is not available.

Table 5
Custodian Training Programs

Training Provider	Training Program
Abram Friedman Occupational Center	Building and Grounds Worker (Fundamentals)
East Los Angeles Occupational Center	Building and Grounds Worker (Fundamentals)
Harbor Occupational Center	Building and Grounds Worker (Fundamentals)



Electronic Communications Technician

Individuals in the Electronic Communications Technicians occupation install, adjust, or maintain mobile electronics communication equipment, including sound, sonar, security, navigation, and surveillance systems¹⁰. These installers and repairers work with a range of complex electronic equipment, including digital audio and video players, navigation systems, and passive and active security systems. Other, common job titles related to this occupation in the transit industry are: Radio Technician, Transit Electrician, Electronics Mechanic, Electronic Technician, and Electronic Bench Technician.

Typical education and work experience requirements for Electronic Communication Technicians at transit agencies and companies is a 2-year credential from an accredited electronics trade school or college or 3 years' related experience. A high school diploma, GED, or equivalent is required.

Workforce Statistics

The standard occupational title and code associated with Electronic Communications Technicians is Electrical and Electronics Installers and Repairers, Transportation Equipment (49-2093). There are 415 Electrical and Electronics Installers and Repairers, Transportation Equipment, jobs in Los Angeles County in 2018; 13% below the national average for this occupation. There is insufficient data on the number employed in the transit industry. The number of jobs is expected to remain relatively the same in the near-term with a projected increase of 2.4% in the next three years. The median hourly wages for this occupation is \$36.18/hour, above the national average of \$28.50/hour.

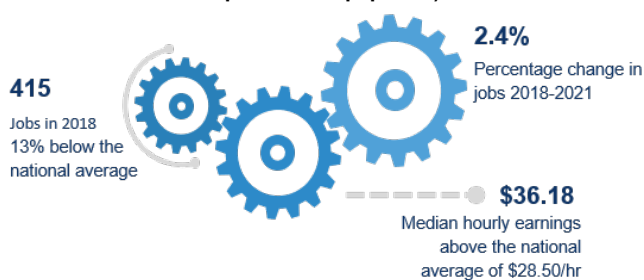
¹⁰ ONet Online. Summary Report for 49-209300 – Electrical and Electronics Installers and Repairers, Transportation Equipment. On the

internet at <https://www.onetonline.org/link/summary/49-2093.00>. Downloaded April 5, 2018.

No job postings occurred for this occupation from January 2018 to September 2018 therefore insufficient data was available to determine how hard employers/companies currently are trying to hire for this occupation.

Less than a quarter of the workforce is nearing or is at retirement age, therefore it is not likely large numbers of new hires will result from retirements in the near-term future¹¹.

Figure 11
Electronic Communication Technician
Employment
(Electrical and Electronics Installers and Repairers,
Transportation Equipment)



Source: Economic Modeling Specialists (EMSI) Inc.

Education and Training for Electronic Communication Technicians

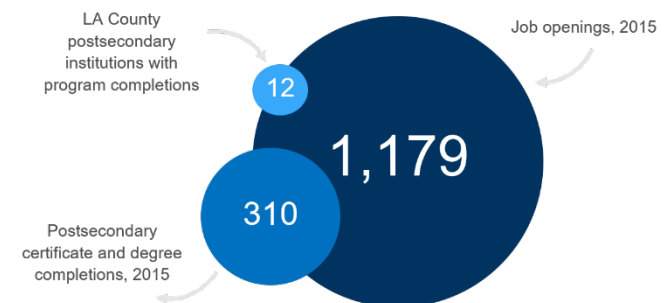
Electronics-Related Credential Programs and Completions

There are three types of electronics-related postsecondary education programs that correspond to the Electronic Communications Technician position: (1) Telecommunications Technology, (2) Electrical/Electronics Equipment Installation and Repair, and (3) Communications Systems Installation and Repair Technology.

The education and training programs that prepare individuals for this occupation are similar for the Rail Electronic Communication Inspector and the Systems Electronic Communication Technician described elsewhere in this report. Eighteen postsecondary providers (of these three types of programs) had completers in the past 14 years. Twelve, collectively, had 310 program completions to fill 1,179 openings in 2015.



Figure 12
Electronic Communication Technician
Demand and Supply, 2015



Sources: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February 2018.

Postsecondary credentials awarded in 2015 were predominately (54.1%) certificates from programs that were at least one year but less than two academic years in duration. Associates degrees were the next highest percentage of awards conferred (26.4%) and certificates from programs less than one academic year in duration made up the remaining credentials conferred (19.3%). Overall, more than 2/3rds (73.5%) of credentials awarded were certificates (228 total certificates). All remaining credentials completed (82) were associates degrees (refer to Table 6 and Figure 13).

Table 6

Electronics-Related Program Completions, by Award Level, 2015

Award Level	Completions	Percent
Telecommunications Technology Programs		
Award of less than 1 academic year	5	8.9
Award of at least 1 but less than 2 academic years	40	71.4
Associates degree	11	19.6
Subtotal	56	
Electronics and Electrical Technology Programs		
Award of less than 1 academic year	18	8.2

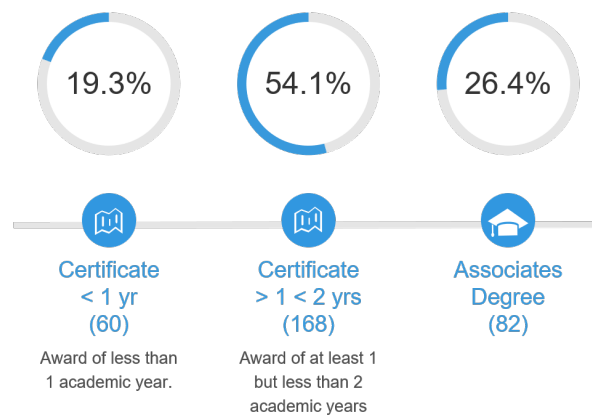
¹¹ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

Table 6**Electronics-Related Program Completions, by Award Level, 2015**

Award Level	Completions	Percent
Award of at least 1 but less than 2 academic years	128	58.9
Associates degree	71	32.7
Subtotal	217	
Communications Systems Installation and Repair Technology Programs		
Award of less than 1 academic year	37	100.0
Subtotal	37	
All Program Types Combined		
Award of less than 1 academic year	60	19.3
Award of at least 1 but less than 2 academic years	168	54.1
Associates degree	82	26.4
Combined Total	310	

Sources: Economic Modeling Specialists (EMS) Inc., Centers of Excellence, LMI Supply Tables February 2018.

Figure 13
Electronics-Related Postsecondary Awards, 2015



The postsecondary education and training institutions with credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Table 7.

Table 7**Electronics-Related Program Completions, by Institution, 2015**

Institution	Certificates	Degrees	Total Completions
Telecommunications Technology Programs			
Los Angeles Trade-Technical College	22	11	33
Mt. San Antonio College	11	0	11
Long Beach City College	5	0	5
Pierce College	7	0	7

Table 7**Electronics-Related Program Completions, by Institution, 2015**

Institution	Certificates	Degrees	Total Completions
Electrical/Electronics Equipment Installation and Repair Programs			
Mt. San Antonio College	44	23	67
Long Beach City College	27	23	50
Antelope Valley College	18	14	32
Pasadena City College	16	3	19
Pierce College	10	5	15
East Los Angeles College	7	0	7
Glendale Community College	7	0	7
Los Angeles Valley College	11	1	12
El Camino College	2	0	2
Los Angeles Southwest College	3	2	5
Los Angeles City College	1	0	1
Communications Systems Installation and Repair Technology Programs			
RWM Fiber Optics, Inc.	37	0	37

Source: Economic Modeling Specialists (EMS) Inc., Centers of Excellence, LMI Supply Tables February 2018.

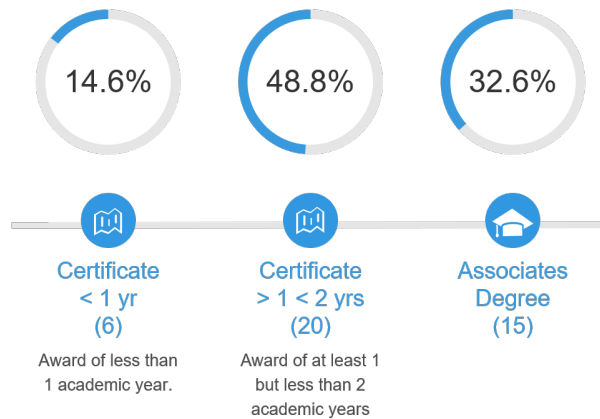
Community College Electronics-Related Programs

According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 14 community colleges in the region with 41 active electronics-related certificate and degree programs categorized as follows:

- Associate of Arts Degree (AA): 1
- Associate of Science Degree (AS): 14
- Certificate 18 > units: 22
- Certificate < 18 units: 4

The breakdown of community college programs, by type, are depicted in Figure 14.

Figure 14
Community College
Electronics-Related
Credential Programs



Sources: California Community Colleges Chancellor's Office Curriculum Inventory and Los Angeles County community colleges

The degree-specific programs offered by each community college are depicted in Table 8. This table focuses only on community colleges (12) with active degree programs (15) because this occupation typically requires at least a two-year degree.

Table 8
Community College Degree Programs in Electronics-Related Technology

College	Program	Degrees	
		AA	AS
Telecommunications Technology Programs			
Los Angeles Trade-Technical College	<ul style="list-style-type: none">Electronics Communications		X
Electrical/Electronics Equipment Installation and Repair Programs			
Antelope Valley College	<ul style="list-style-type: none">Electronics Technology		X
Cerritos College	<ul style="list-style-type: none">Industrial Electronics		X
Glendale Community College	<ul style="list-style-type: none">Electronics Technology Technician		X
Long Beach City College	<ul style="list-style-type: none">Electrical Technology		X
Los Angeles Harbor College	<ul style="list-style-type: none">Engineering Technology – ElectronicsElectronic Engineering Technology		X X
Los Angeles Southwest College	<ul style="list-style-type: none">Liberal Arts – ElectronicsElectronics Technology	X	X
Los Angeles Valley College	<ul style="list-style-type: none">Electronics		X
Mt. San Antonio College	<ul style="list-style-type: none">Electronics and Computer Engineering TechnologyComputer Networking and Technology		X X
Pasadena City College	<ul style="list-style-type: none">Electrical Technology		X

¹² ONet Online. Summary Report for 49-9071.00 Maintenance and Repair Workers, General and for 49-2094.00 Electrical and Electronics Repairers, Commercial and Industrial Equipment. On the internet at

Table 8
Community College Degree Programs in Electronics-Related Technology

College	Program	Degrees	
		AA	AS
Pierce College	• Electronics and Electric Technology: Electronics		X
Rio Hondo College	• Electronics Technology		X

Sources: California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

El Camino College has submitted a draft application for a new, two-year A.S. degree program in Electronics and Computer Hardware Technology with an Electronics Technology Option.

Other Electronics-Related Training Programs

Beyond certificate and degree programs at community colleges, the Electrical Training Institute offers a four-year, Electrical Transportation Systems Apprenticeship Program.



Facilities System Technician

Individuals in the Facilities System Technician occupation perform work involving the skills of two or more

maintenance or craft occupations to keep the structure of an establishment in good repair. They also repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas¹². These individuals work with a range of complex electrical equipment--servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles. Other, common job titles related to this occupation are: Electrical and Instrument Mechanic, Electrical and Instrument Technician (E&I Tech), Electrical Maintenance Technician, Electrical Technician, Service Technician, Building Maintenance Mechanic, Maintenance Engineer, and Maintenance Technician.

Typical work experience and requirements for Facilities System Technician at transit agencies and companies is 4-years. Completion of 2-years or more full-time training or education in Industrial Technology, Electrical Maintenance, or similar program at a recognized trade school or apprenticeship program may substitute for some experience (typically 1-year). A high school diploma, GED, or equivalent is required.

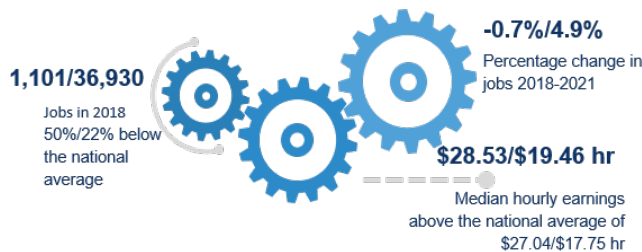
www.onetonline.org/link/summary/49-9071.00 and www.onetonline.org/link/summary/49-2094.00. Downloaded April 5, 2018.

Workforce Statistics

The two standard occupational titles and codes associated with Facilities System Technician are (1) Maintenance and Repair Workers and (2) Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094 and 49-9071). There are 1,101 Electrical and Electronics Repairers, Commercial and Industrial Equipment (and another 36,930 Maintenance and Repair Workers) jobs in Los Angeles County in 2018. There is insufficient data on the number employed in the transit industry. Both are 50% and 22% below the national employment average for these occupations, respectively.

Figure 15

Facilities System Technician Employment (Maintenance and Repair Workers and Electrical and Electronics Repairers, Commercial and Industrial Equipment)



Source: Economic Modeling Specialists (EMSI) Inc.

The number of jobs is expected to remain relatively the same for Electrical and Electronics Repairers in the near-term with a projected increase of -0.7% in the next three years. For Maintenance and Repair workers, jobs are expected to increase 4.9% in the next three years. The median hourly wages for these occupations is \$28.53/hour and \$19.46/hour, respectively--both are above the national average.

There were 31,438 total job postings for Maintenance and Repair Workers and Electrical and Electronics Repairers, Commercial and Industrial Equipment from January 2018 to September 2018, of which 7,587 were unique. These numbers result in a Posting Intensity of 4-to-1, meaning that for every 4 postings there is 1 unique job posting. This is close to the Posting Intensity for all other occupations and companies in Los Angeles County (4-to-1), indicating employers/companies are putting average effort toward hiring for this position. The median posting duration was 43 days compared to the regional average of 32 days for all occupations in Los Angeles.

Approximately a quarter of the workforce is nearing or is at retirement age, therefore it is not likely large numbers of new hires will result from retirements in the near-term future¹³.

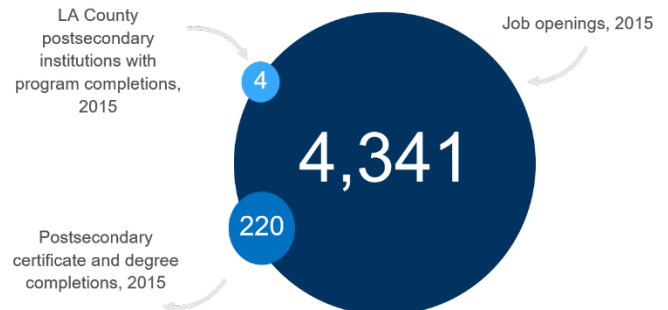
Education and Training for Facilities Systems Technicians

Industrial Technology and Electrical/Electrical Maintenance Education Credential Programs and Completions

There are two types of electrical, facilities-related postsecondary education programs: (1) Industrial Technology and (2) Electrical/Electrical Maintenance. Fourteen postsecondary providers (of these two types of programs) had completers in the past 14 years. Four, collectively, had 220 program completions to fill 4,341 job openings in 2015.

Figure 16

Facilities System Technician Demand and Supply



Sources: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February, 2018.

The number of completions has decreased more than 58 percent between 2003 and 2015; in stark contrast to state and national program completion increases of over 80 percent.

Postsecondary credentials awarded in 2015 were predominately (67.7%) certificates (149) from programs that were at least one year but less than two academic years in duration. Associates degrees were the next highest percentage of awards conferred (16.8%, 37 degrees) and bachelor's degrees made up the remaining credentials conferred (15.5%, 34 degrees) (refer to Table 9).

¹³ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

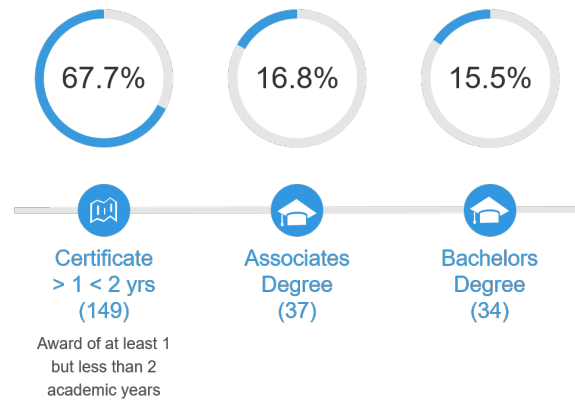
Table 9**Industrial Technology and Electrical/Electrical Maintenance Program Completions, by Award Level, 2015**

Award Level	Completions	Percent
Industrial Technology Programs		
Award of at least 1 but less than 2 academic years	54	60.7
Associates Degree	1	1.1
Bachelor's degree	34	38.2
Subtotal	89	
Electrical/Electrical Maintenance Programs		
Award of at least 1 but less than 2 academic years	95	72.5
Associates degree	36	27.5
Subtotal	131	
Both Program Types Combined		
Award of at least 1 but less than 2 academic years	149	67.7
Associates degree	37	16.8
Bachelors degree	34	15.5
Combined Total	220	

The postsecondary education and training institutions with credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Table 10.

Table 10**Industrial Technology and Electrical/Electrical Maintenance Program Completions, by Institution, 2015**

Institution	Certificates	Degrees	Total Completions
Industrial Technology Programs			
California State University, Los Angeles		34 Bachelors	34
Los Angeles Trade-Technical College	52	0	52
Long Beach City College	2	1 Associates	3
Electrical/Electrical Maintenance Programs			
Los Angeles Trade-Technical College	95	36	131

**Figure 17****Electrical- and Facilities-Related Postsecondary Awards, 2015**

Sources: Economic Modeling Specialists (EMS) Inc., Centers of Excellence, LMI Supply Tables February, 2018.

University and Community College Programs

California State University, Los Angeles, offers a Bachelor of Science degree in Industrial Technology with a Sustainable Power and Transportation Technologies concentration.

According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 4 postsecondary institutions in the region with 11 active industrial technology and/or electrical/electrical maintenance certificate and degree programs categorized as follows:

- Associate of Science Degree (AS): 4
- Certificate 18 > units: 6

The breakdown of university and community college programs, by duration, are depicted in Figure 18.

Figure 18
Electrical- and Facilities-Related
Credential Programs

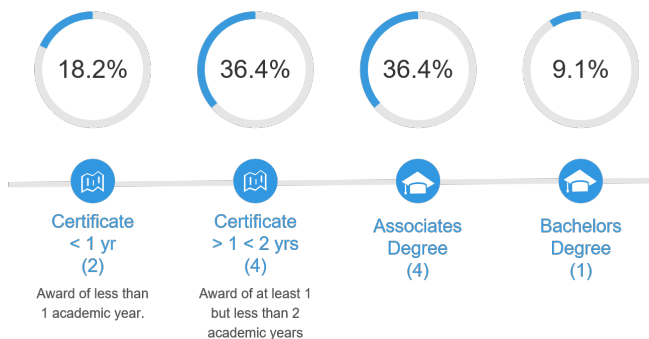


Table 11
University and Community College Certificate and Degree Programs in Industrial Technology and Electrical/Electrical Maintenance

College	Program	Degrees		Certificates
		AS 2- Yr	BS 4- Yr	18+ sem units
Industrial Technology Programs				
California State University, Los Angeles	• Industrial Technology		X	
Los Angeles Trade-Technical College	• Powerline Mechanic			20
	• Utility Industry Fundamentals			19
	• Renewable Energy Generation, Transmission & Distribution: Powerline Mechanic	X		
Electrical/Electrical Maintenance Programs				
Antelope Valley College	• Electrical Technology	X		34
Cerritos College	• Apprenticeship-Electrical			25
Los Angeles Trade-Technical College	• Electrical Construction Maintenance-Electrician	X		48
	• Electrical Construction Maintenance-Construction Technician	X		48

Sources: California State University, California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

Other Electrical-Related Training Programs

Beyond certificate and degree programs at universities and community colleges, other electrical-related training programs offered in Los Angeles County are depicted in Table 12.

Table 12
Apprenticeship and Other Electrical-Related Training

Training Provider	Program Name	Duration
East Los Angeles Occupation Center	Electrician 1-5	Varies by Level 1,200 hours total 4-years
Electrical Training Institute	Inside Electrical Wireman Apprenticeship Program	
Harbor Occupational Center	Electrician 1&2	Insufficient Data
Operating Engineers, Local 12	Operating and Maintenance Engineers Apprenticeship	Insufficient Data
Operating and Maintenance Engineers, Local 501	Operating Engineers Apprenticeship	Insufficient Data
Maxine Waters Employment Preparation Center	Electrician 1-3	Insufficient Data
	Powerline Systems	Insufficient Data



Rail Electronic Communication Inspector

Rail Electronic Communication

Inspectors inspect, test, maintain, and repair electronics equipment in connection with the safe transport of cargo or people¹⁴ on trains and within rail/train facilities.

Typical work experience and education requirements for Rail Electronic Communication Inspectors at transit agencies and companies is 4-years of journey-level experience in preventive and remedial maintenance of communication equipment. Up to 2-years of full-time training or education in an electronics/electrical-related program at a recognized trade school or apprenticeship program may be substituted for equivalent experience. A high school diploma, GED, or equivalent is required.

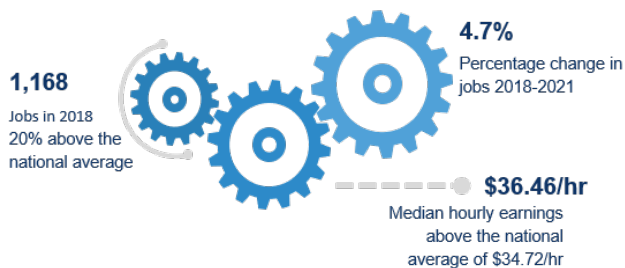
Workforce Statistics

The standard occupational title and code associated with Rail Electronic Communication Inspectors is

¹⁴ ONet Online. Summary Report for 53-6051.00 - Transportation Inspectors. On the internet at <https://www.onetonline.org/link/summary/53-6051.00>. Downloaded April 5, 2018.

Transportation Inspectors, Electronic Communication (53-6051). There are 1,168 Transportation Inspector jobs in Los Angeles County in 2018; 20% above the national average for this occupation. There is insufficient data on the number employed in the transit industry. The number of jobs is expected to increase 4.7% in the next three years. The median hourly wages for this occupation is \$36.46/hour, above the national average of \$34.72/hour.

Figure 19
Rail Electronic Communication Inspector Employment
 (Transportation Inspectors, Electronic Communication)



Source: Economic Modeling Specialists (EMSI) Inc.

There were 2,229 total job postings for this occupation from January 2018 to September 2018, of which 577 were unique. These numbers result in a Posting Intensity of 4-to-1, meaning that for every 4 postings there is 1 unique job posting. This is close to the Posting Intensity for all other occupations and companies in Los Angeles County (4-to-1), indicating employers/companies are putting average effort toward hiring for this position. The median posting duration was 32 days which is the same as the regional average for all occupations in Los Angeles.

More than a third of the workforce is nearing or is at retirement age, therefore large numbers of new hires may result from retirements in the near-term future¹⁵.

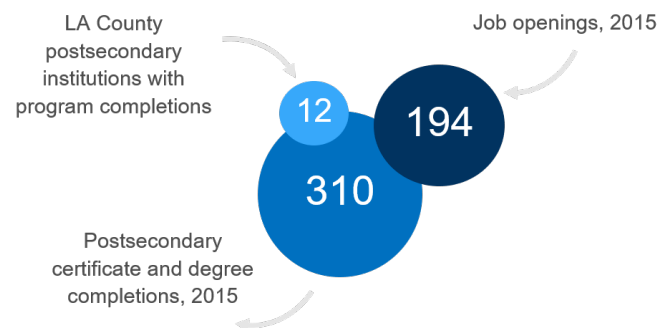


Education and Training for Rail Electronic Communication Inspectors

Electronics-Related Credential Programs and Completions

Because of the typical duties and education and work experience requirements for Rail Electronic Communication Inspectors, there are three types of electronics-related postsecondary education programs that would prepare individuals for this occupation. These programs are: (1) Telecommunications Technology, (2) Electrical/Electronics Equipment Installation and Repair, and (3) Communications Systems Installation and Repair Technology. The education, apprenticeship, and training programs that prepare individuals for this occupation are similar for the Electronic Communication Technician and the Systems Electronic Communication Technician described elsewhere in this report.

Figure 20
Rail Electronic Communication Inspector Demand and Supply



Sources: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February, 2018.

Eighteen postsecondary providers (of these three types of programs) had completers in the past 14 years. Twelve, collectively, had 310 program completions to fill 194 openings in 2015.

¹⁵ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.



Postsecondary credentials awarded in 2015 were predominately (54.1%) certificates from programs that were at least one year but less than two academic years in duration. Associates degrees were the next highest percentage of awards conferred (26.4%) and certificates from programs less than one academic year in duration made up the remaining credentials conferred (19.3%). Overall, more than 2/3rds (73.5%) of credentials awarded were certificates (228 total certificates). All remaining credentials completed (82) were associates degrees (refer to Figure 21 and Table 13).

Figure 21
Electronics-Related
Postsecondary
Awards, 2015

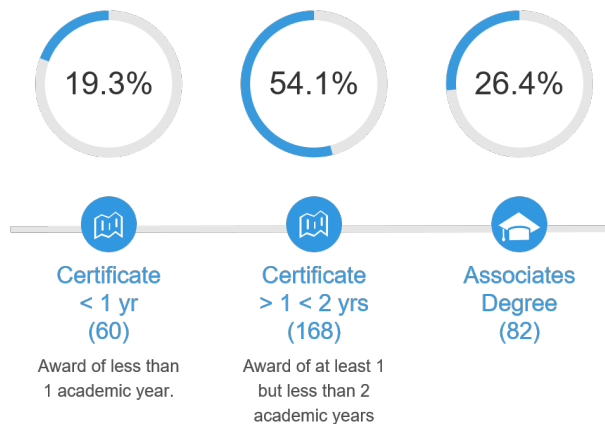


Table 13

Electronics-Related Program Completions, by Award Level, 2015

Award Level	Completions	Percent
Telecommunications Technology Programs		
Award of less than 1 academic year	5	8.9
Award of at least 1 but less than 2 academic years	40	71.4
Associates degree	11	19.6
Subtotal	56	
Electronics and Electrical Technology Programs		
Award of less than 1 academic year	18	8.2
Award of at least 1 but less than 2 academic years	128	58.9
Associates degree	71	32.7
Subtotal	217	
Communications Systems Installation and Repair Technology Programs		
Award of less than 1 academic year	37	100.0
Subtotal	37	
All Programs Combined		
Award of less than 1 academic year	60	19.3
Award of at least 1 but less than 2 academic years	168	54.1
Associates degree	82	26.4
Combined Total	310	

Sources: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February 2018.

The postsecondary education and training institutions with credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Table 14.

Table 14

Electronics-Related Program Completions, by Institution, 2015

Institution	Certificates	Degrees	Total Completions
Telecommunications Technology Programs			
Los Angeles Trade-Technical College	22	11	33
Mt. San Antonio College	11	0	11
Long Beach City College	5	0	5
Pierce College	7	0	7
Electrical/Electronics Equipment Installation and Repair Programs			
Mt. San Antonio College	44	23	67
Long Beach City College	27	23	50
Antelope Valley College	18	14	32
Pasadena City College	16	3	19
Pierce College	10	5	15
East Los Angeles College	7	0	7
Glendale Community College	7	0	7
Los Angeles Valley College	11	1	12
El Camino College	2	0	2

Table 14**Electronics-Related Program Completions, by Institution, 2015**

Institution	Certificates	Degrees	Total Completions
Los Angeles Southwest College	3	2	5
Los Angeles City College	1	0	1

Source: Economic Modeling Specialists (EMS1) Inc., Centers of Excellence, LMI Supply Tables February 2018.

Community College Electronics-Related Programs

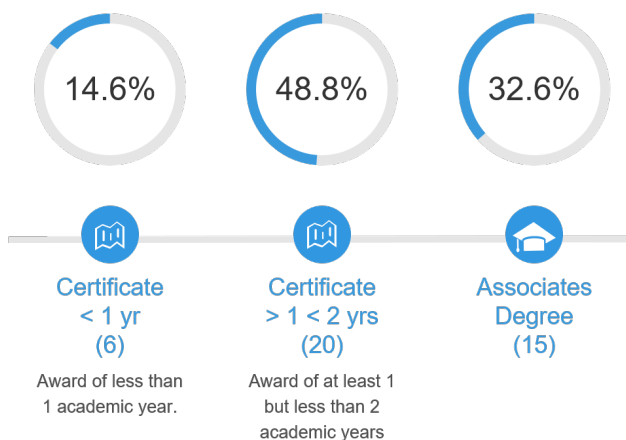
According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 14 community colleges in Los Angeles County with 41 active electronics-related certificate and degree programs categorized as follows:

- Associate of Arts Degree (AA): 1
- Associate of Science Degree (AS): 14
- Certificate 18 > units: 22
- Certificate < 18 units: 4

The breakdown of community college programs, by duration, are depicted in Figure 22.

Programs offered by each community college, and total number of units for certificate programs, are depicted in Table 15.

Figure 22
Community College Electronics-Related Credential Programs



Sources: California Community Colleges Chancellor's Office Curriculum Inventory and Los Angeles County community colleges

Table 15**Community College Certificate and Degree Programs in Electronics-Related Technology**

			Degrees		Certificates	
			AA	AS	<18 sem units	18> sem units
College	Program					
Telecommunications Technology Programs						
Los Angeles Trade-Technical College	•	Electronics Communications		X		44
Mt. San Antonio College	•	Electronic Systems Technology - Level II				29
	•	Electronics Communications				36
Pierce College	•	Electronics Communications				20
Electrical/Electronics Equipment Installation and Repair Programs						
Antelope Valley College	•	Electronics Technology		X		29
Cerritos College	•	Industrial Electronics		X		37
East Los Angeles College	•	Programming and Apps			5	
El Camino College	•	Electronics Engineering Tech				30
	•	Electronics & Comp. Hard. Tech/Industrial Comp Control Tech				36
Glendale Community College	•	Electronics Technology Technician		X		23.5
Long Beach City College	•	Electrical Technology		X		45
Los Angeles City College	•	Electronic Systems				42
Los Angeles Harbor College	•	Engineering Technology – Electronics		X		
	•	Electronic Engineering Technology		X		
	•	Electronic Technology				28
Los Angeles Southwest College	•	Liberal Arts – Electronics	X			
	•	Electronics Technology		X		
Los Angeles Trade-Technical College	•	Electronics Engineering Technician				27
Los Angeles Valley College	•	Electronics Technology				22
	•	Electronics Technician				42
	•	Electronics		X		
Mt. San Antonio College	•	Electronics: Industrial Systems				33
	•	Electronics and Computer Engineering Technology		X		45
	•	Electronics Technology				24

Table 15
Community College Certificate and Degree Programs in Electronics-Related Technology

College	Program	Degrees		Certificates	
		AA	AS	<18 sem units	18> sem units
	• Computer Networking and Technology		X		
	• Industrial Electronics				Insuff. Data
	• Electronic Technology				Insuff. Data
	• Electronic Assembly and Fabrication				Insuff. Data
Pasadena City College	• Electrical Technology		X		18
Pierce College	• Electronics: Analog				20
	• Electronics: Digital				20
	• Electronics and Electric Technology: Electronics		X		
	• Electronics Technology		X		24
Rio Hondo College					

Sources: California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

In addition, Mt. San Antonio College offers three short-term, noncredit programs as follows: (1) Electronic Systems Technology, (2) Electronic Systems Technology - Cabling and Wiring, and (3) Electronic Systems Technology - Level 1. East Los Angeles College offers a short-term, noncredit Programming and Apps program which covers basic skills in assembly, programming, app design, electronic engineering, and robotics.

Other Electronics-Related Training Programs

Beyond certificate and degree programs at community colleges, other electronics-related training programs offered in Los Angeles County are depicted in Table 16.

Table 16
Apprenticeship and Other Electronics-Related Training

Training Provider	Program Name	Duration
Electrical Training Institute	• Electrical Transportation Systems Apprenticeship Program	4-years



Service Attendant

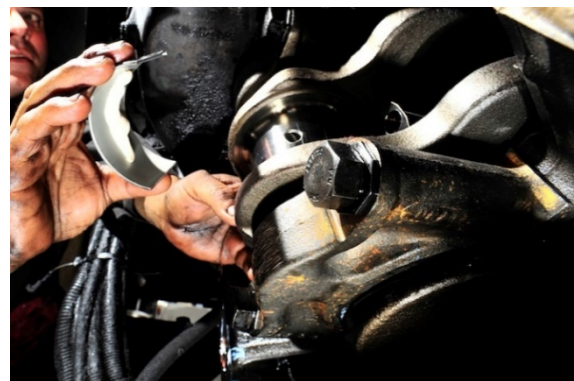
Individuals in the Service Attendant occupation service automobiles, buses, trucks, and other vehicles with

fuel, lubricants, and accessories. They lubricate vehicles, change motor oil, install antifreeze, or replace lights or other accessories, such as windshield wiper blades or fan belts. They also may repair or replace tires. Additionally, they inspect, maintain, and repair vehicles, mostly cars and light-trucks¹⁶. Another common job title related to this occupation is Transit Attendant.

Typical work experience and education requirements for Service Attendants at transit agencies and companies is 1- to 2-years of experience and a high school diploma, GED, or equivalent. Education and training (usually full-time from an accredited school in automotive or truck maintenance) may substitute for experience.

Workforce Statistics

The two, standard occupational titles and codes associated with Service Attendants are: (1) Automotive Service Attendants and (2) Automotive Service Technicians and Mechanics (49-3023 and 53-6031). There are 23,223 Automotive Service Attendants, Technicians, and Mechanics jobs in Los Angeles County in 2018; of these 1,188 are Automotive Service Attendant jobs and the remaining 22,035 are Automotive Service Technician and Mechanic jobs. Most jobs are in automotive repair shops, dealerships, automotive parts and accessories stores, tire dealerships, and automotive oil change and lubrication shops. There is insufficient data on the number employed in the transit industry.



The number of jobs for Automotive Service Attendants, Technicians, and Mechanics are well below the national average and pay is slightly above the national median hourly wage. Table 17 (on the following page) outlines the number of jobs, expected job change, and median hourly earnings for these positions in Los Angeles County.

¹⁶ ONet Online. Summary Report for 53-6031.00 – Automotive and Watercraft Service Attendants. On the internet at www.onetonline.org/link/summary/53-6031.00. Downloaded April 5, 2018.

There were 12,721 total job postings for these occupations from January 2018 to September 2018 (10,955 postings for Automotive Service Technicians and Mechanics, and 165 postings for Automotive Service Attendants). Of these postings, 2,557 (2,392 and 165, respectively) were unique resulting in a Posting Intensity of 5-to-1 for Automotive Service Technicians and Mechanics and 11-to-1 for Automotive Service Attendants. This is similar to the Posting Intensity for all other occupations and companies in the region (4-to-1), indicating other employers/ companies may not be currently trying as hard to hire for this occupation. The median posting duration was 49 days (51 for Service Attendants) and the regional average is 32 days.

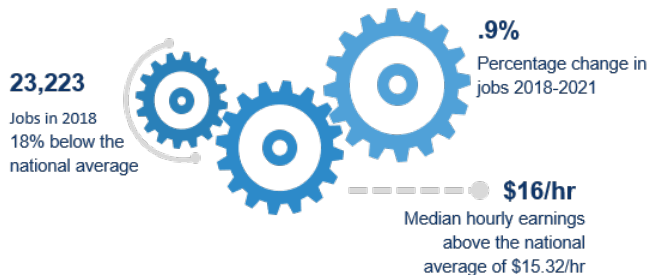
Table 17
Automotive Service Attendant, Technician and Mechanic Employment and Earnings

Occupation	2018 Jobs	2021 Jobs	Change	% Change	Median Hourly Earnings
Automotive Service Attendant	1,188	1,259	71	6%	\$13.18
Automotive Service Technician and Mechanic	22,035	22,169	134	1%	\$16.18
Combined	23,223	23,428	205	.9%	\$16.00

Source: Economic Modeling Specialists (EMSI) Inc.

Additionally, less than a quarter of the workforce is nearing or is at retirement age, therefore it is not likely large numbers of new hires will result from retirements in the near-term future¹⁷.

Figure 23
Service Attendant Employment
(Automotive Service Attendants, Technicians, and Mechanics)

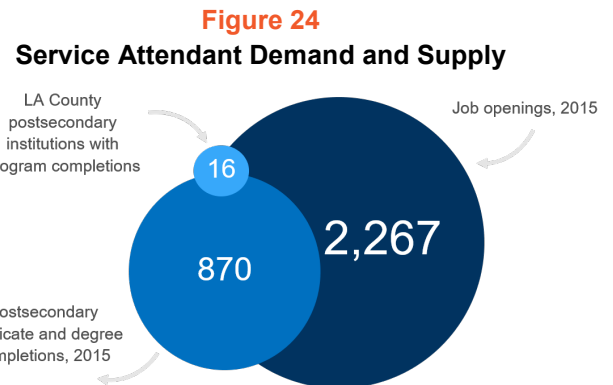


Source: Economic Modeling Specialists (EMSI) Inc.

Education and Training for Service Attendants

Automotive Technology Credential Programs and Completions

Twenty-four postsecondary automotive technology certificate and degree providers had program completers in the past 14 years. Sixteen, collectively, had 870 program completions to fill 2,267 job openings in 2015.



Source: Economic Modeling Specialists (EMSI) Inc.

The number of completions has increased more than 169 percent between 2003 and 2015 as compared to a state increase of 92 percent and a national increase of 82 percent during the same timeframe. There was a dramatic increase in regional completions in 2015; whereas state and national completion rates remained relatively the same.

Automotive technology credentials awarded in 2015 were predominately (53.8%) certificates from programs less than one academic year in duration. Certificates from programs that were at least one year but less than two academic years in duration were the next highest percentage of awards conferred (35.6%). Overall, 91.8 percent of credentials awarded were certificates (799 total certificates). Most remaining credentials completed (8.2%) were associates degrees (71 total degrees) (refer to Figure 25 and Table 18).

¹⁷ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

Figure 25
Automotive Technology
Postsecondary
Awards, 2015

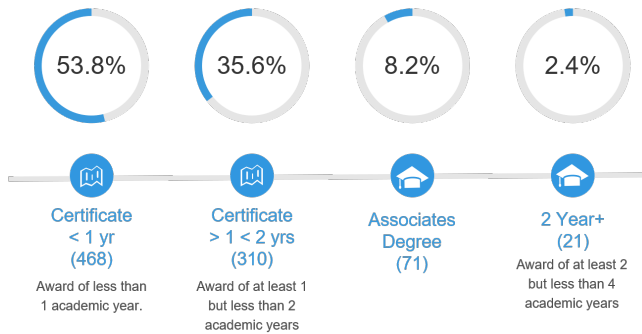


Table 18
Automotive Technology Program Completions, by Award Level, 2015

Award Level	Completions (2015)	Percent
Award of less than 1 academic year	468	53.8
Award of at least 1 but less than 2 academic years	310	35.6
Associates degree	71	8.2
Award of at least 2 but less than 4 academic years	21	2.4
Total	870	100%

Source: Economic Modeling Specialists (EMS) Inc.

Postsecondary education and training institutions with automotive technology credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Table 19.

Table 19
Automotive Technology Program Completions, by Institution, 2015

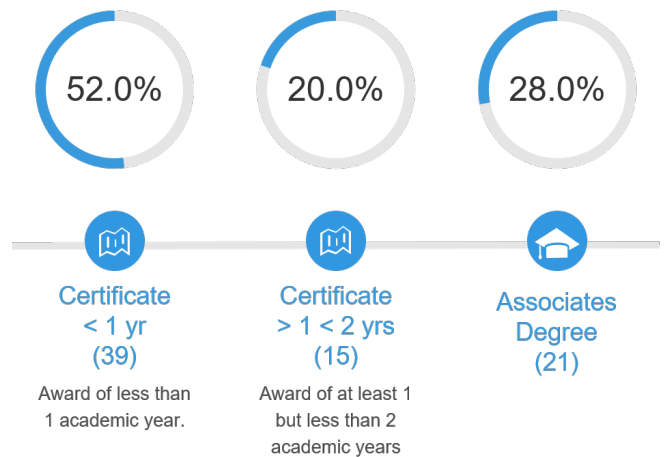
Institution	Certificates (2015)	Degrees (2015)	Total Completions (2015)
Los Angeles Trade- Technical College	249	9	258
Citrus College	112	8	120
Pierce College	103	12	115
UEI College-Gardena	84	0	84
Pasadena City College	82	3	85
Hacienda La Puente Adult Education	40	0	40
Rio Hondo College	25	6	31

Table 19
Automotive Technology Program Completions, by Institution, 2015

Cerritos College	23	12	35
El Camino College	22	4	26
East Los Angeles College	15	5	20
Antelope Valley College	13	7	20
Baldwin Park Adult & Community Education	11	0	11
GDS Institute	10	0	10
College of the Canyons	6	1	7
Long Beach City College	2	3	5
El Camino College-Compton Center	2	1	3
Total	799	71	870

Source: Economic Modeling Specialists (EMS) Inc.

Figure 26
Community College
Automotive Technology
Credential Programs



Sources: California Community Colleges Chancellor's Office Curriculum Inventory and Los Angeles County community colleges

Community College Automotive Technology Programs

According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 11 community colleges in Los Angeles County with 68 active automotive technology certificate and degree programs categorized as follows:

- Associate of Arts Degree (AA): 5
- Associate of Science Degree (AS): 16
- Certificate 12 < 18 units: 26
- Certificate 18 > units: 28

Programs offered by each community college, and total number of units for certificate programs, are depicted in Table 20.

Table 20
Community College Certificate and Degree Programs in Automotive Technology

College	Program	Degrees		Certificates	
		AA	AS	12 to <18 sem units	18> sem units
Antelope Valley College	• Driveability, Emissions, and Electrical		X		26
	• Engine and Drive Trains		X		26
Cerritos College	• Auto Mechanical Repair Tech: Engine/Machining Technology	X			20
	• Auto Mechanical Repair Technology: Electrical/Diagnosis Tech	X			23
	• Auto Mechanical Repair Technology: General Technician	X			29
	• Auto Mechanical Repair Tech: Manufacturer Specialty	X			48
	• Automotive Mechanical Repair Technology: Automotive Management	X			19.5
Citrus College	• Automotive Research & Development				23
	• Automotive Technology		X		
	• Automotive Service, Diagnosis & Repair-Underhood Specialist				21
	• Automotive Svc Diagnosis & Rpr-Toyota/Lexus/Scion Technician				55
	• Automotive Svc, Diagnosis & Rpr-Undercar/Drivetrain Spec.				26

Table 20
Community College Certificate and Degree Programs in Automotive Technology

College	Program	Degrees		Certificates	
		AA	AS	12 to <18 sem units	18> sem units
College of the Canyons Compton College	• Automotive Service, Diagnosis & Repair-Master Technician				56.5
	• Automotive Maintenance and Light Repair				23
	• Automotive Technology		X		34
	• Automotive Technology		X		
	• Automotive Technology: Automotive Brakes/Suspension, Transmission/Drive Train Technician				16
	• Automotive Technology: Automotive Engine Rebuilding/Repair Technician				12
	• Automotive Technology: Tune-Up Technician				16
	• Automotive Technician I/II				12 (I) 16 (II)
	• Automobile Technology		X		46
	• Cooling System and Climate Control Specialist				15
East Los Angeles College	• Drivetrain Specialist				15
	• Engine Performance and Drivability				15
	• Hybrid and Electric Vehicle Technician				15
	• Automotive Technology		X		
	• Automotive Tech II				32
El Camino College	• Automotive Technology: Automotive Brakes/Suspension, Transmission/Drive Train Technician				16
	• Automotive Technology: Automotive Engine Rebuilding/Repair Technician				12
	• Automotive Technology: Tune-Up Technician				16
	• Hybrid, Electric, and Alt Fuels		X		30
	• Automotive and Related Technology		X		36
Los Angeles Trade-Technical College	• Auto & Related Technology: Tune-Up				18
	• Auto & Related Technology: Transmission Repair				18
Pasadena City College	• Automotive Technology - All Automotive Systems		X		50

Table 20**Community College Certificate and Degree Programs in Automotive Technology**

College	Program	Degrees		Certificates	
		AA	AS	12 to <18 sem units	18+ sem units
Pierce College	• Automotive Electrical Systems Technician			12	
	• Engine Performance Technician		X		28
	• Powertrain Technician		X		18
	• Automotive Emission Specialist				18
	• Automotive Light Service Technician			13	
	• Automotive Performance Applications			15	
Rio Hondo College	• Automotive Powertrain Specialist			13	
	• Automotive Service Technology		X		46
	• Automotive Technology: General Service Technician			12	
	• Brake and Suspension Service				18
	• Diesel Fuel and Emission Systems			15	
	• Engine Repair			14	
	• Honda Professional Career Training Program		X		
	• Specialization (PACT)				
	• Transmission Service			15	
	• Safety, Comfort, and Convenience Systems			14	
	• Fuel Injection Systems			16	
	• Advanced Engine Performance		X		32
	• Advanced Engine Performance-Technician			12	
	• Honda/Acura Air Conditioning and Supplemental Restraints Systems			14	
	• Honda/Acura Power Train and Transmission Systems			14	
	• Honda/Acura Brakes, Suspension, and Electronic Systems			15	
	• Honda/Acura Engine Repair and Chassis Electrical Systems			15	
	• Automotive Technology		X		
	• General Automotive Service				35

Los Angeles Trade-Technical College also offers a Hybrid and Electric Plug-In Vehicle Technology certificate program. In addition, El Camino College has submitted a draft program application for an Automotive Technician II certificate program.

Other Automotive Training Programs

Beyond certificate and degree programs at community colleges, other automotive programs and services currently offered in the region include: industry-sponsored training and a pre-apprenticeship program at Rio Hondo College and other automotive-related programs/services at West Los Angeles College and Los Angeles Harbor College. Additionally, several Regional Occupational Centers in Los Angeles County offer automotive training programs which are outlined in Table 21.

Table 21**Automotive Training Programs**

Training Provider	Program Name	Duration
Abram Friedman Occupational Center	• Automotive Technician	470 hours
Baldwin Park Adult & Community Education	• Automotive Services	1,080 hrs.
Hacienda La Puente Adult Education	• Automotive Service Masters Level	1,080 hrs
Harbor Occupational Center	• Automotive Technology	Unavailable
La Puente Valley ROP	• Automotive Technology	Unavailable
Maxine Waters Employment Preparation Center	• Automotive Technician	Unavailable
Southern California Regional Occupation Center	• Automotive	Unavailable

Diesel Technology Programs

Many transit agencies and companies also accept other vehicle repair training, such as diesel technology training, as a substitute for automotive training. Therefore, refer to the Bus Mechanic section of this report for more information on diesel technology education and training programs available in Los Angeles County.



Stock Clerk

Stock Clerks receive, store, and issue merchandise, materials, equipment, and other items from stockroom, warehouse, or storage yard to fill shelves, racks, tables, or orders¹⁸. A Stock Clerk in a transit company or agency handles primarily vehicle parts and other transportation materials. Other, common job

¹⁸ ONet Online. Summary Report for 43-5081.03 – Stock Clerks-Stockroom, Warehouse, or Storage Yard. On the internet at

<https://www.onetonline.org/link/summary/43-5081.03>. Downloaded April 5, 2018.

titles related to this occupation are: Stocker and Stockroom Clerk.



Typical work experience requirements for Stock Clerks at transit agencies and companies is 1-year, full-time equivalent work. In some cases, training may substitute for all or some work experience. Experience in an automotive, mechanical parts counter support, or manufacturing environment may be required or is considered highly desirable. A high school diploma, GED, or equivalent is required.

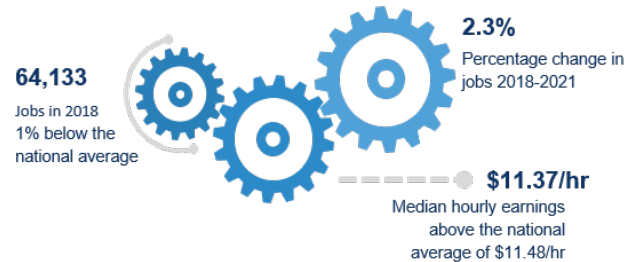
Workforce Statistics

The standard occupational title and code associated with Stock Clerks is Stock Clerks- Stockroom, Warehouse, or Storage Yard (43-5081.03). There were 64,133 Stock Clerk jobs in Los Angeles County in 2018; 1% below the national average for this occupation. There is insufficient data on the number employed in the transit industry. The number of Stock Clerk jobs is expected to increase slightly (2.3%) in the next three years. The median hourly wages for this occupation is \$11.37/hour, slightly above the national average of \$11.48/hour.

There were 34,651 total job postings for this occupation from January 2018 to September 2018, of which 8,948 were unique resulting in a Job Posting Intensity of 4-to-1; meaning that for every 4 postings there is 1 unique job posting. This is similar to the Job Posting Intensity for all other occupations and companies in the region (4-to-1), indicating other employers/companies may not be currently trying as hard to hire for this occupation. The median posting duration was 35 days compared to the regional average of 32 days for all occupations in Los Angeles County.

Less than a quarter of the workforce is nearing or is at retirement age, therefore it is not likely large numbers of new hires will result from retirements in the near-term future¹⁹.

Figure 27
Stock Clerk Employment

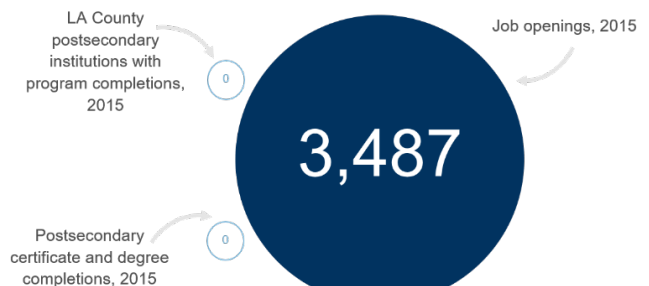


Source: Economic Modeling Specialists (EMSI) Inc.

Education and Training for Stock Clerks

There haven't been any recent completions from stock clerk-related credential programs at colleges or universities in Los Angeles County.

Figure 28
Stock Clerk Demand and Supply



Sources: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February 2018.

Community College Stock Clerk Credential Programs

According to a recent survey of Los Angeles County community colleges, there are 2 community colleges in Los Angeles County with 3 active, stock clerk-related certificate programs. All three programs are less than one-year in duration (refer to Table 22).

¹⁹ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

Table 22
Community College Stock Clerk-Related Certificate and Degree Programs

College	Program	Degrees		Certificates	
		AA	AS	<18 sem units	18> sem units
East Los Angeles College	• Logistics Material Handling			11	
	• Logistics Clerk			11	
Los Angeles Harbor College	• Logistics – Warehouse Associate			17	

Sources: California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

Additionally, Long Beach City College offers short-term training for Freight, Stock, and Material Movers; Los Angeles Harbor College is currently seeking approval of a Warehousing and Distribution certificate program; and Los Angeles Trade-Technical College is planning to develop certificate programs for Automotive and Truck Parts Specialists.



Systems Electronic Communication Technician

Systems Electronic Communication

Technicians install communications equipment and wiring and service or repair telephone, television, Internet, and other communications equipment²⁰. Systems Electronic Communication Technicians at transit companies and agencies install, maintain, repair and modify advanced communications systems carrying voice, data, and video information.

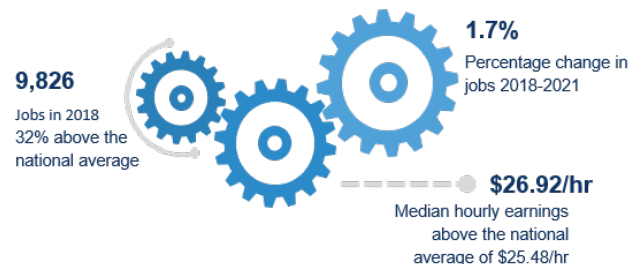
Typical work experience and education requirements for Systems Electronic Communication Technicians at transit agencies and companies is 4-years of journey-level experience in preventive and remedial maintenance of communication equipment. Up to 2-years of full-time training or education from an electronics/electrical-related program at a recognized trade school or apprenticeship program may substitute for equivalent experience. Certification in network cabling and/or network systems (LAN/WAN) is either required or often considered highly desirable. A high school diploma, GED, or equivalent is required.



Workforce Statistics

The standard occupational title and code associated with Systems Electronic Communication Technicians is Telecommunications Equipment Installers and Repairers (49-2022). There are 9,826 Telecommunications Equipment Installers and Repairers jobs in Los Angeles County in 2018; 32% above the national average for this occupation. There is insufficient data on the number employed in the transit industry. The number of jobs is expected to increase of 1.7% in the next three years. The median hourly wages for this occupation is \$26.92/hour, above the national average of \$25.48/hour.

Figure 29
Systems Electronic Communication Technician Employment
(Telecommunications Equipment Installers and Repairers)



Source: Economic Modeling Specialists (EMS) Inc.

There were 3,756 total job postings for this occupation from January 2018 to September 2018, of which 656 were unique resulting in a Job Posting Intensity of 6-to-1; meaning that for every 6 postings there is 1 unique job posting. This is higher than the Job Posting Intensity for all other occupations and companies in the region (4-to-1), indicating other employers/companies may be trying harder to

²⁰ ONet Online. Summary Report for 49-2022.00 – Telecommunications Equipment Installers and Repairers. On the internet at

hire for this occupation. The median posting duration was 42 days compared to the average median posting of 32 days for all occupations in Los Angeles County.

Less than a quarter of the workforce is nearing or is at retirement age, therefore large numbers of new hires are not likely to result from retirements in the near-term future²¹.

Education and Training for Systems Electronic Communication Technicians

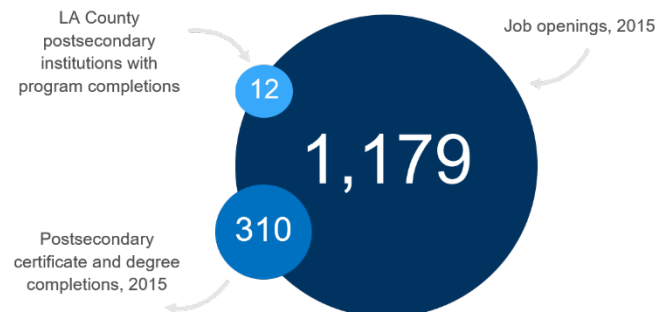
Electronics-Related Credential Programs and Completions

Because of the typical duties and education and work experience requirements for Systems Electronic Communication Technicians, there are three types of electronics-related postsecondary education programs that prepare individuals for this occupation. These programs are: (1) Telecommunications Technology, (2) Electrical/Electronics Equipment Installation and Repair, and (3) Communications Systems Installation and Repair Technology.

The education and training programs that prepare individuals for this occupation are similar for the Electronic Communication Technician and the Rail Electronic Communication Inspector described elsewhere in this report.

Eighteen postsecondary providers (of these three types of programs) had completers in the past 14 years. Twelve, collectively, had 310 program completions to fill 1,179 openings in 2015.

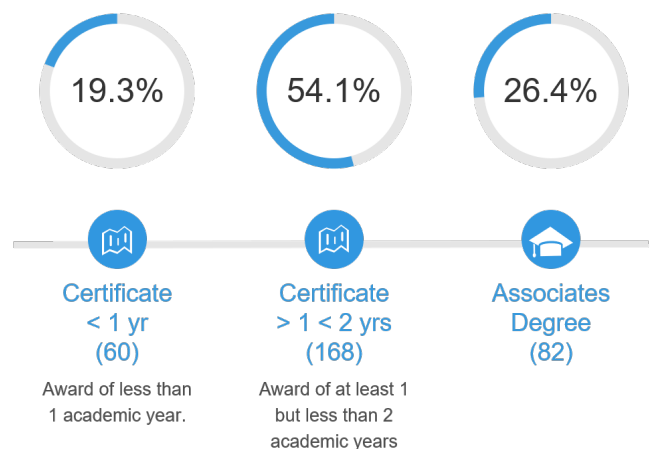
Figure 30
Systems Electronic Communication Technician Demand and Supply



Sources: Economic Modeling Specialists (EMS) Inc., Centers of Excellence, LMI Supply Tables February, 2018.

The number of completions has decreased more than 45 percent between 2003 and 2015; a slightly higher percentage decrease compared to state and national completion trends.

Figure 31
Electronics-Related Postsecondary Awards, 2015



Postsecondary credentials awarded in 2015 were predominately (54.1%) certificates from programs that were at least one year but less than two academic years in duration. Associates degrees were the next highest percentage of awards conferred (26.4%) and certificates from programs less than one academic year in duration made up the remaining credentials conferred (19.3%). Overall, more than 2/3rds (73.5%) of credentials awarded were certificates (228 total certificates). All remaining

²¹ Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

credentials completed (82) were associates degrees (refer to Figure 31 and Table 23).

Table 23**Electronics-Related Program Completions, by Award Level, 2015**

Award Level	Completions	Percent
Telecommunications Technology Programs		
Award of less than 1 academic year	5	8.9
Award of at least 1 but less than 2 academic years	40	71.4
Associates degree	11	19.6
Subtotal	56	
Electronics and Electrical Technology Programs		
Award of less than 1 academic year	18	8.2
Award of at least 1 but less than 2 academic years	128	58.9
Associates degree	71	32.7
Subtotal	217	
Communications Systems Installation and Repair Technology Programs		
Award of less than 1 academic year	37	100.0
Subtotal	37	
Three Types of Programs Combined		
Award of less than 1 academic year	60	19.3
Award of at least 1 but less than 2 academic years	168	54.1
Associates degree	82	26.4
Combined Total	310	

Sources: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February 2018.

The postsecondary education and training institutions with credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Table 24.

Table 24**Electronics-Related Program Completions, by Institution, 2015**

Institution	Certificates	Degrees	Total Completions
Telecommunications Technology Programs			
Los Angeles Trade-Technical College	22	11	33
Mt. San Antonio College	11	0	11
Long Beach City College	5	0	5
Pierce College	7	0	7
Electrical/Electronics Equipment Installation and Repair Programs			
Mt. San Antonio College	44	23	67
Long Beach City College	27	23	50
Antelope Valley College	18	14	32
Pasadena City College	16	3	19
Pierce College	10	5	15
East Los Angeles College	7	0	7
Glendale Community College	7	0	7

Table 24**Electronics-Related Program Completions, by Institution, 2015**

Institution	Certificates	Degrees	Total Completions
Los Angeles Valley College	11	1	12
El Camino College Los Angeles	2	0	2
Southwest College Los Angeles City College	3	2	5
RWM Fiber Optics, Inc.	1	0	1
Communications Systems Installation and Repair Technology Programs			
RWM Fiber Optics, Inc.	37	0	37

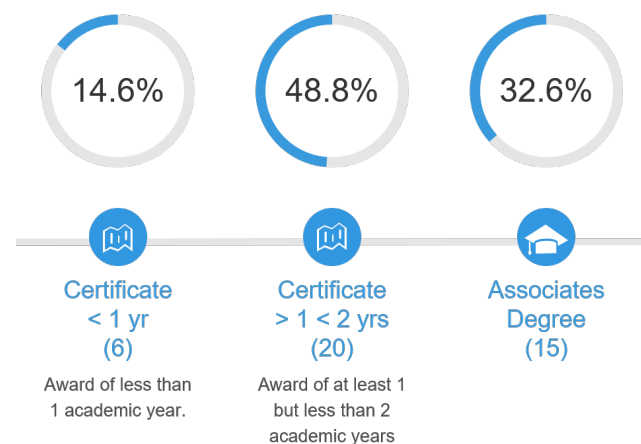
Source: Economic Modeling Specialists (EMSI) Inc., Centers of Excellence, LMI Supply Tables February 2018.

Community College Electronics-Related Programs

According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 14 community colleges in the region with 41 active electronics-related certificate and degree programs categorized as follows:

- Associate of Arts Degree (AA): 1
- Associate of Science Degree (AS): 14
- Certificate 18 > units: 22
- Certificate < 18 units: 4

The breakdown of community college programs, by duration, are depicted in Figure 32.

Figure 32**Community College Electronics-Related Credential Programs**

Programs offered by each community college, and total number of units for certificate programs, are depicted in Table 25.

Table 25
Community College Certificate and Degree Programs in Electronics-Related Technology

			Degrees		Certificates	
College	Program	AA	AS	<18 sem units	18> sem units	
Telecommunications Technology Programs						
Los Angeles Trade-Technical College	• Electronics Communications		X		44	
Mt. San Antonio College	• Electronic Systems Technology - Level II				29	
	• Electronics Communications				36	
Pierce College	• Electronics Communications				20	
Electrical/Electronics Equipment Installation and Repair Programs						
Antelope Valley College	• Electronics Technology		X		29	
Cerritos College	• Industrial Electronics		X		37	
East Los Angeles College	• Programming and Apps			5		
El Camino College	• Electronics Engineering Tech				30	
	• Electronics & Comp. Hard. Tech/Industrial Comp Control Tech				36	
Glendale Community College	• Electronics Technology Technician		X		23.5	
Long Beach City College	• Electrical Technology		X		45	
Los Angeles City College	• Electronic Systems				42	
Los Angeles Harbor College	• Engineering Technology – Electronics		X			
	• Electronic Engineering Technology		X			
	• Electronic Technology				28	
Los Angeles Southwest College	• Liberal Arts – Electronics	X				
	• Electronics Technology		X			
Los Angeles Trade-Technical College	• Electronics Engineering Technician				27	
Los Angeles Valley College	• Electronics Technology				22	
	• Electronics Technician				42	
	• Electronics		X			
Mt. San Antonio College	• Electronics: Industrial Systems				33	
	• Electronics and Computer Engineering Technology		X		45	
	• Electronics Technology				24	

Table 25
Community College Certificate and Degree Programs in Electronics-Related Technology

College	Program	Degrees		Certificates	
		AA	AS	<18 sem units	18> sem units
	• Computer Networking and Technology		X		
	• Industrial Electronics				Insuff. Data
	• Electronic Technology				Insuff. Data
	• Electronic Assembly and Fabrication				Insuff. Data
Pasadena City College	• Electrical Technology		X		18
Pierce College	• Electronics: Analog				20
	• Electronics: Digital				20
	• Electronics and Electric Technology: Electronics		X		
Rio Hondo College	• Electronics Technology		X		24

Sources: California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

Other Electronics-Related Training Programs

Beyond certificate and degree programs at community colleges, other electronics-related training programs offered in Los Angeles County are depicted in Table 26.

Table 26
Apprenticeship and Other Electronics-Related Training

Training Provider	Program Name	Duration
Electrical Training Institute	• Electrical Transportation Systems Apprenticeship Program	4-years



Transit Security Officer I

Individuals in Transit Security Officer occupations protect and police transit property, employees, or passengers. Other, common job titles related to this

occupation are: Transit Police Officer and Security Officer.

Typical education and work experience requirements for Transit Security Officers is a high-school diploma, GED, or equivalent. One-year's related experience is preferred but not typically required.

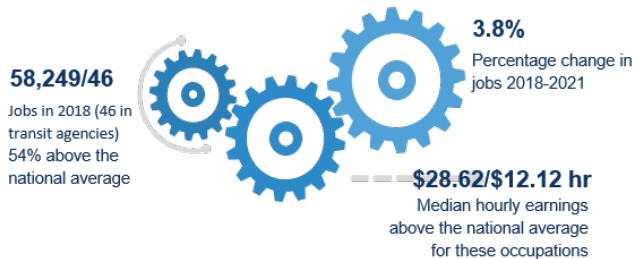


Workforce Statistics

The two standard occupational titles and codes associated with Transit Security Officers are: (1) Railroad Police and (2) Security Guards (33-3052, 33-9032). There were 58,249 Transit Railroad and Police and Security Guard jobs in Los Angeles County in 2018; 54% above the national average for this occupation. Of these jobs, 46 were Transit Railroad and Police jobs. The number of Transit Railroad and Police and Security Guard jobs is expected to increase 7% and 4%, respectively, in the next three years. The median hourly wages for Transit Railroad and Police is \$28.62/hour and for Security Guards is \$12.12/hour.

Figure 33

Transit Security Officer Employment (Transit/Railroad Police and Security Guards)



Source: Economic Modeling Specialists (EMSI) Inc.

There were 96,402 total job postings for these occupations from January 2018 to September 2018 (note: all postings were for Security Guards). Of these postings, 10,080 were unique resulting in a Job Posting Intensity of 10-to-1. This is higher than the Job Posting Intensity for all other occupations and companies in the region (4-to-1), indicating other employers/companies may be trying harder to hire for this occupation. The median posting

duration was 32 days, the same as the median posting duration for all occupations in Los Angeles County.

Approximately 1/4th of the workforce is nearing or are at retirement age therefore it is not likely large numbers of new hires will result from retirements in the near-term future²².

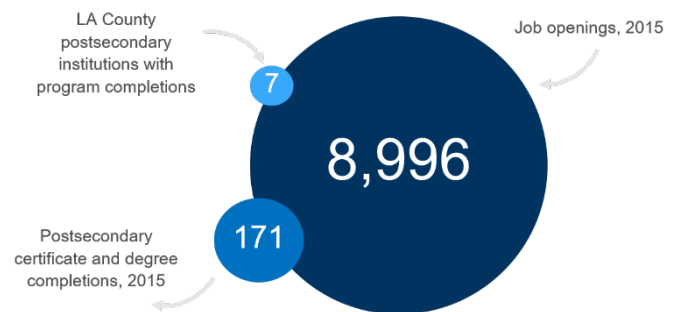
Education and Training for Transit Security Officers

Transportation Security and Security Guard/Services Programs and Completions

Eight postsecondary providers of transportation security and security guard/services certificate and degree programs had program completers in the past 14 years. Seven, collectively, had 171 program completions to fill the 8,996 job openings in 2015.

Figure 34

Transit Security Officer Demand and Supply



Source: Economic Modeling Specialists (EMSI) Inc..

Of the credentials awarded in 2015, nearly all (99.4%) were certificates from programs less than one academic year in duration (a total of 170 certificates). The one remaining credential completed was an Associate degree (refer to Table 27).

Table 27

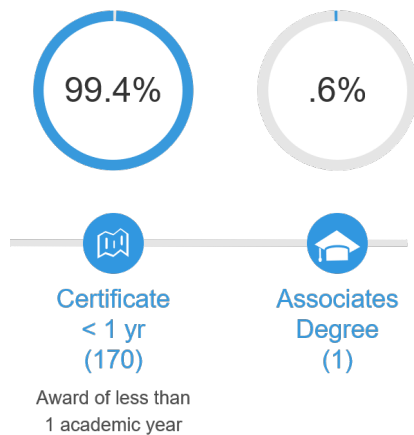
Transportation Security and Security Guard/Services Program Completions, by Award Level, 2015

Award Level	Completions	Percent
Award of less than 1 academic year	170	99.4
Associates degree	1	.6
Total	171	100%

Source: Economic Modeling Specialists (EMSI) Inc.

²² Economic Modeling Specialists, Inc. Occupation Overview Report. Report run April 4, 2018.

Figure 35
Transportation Security and Security Guard/Services Postsecondary Awards, 2015



Postsecondary education and training institutions with transportation security and security guard/services credential completions in 2015, and the number of certificates and degrees each awarded, are provided in Table 28.

Table 28
Transportation Security and Security Guard/Services Program Completions, by Institution, 2015

Institution	Certificates	Degrees	Total Completions
Citrus College	2	1	3
East Los Angeles College	19	0	19
UEI College-Huntington Park	54	0	54
UEI College-Gardena	46	0	46
UEI College-El Monte	30	0	30
ICDC College	10	0	0
UEI College-Encino	9	0	0

Community College Transportation Security and Security Guard/Services Programs

According to the California Community College Chancellor's Office Curriculum Inventory and a recent survey of Los Angeles County community colleges, there are 2 community colleges in the region with 4 active transportation security and security guard/services certificate and degree programs categorized as follows:

- Associate of Arts Degree (AA): 1
- Associate of Science Degree (AS): 1
- Certificate 12 < 18 units: 2

The breakdown of community college programs, by duration, are depicted in Figure 36.

Programs offered by each community college, and total number of units for certificate programs, are depicted in Table 29.

Figure 36
Community College Transportation Security and Security Guard/Services Credential Programs

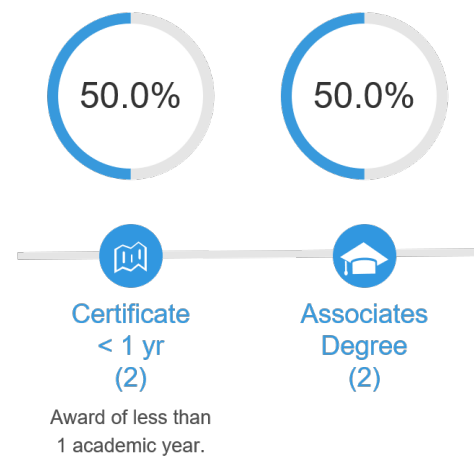


Table 29
Community College Certificate and Degree Programs in Transportation Security and Security Guard/Services

College	Program	Degrees		Certificates	
		AA	AS	<18 sem units	18> sem units
Cerritos College	• Security Management	X			21
Citrus College	• Emergency Management and Homeland Security		X	15	

Sources: California Community College Chancellor's Office, March 2018, Survey of Los Angeles County Community Colleges, Spring 2018.

Additionally, there are many community colleges in Los Angeles County that, collectively, offer a full range of 56 certificate and degree programs in Administration of Justice (e.g., corrections, law, forensic crime scene investigation, peace officer/patrol, etc.). These colleges are: Antelope Valley College, Cerritos College, Citrus College, College of the Canyons, East Los Angeles College, El Camino College, Glendale College, Long Beach City College, Los Angeles City College, Los Angeles Harbor College, Los Angeles Mission College,

Los Angeles Southwest College, Los Angeles Trade-Technical College, Mt. San Antonio College, Pasadena City College, Pierce College, Rio Hondo College, and West Los Angeles College.

Long Beach City College and Los Angeles Southwest College are developing new programs that have been submitted to the Chancellor's office.

Other Security Guard/Services Training Programs

Additionally, several Occupational Centers offer security guard/security services training programs in Los Angeles County (refer to Table 30). Information on the duration of these programs is not available.

Table 30

Security Guard/Security Services Training Programs

Training Provider	Program Name
Abram Friedman Occupational Center	• Security Guard Trainee
East Los Angeles Skill Center	• Security Guard Trainee
East San Gabriel Valley Regional Occupational Program	• Security Officer Training
La Puente Valley ROP	• Public Safety Academy

APPENDIX A: LOS ANGELES COUNTY OVERVIEW

Population and Urbanization

Population Density

Los Angeles County covers 4,084 square miles²³ and is one of the most populated counties in the United States--home to a little more than 10 million residents²⁴--and is projected to grow by nearly 550,000 new residents by 2030²⁵. It was the first county in the nation to reach 10 million residents and if it were a state, it would be the seventh most populated state in the U.S.

Located in the southwest portion of California, the county contains 3 urbanized areas (UZAs) as designated by the United States Census Bureau (refer to Table 31).

Table 31
Urbanized Areas (UZA), Los Angeles County, CA

Lancaster-Palmdale
Los Angeles-Long Beach-Anaheim (Los Angeles and Orange Counties)
Santa Clarita

The Los Angeles-Long Beach-Anaheim UZA, with nearly 7,000 people per square mile, is the nation's most densely populated urbanized area²⁶.

There are 88 incorporated cities in the county ranging in size from Vernon (population 123) to Los Angeles (population 4 million)²⁷.

Demographics

Multi-Ethnicity

The diverse, multiethnic population of Los Angeles County distinguishes it as the cultural hub of the Pacific Rim. More than 1/3rd of the residents (34.50%) are foreign born²⁸. In the City of Los Angeles alone, people from more than 140 countries speak 224 different identified languages²³.

²³ LAcounty.gov

²⁴ Economic Modeling Specialists, Inc. Demographic Overview of Los Angeles County Report. Data run April 3, 2018.

²⁵ Demographic Research Unit, California Department of Finance. 2017. County Population Projections (2010-2060).

²⁶ U.S. Census Bureau. 2012. Growth in Urban Population Outpaces Rest of Nation, Census Bureau Reports.

Figure 37
Counties in California Map



The county does not have a majority ethnicity. Most residents, 47.7%, are Hispanic and the remainder are 27.8% White, 13.7% Asian, 8.7% Black, .7% American Indian, and .3% Pacific Islander²⁴.

Low-Income Population

Recent and continued housing market instability and the recessions of the 2000s has resulted in increased poverty in the region. The rate of poverty has grown as a percentage of total population and by its geographic dispersion. The California Poverty Measure²⁹ reveals the average poverty rate between 2012 and 2014 for Los Angeles County was 25.6 percent, the highest rate among California counties³⁰. More recently, the improving economy is helping poverty rates fall. For example, the

²⁷ Discoverlosangeles.com

²⁸ U.S. Census Bureau, American Community Survey. 2012.

²⁹ The California Poverty Measure is a more comprehensive measure of poverty that incorporates the state's high—and variable—cost of living and the effect of social safety net programs.

³⁰ Bohn, S., Danielson, C., Levin, M., Mattingly, M., & Wimer, C. (October, 2013). *The California Poverty Measure: A new look at the social safety net*.

individual poverty rate in Los Angeles County is now at 16.6 percent, a decrease of 2.5 percent since 2012. But even with these recent decreases, inflation-adjusted household incomes are still six percent below where they were in 1990³¹. And the concentration of poverty in the Los Angeles-Long Beach-Anaheim, CA MSA has increased since 2000 (as measured by the share of poor residing in tracts with poverty rates of 20 and/or 40 percent or more)³². Moreover, poverty rates are projected to grow.

Low-income households tend to have less access to vehicles and, overall, higher public transportation needs. This condition is illustrated by *The Los Angeles Equity Atlas Framework*³³, a study conducted by the California Community Foundation and Reconnecting America. The study found that nearly 90 percent of transit commuters in Los Angeles County had incomes under \$50,000 and 70 percent had incomes below \$25,000. Of households with incomes under \$25,000 who live near frequent transit, 31 percent take it to work, versus 13 percent of workers in households earning between \$25,000 and \$50,000. These lower-income workers also make up 71 percent of the commute-to-work trips on the existing transit system.

Aging Population

The number of residents over 65 will grow by 58 percent and comprise 20 percent of the total county population by 2030 and will comprise 25 percent by 2040. Those over 85 will comprise a 5 percent share of residents in 2040³.

Many of these residents will likely need mobility assistance, greatly increasing the capacity requirements of the transit and demand response transportation network in the region.

Zero-Vehicle Households

While the region has a notorious reputation for its auto-centricity, the Los Angeles-Long Beach-Santa Ana Metropolitan Statistical Area (MSA) has the third largest number of zero-vehicle households in the U.S., behind New York-Northern New Jersey-Long Island NY-NJ-PA and Chicago-Naperville-Joliet IL-IN-WI. The 358,705 zero car households in the MSA (10% of households in Los Angeles County) represent nearly 5 percent of the national total and are nearly as much as the combined total of the San Francisco-Oakland-Fremont CA and Washington-Arlington-Alexandria DC-VA-MD-MV MSAs³⁴. The

majority of zero car households are low income (68.2%). Data on job access for zero-vehicle households—that is the share of jobs accessible, on average, within 90 minutes via transit, also indicates high transit demand. The Los Angeles-Long Beach-Santa Ana MSA ranks 52 (out of 100) in job access for zero-vehicle households where 36.0% of MSA residents and 44.9% of residents living within the urban core have access. By comparison, Los Angeles-Long Beach-Anaheim MSA public transportation commuters spend an average of 50.2 minutes traveling to work. It takes those who drive alone 27.9 minutes³⁵.

Report prepared on behalf of the Public Policy Institute of California in collaboration with the Stanford Center on Poverty and Inequality.

³¹ 2015 American Community Survey 1-year estimates.

³² Kneebone, E., & Holmes, N. (March, 2016). *U.S. concentrated poverty in the wake of the Great Recession*. Brookings Institute. Downloaded from <https://www.brookings.edu/research/u-s-concentrated-poverty-in-the-wake-of-the-great-recession/>.

³³ Report is available for download at <http://reconnectingamerica.org/laequityatlas/index.php>.

³⁴ Adie Tomer, (2011). *Transit access and zero vehicle households*. Report prepared on behalf of the Brookings Institution as part of the Metropolitan Infrastructure Initiative Series and Metropolitan Opportunity Series.

³⁵ Governing. Average Commute Times for Metro Areas. <http://www.governing.com/gov-data/transportation-infrastructure/commute-time-averages-drive-public-transportation-bus-rail-by-metro-area.html>

APPENDIX B: LOS ANGELES COUNTY TRANSPORTATION OVERVIEW

Transit Agencies, Establishments, and Transit Use

Los Angeles County has an extensive and complex transit network comprised of numerous agencies who operate fixed-route local and express bus; bus rapid transit; community circulators; demand response; and commuter, light, and heavy rail³⁶. Los Angeles Metropolitan Transportation Authority (Metro) is the third largest transit agency nationally, when ranked by number of passenger trips, and the fourth largest in terms of passenger miles. In 2014, there were 479,654 passenger trips taken and 2,339,177 passenger miles logged on Metro. In addition, the City of Los Angeles Department of Transportation (LADOT), and the Southern County Regional Rail Authority (Metrolink) also make the list of the 50 largest transit agencies, when ranked by passenger trips and/or passenger miles in 2014³⁷.

Taking a look at bus agencies in urbanized areas in the region, Metro ranks second in the nation both in terms of passenger trips and miles. Rounding out the list of the 50 largest bus agencies in urbanized areas in the nation are Long Beach Transit, LADOT, Santa Monica's Big Blue Bus, and Foothill Transit³⁸. Metro also ranks third in passenger trips and first in passenger miles among national urbanized areas for bus rapid transit³⁹. And the LADOT ranks 12th in passenger trips and 21st in passenger miles among commuter bus agencies⁴⁰.

Table 32 illustrates how agencies that make up the Los Angeles County transit network, rank nationally compared to other transit agencies in the American Public Transportation Association's *2016 Public Transportation Fact Book*.

APTA Ranking Category	Regional Transit Agency	Unlinked Passenger Trips Rank	Passenger Miles Rank
50 Largest Transit Agencies	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	3	4
	Long Beach Transit (LBT)	45	34
	City of Los Angeles Department of Transportation (LADOT)	50	
	Southern California Regional Rail Authority (Metrolink)		21
50 Largest Bus Agencies in Urbanized Areas	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	2	2
	Long Beach Transit (LBT)	35	43
	City of Los Angeles Department of Transportation (LADOT)	40	
	Santa Monica's Big Blue Bus	47	
	Foothill Transit		38
Bus Rapid Transit Agencies in Urbanized Areas	Los Angeles County Metropolitan Transportation Authority (LACMTA)	3	1
30 Largest Commuter Bus Agencies in Urbanized Areas	City of Los Angeles Department of Transportation (LADOT)	12	21
50 Largest Demand Response Agencies in Urbanized Areas	Access Services	3	2
	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro) – Small Operators	22	
Light Rail and Street Car Agencies	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	2	1
Heavy Rail Agencies	Los Angeles County Metropolitan Transportation Authority (LACMTA, Metro)	9	9

Source: American Public Transportation Association, 2016 Public Transportation Fact Book.

³⁶ Descriptions/definitions of these transportation modes are provided in Appendix G.

³⁷ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 3: 50 Largest Transit Agencies Ranked by Unlinked Passenger Trips and Passenger Miles.

³⁸ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 30: 50 Largest Bus Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

³⁹ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 31: Bus Rapid Transit Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

⁴⁰ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 32: Largest Commuter Bus Agencies in Urbanized Areas Ranked by Unlinked Passenger Trips and Passenger Miles.

In addition, Metro ranks first, nationally among the 30 largest vanpool agencies, eighth (in terms of passenger trips) and seventh (in terms of passenger miles) among commuter and hybrid rail agencies⁴¹.

Transit use provides numerous benefits to the region's transportation system through investment, business growth, reduced traffic congestion, travel and vehicle ownership cost savings, and air pollution emissions reductions. APTA estimates that for every billion dollars invested in transit (as of 2014) the total, long-term economic impact is \$3.7 billion. Also, slightly more than 50,000 jobs are created by the direct purchasing power of transit agencies and also by the spending power of the employees of transit agencies⁴². Given the size of Los Angeles County transit agencies, the economic impact of these industries in the region is significant.



Los Angeles County Transit Network Overview

Most of the population of Los Angeles County is located in the south and southwest, with major population centers in the Los Angeles Basin, San Fernando Valley, and San Gabriel Valley. Other population centers are found in the Santa Clarita Valley, Pomona Valley, Crescenta Valley, and Antelope Valley⁴³ (refer to Figure 38).

Figure 38
Los Angeles County, CA Map



Source: Los Angeles Economic Development Corporation.

Transit service in Los Angeles County can be categorized into three types of services/providers: Metro, Municipal Operators of Transit, and Specialized and Local Operators (refer to Figure 39).

Los Angeles County Metropolitan Transportation Authority (Metro)

Metro provides the majority of transit services in the county. Metro's service area includes portions of Los Angeles County south of the Angeles National Forest. Metro operates multiple transit modes including light rail, heavy rail, bus rapid transit, and fixed route bus services. Where there are local operators, Metro operates trunk routes and serves long distance markets. Metro also funds Metrolink service (described later in this Appendix) in Los Angeles County.

Metro's network of bus lines, rail and busways, fleets, and stations is extensive. Metro operates 2,438 buses on 170 routes covering 1,433 square miles with 15,967 stops. Metro also leases another 185 buses to contractors who provide service on Metro routes.

⁴¹ American Public Transportation Association. (February, 2017). *2016 public transportation fact book: 67th edition*. Table 37: Commuter Rail and Hybrid Rail Agencies Ranked by Unlinked Passenger Trips and Passenger Miles.

⁴² American Public Transportation Association (2014). *Economic impact of public transportation investment. 2014 update*.

⁴³ Wikipedia-https://en.wikipedia.org/wiki/Los_Angeles_County,_California

Table 33
Los Angeles County Metropolitan Transportation Authority Bus Service

Bus Stops	15,967
Square Miles in Service Area	1,433
Number of Bus Routes	170
Total Bus Fleet	2,438
Buses Leased to Contractors	185

LA Metro Facts at a Glance: <https://www.metro.net/news/facts-glance/>.
Last updated 11/18/2016.

Metro's rail service consists of 6 rail lines (4 light rail and 2 subway) covering 105 miles of service and including 93 stations.

Table 34
Los Angeles County Metropolitan Transportation Authority Rail Service

Stations	93
Miles of Service	105
Number of Lines	4 Light Rail, 2 Subway

LA Metro Facts at a Glance: <https://www.metro.net/news/facts-glance/>.
Last updated 11/18/2016.

Metro's rail and busways began operation in 1990 (Metro Blue Line) and expanded operation as recently as 2016 (Santa Monica extension of the Metro Expo Line).

Table 35
Los Angeles County Metropolitan Transportation Authority Rail and Busways

Rail Line	Opened	Miles	Type	Stations
Metro Blue Line	1990	22	Light Rail	22
Metro Red/Purple Lines	1993 McArthur Park 1993, Wilshire/Western 1996, Hollywood 1999, North Hollywood 2000	17.4	Subway/Subway	16
Metro Green Line	1995	20	Light Rail	14
Metro Gold Line	2003, Eastside Extension 2009, Azusa Extension 2016	31	Light Rail	27
Metro Orange Line	2005 Canoga Park to Chatsworth Extension 2012	18	Busway	18
Metro Expo Line	2012 Santa Monica Extension 2016	15.1	Light Rail	19

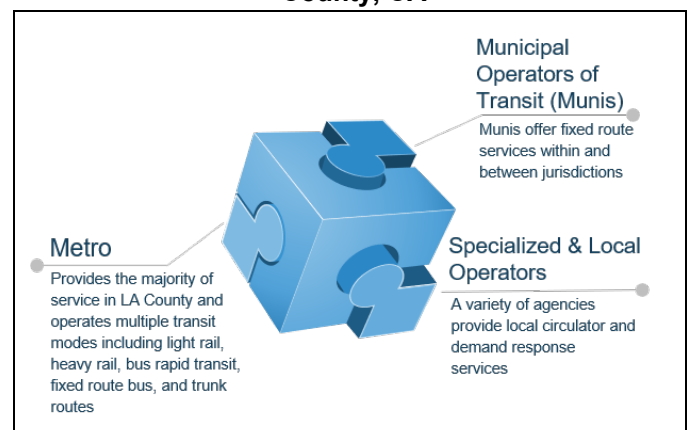
LA Metro Facts at a Glance: <https://www.metro.net/news/facts-glance/>.
Last updated 11/18/2016.

Metro is expanding its services/lines as it is currently undergoing major construction projects including: Crenshaw/LAX, the Purple line expansion, and the Regional Connector to name a few.

Municipal Operators of Transit

Referred to as "Munis", Municipal Operators of Transit offer fixed route services between jurisdictions, though their service areas tend to be centered around the jurisdiction that owns them. In most cases, these operators provide the bulk of local trips within their service area while Metro service is overlaid to support longer distance trips. Some of the Munis have smaller service areas, such as Beach Cities or Culver City Transit. Others, including Long Beach Transit, and Foothill Transit, have very large service areas.

Figure 39
Categories of Transit Services in Los Angeles County, CA



Antelope Valley Transit Authority (AVTA) is the sole provider of fixed route bus service in the Lancaster-Palmdale UZA. Table 36 illustrates the municipal operators, and their respective service areas, in Los Angeles County.

Table 36
Municipal Transit Operators, Los Angeles County, CA

Agency	Service Area
Arcadia Transit	City of Arcadia
Antelope Valley Transit Authority	Lancaster-Palmdale UZA
Beach Cities Transit	Western Southbay Subregion
Claremont Dial-a-Ride	Pomona Valley
Commerce Municipal Bus Lines	City of Commerce and Surrounding Communities
Culver City Municipal Bus Lines	City of Culver City and Surrounding Communities
Foothill Transit	San Gabriel Valley Subregion

Table 36
Municipal Transit Operators, Los Angeles County, CA

Agency	Service Area
Gardena Municipal Bus Lines	Northern Gateway Cities, Near City of La Mirada
Los Angeles Department of Transportation	City of Los Angeles
La Mirada Transit	Northern Gateway Cities Near City of La Mirada
Long Beach Transit	Southern Gateway Cities
Montebello Bus Lines	Northwestern Gateway Cities
Norwalk Transit System	Eastern Gateway Cities
Santa Clara Transit	Santa Clarita UZA
Santa Monica's Big Blue Bus	Cities of Santa Monica, Culver City, and Los Angeles (Westside Cities Region)
Torrance Transit System	Southern South Bay Cities

Specialized and Local Operators

Local circulator and demand response services are provided by a variety of transit agencies throughout Los Angeles County. Access Services of Los Angeles, Incorporated (ASI) is the largest provider of Americans with Disabilities Act (ADA) paratransit trips in the county and provides some or all complimentary ADA paratransit service for Metro and various municipal bus operators. Pomona Valley Transit Authority provides demand response service in eastern Los Angeles County. More localized providers, referred to as “local operators”, are typically municipally-owned and provide demand response or circulator services within jurisdictional boundaries.

Metrolink

Metro, in cooperation with the California Regional Rail Authority (SCRRA), operates commuter rail service under the Metrolink brand at a regional scale crossing multiple counties. Metrolink operates 165 daily trains on seven different lines over 536 route miles. The lines that serve Los Angeles County are the Antelope Valley Line, connecting Los Angeles to Palmdale and Lancaster in the Antelope Valley; the Orange County Line, operating between Los Angeles and Oceanside through Orange County; the Riverside Line from Los Angeles to downtown Riverside; the San Bernardino Line, between Los Angeles and the City of San Bernardino; the Ventura County Line, operating between Los Angeles and East Ventura via the San Fernando Valley; and the 91 Line, operating between downtown Los Angeles to downtown Riverside via Fullerton and along State Route 91.



Planning for the Future

Metro is the designated transit district by the State of California for Los Angeles County. Metro's Commission plays an important role in establishing the vision for public transportation; apportioning local, state, and federal transit funds; and selecting transit projects.

Metro continues to work on updating the *Long-Range Transportation Plan* (LRTP) that was last adopted in 2009. The LRTP is a focused, ten-year plan that guides actions through 2024 and lays out a 30-year vision for addressing growth and traffic including doubling rail vehicle revenue miles by 2024. The 2009 LRTP is available for download at <https://www.metro.net/projects/reports/>. In addition, the *2016-2019 Coordinated Public Transit-Human Services Transportation Plan* for Los Angeles County outlines results from an assessment of transportation services and needs of target populations; strategies, activities, and projects to address identified gaps based on the assessments; and priorities for implementation. The report is available for download at https://media.metro.net/projects_studies/fta5310/images/2016-2019_coordinated_plan_072015.pdf.

Measure M

Arguably most significantly for the near- and long-term future of transit in Los Angeles County was the passage of Measure M, also referred to as the *Los Angeles County Traffic Improvement Plan*, in November 2016. Approved was a ½ cent sales tax and the continuance of an existing ½ cent traffic relief tax (until voters decide to end it) that supports multiple and significant transit projects. Measure M generates roughly \$860 million a year to fund major transportation projects including rail connectors, rail line and subway extensions, express bus extensions, and transit corridors⁴⁴.

⁴⁴ Los Angeles County Metropolitan Transportation Authority. 2016. Measure M: the Los Angeles County traffic improvement plan information

guide. Downloaded from http://theplan.metro.net/wp-content/uploads/2016/10/factsheet_measurem.pdf

In forty years, the tax revenue from Measure M is expected to fund \$120 billion in highway and transit projects⁴⁵. The tax is also expected to fuel over 778,000 jobs in the Los Angeles area and \$79.3 billion in economic output⁴⁶.

According to *Measure M: The Los Angeles County Traffic Improvement Plan Information Guide*, the goals are to:

- Ease traffic congestion, improve freeway traffic flow, and reduce bottlenecks.
- Expand rail and rapid transit system; accelerate rail construction and build new rail lines; enhance local, regional, and express bus service; and improve system connectivity.
- Repave local streets, repair potholes, and synchronize signals; improve neighborhood streets and intersections; and enhance bike and pedestrian connections.
- Make public transportation more accessible, convenient, and affordable for seniors, students, and the disabled and provide better mobility options for our aging population.
- Earthquake-retrofit bridges and keep the transit and highway system safe and in good working condition.
- Embrace technology and innovation; incorporate modern technology, new advancements, and emerging innovations into the local transportation system.
- Create jobs, reduce pollution, and generate local economic benefits; increase personal quality time and overall quality of life.
- Provide accountability and transparency; protect and monitor the public's investments through independent audits and oversight.

More information on Measure M is available at:

<http://theplan.metro.net/>.

⁴⁵ [Measure M: Metro's Plan to Transform Transportation in LA](#). *The Plan*.

⁴⁶ Los Angeles County Metropolitan Transportation Authority. Next Stop: Boomtown. https://www.metro.net/projects/main_page/boomtown/

APPENDIX C: CAREER PATHWAY OCCUPATION PROFILES



Bus Mechanic

Bus Mechanics diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engine. Bus Mechanics work on a vehicle's electrical system, make major engine repairs, or retrofit engines with emission control systems to comply with pollution regulations. Other, common job titles related to this occupation are: Mechanic, Diesel Mechanic, Diesel Technician, Fleet Mechanic, General Repair Mechanic, Service Technician, and Transit Mechanic.

Bus Mechanics typically have the following duties.

- Plan work procedures, using technical charts and manuals
- Read and interpret diagnostic test results and perform basic diagnosis of malfunctions, determine the probable cause, and recommend necessary remedial action
- Repair or remove and replace dysfunctional components of major systems including, but not limited to, engine, electrical, suspension, fueling, pneumatic and hydraulic systems
- Tune engines
- Perform regular preventive maintenance inspections and repair problems; following checklists to ensure that all critical parts are examined
- Perform acceptance testing and pre-service preparations to newly acquired vehicles
- Repair minor damage to interior or exterior of vehicles including, but not limited to, torn seats, broken windows and windshields, minor dents, and cosmetic paint damage
- Disassemble, clean, inspect, and rebuild engine systems and their mechanical and electrical components
- Respond to road failure situations
- Test-drive vehicles to ensure they run smoothly

The typical work experience and education requirements for Bus Mechanics at transit agencies and companies is 2-years-experience as a heavy equipment or automotive mechanic. Completion of a 2-year degree or training in automotive technology or heavy-duty truck maintenance and repair from an accredited trade or vocation school or 1-year full-time education/training and 1-year experience as a heavy equipment or automotive mechanic may substitute for experience. A high school diploma, GED, or equivalent is required.

Bus Mechanics may be required to obtain a Class A-P Permit or Class C, Commercial, or Class A-P driver's license. Requirements for these licenses are the same as those that are described for the Bus Operator occupation elsewhere in this report.

Some employers require Bus Mechanics to pass a criminal, background check; meet physical requirements (e.g., lifting, pushing, and pulling specified weight amounts, bending, etc.); and have normal color vision. And some employers may require individuals to provide their own tools.

Industry certifications may be required or are often highly desirable. They may also enable individuals to receive additional compensation. Transit employers most commonly recognize current and verifiable Automotive Service Excellence (ASE) certifications for this purpose. They typically recognize the ASE Transit Bus Certifications (H Series)--most notably the H1-CNG, H3-Drive Train, H4-Brakes, H5-Suspension/Steering, and H6-Electrical/Electronics certifications. Other ASE certification series recognized by transit employers are the Truck Equipment Certifications (E Series), the Alternate Fuels Certifications (F Series), and the Electronic Diesel Engine Diagnosis Specialist Certifications (L2 Series). More information on ASE certifications is available at www.ase.com.

Bus Mechanics must be available to work various shifts on weekdays, weekends, evenings, and holidays and must be able to respond to emergencies 24 hours a day, 7 days per week.

This occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.



Bus Operator

Bus Operators drive buses typically on regular route operations. They may assist passengers boarding the bus and collect fares or monitor passes.

Other, common job titles related to this occupation are: Bus Driver, Transit Bus Driver, Transit Coach Operator, Transit Operator.

Bus Operators typically have the following duties in transit companies or agencies.

- Memorize routes, transfer points, and fare structures
- Perform inspection of bus or carriage, safety-check equipment, and inform mechanics when adjustments or repairs are necessary
- Refer to and implement route maps and time schedules
- Collect and count fares and issue transfer tickets
- Provide schedule, route, and fare information to passengers seeking assistance
- Operate wheelchair lifts and assist passengers with disabilities in boarding and riding in a safe manner, which may include pushing a wheelchair up and down the ramp
- Secure wheelchairs of passengers with disabilities and clearly communicate the action being taken
- Receive and transmit two-way radio messages
- Report hazardous or dangerous conditions along routes and at passenger loading zones including such hazards as unusual traffic, road conditions, obstructions, construction, and potential criminal activity
- Write reports and complete forms

The typical work experience required for this position is 6 months of working with the public or customer service experience. Because this position is considered hard-to-fill, some employers do not require any work experience. Nearly all transit employers provide training for Bus Operators. A high school diploma, GED, or equivalent is required.

Bus Operators must possess a valid driver's license for a specified period of time (typically 2 years or more) and must have a commercial driver's license (a California Class C, Commercial driver's license or ability to upgrade to a Class B license). This can sometimes be earned during an education/training program or during on-the-job training. There are specific medical requirements for the commercial driver's license including a Medical Examiner's Certificate signed by a health care professional. More

information on commercial driver license medical requirements in California are available at https://www.dmv.ca.gov/portal/dmv/detail/dl/driversafety/cdl_guidelines.

Additionally, there are other strict state and federal regulations for driving a commercial vehicle that require drivers to take specific steps in order to be eligible for a commercial driver's license. More information on commercial licenses and requirements is available through the California Department of Motor Vehicles (DMV) at <http://www.dmv.org/ca-california/apply-cdl.php>. Some employers also require Bus Drivers to be able to obtain a B-P Permit prior to an offer of employment and a B-P License before completion of training.

A Bus Operator must also possess a clean driving record (e.g., free of driving violations/points, DUIs, suspensions) such as no more than three 1-point violations; no 2-point violations; and/or no DUIs, reckless driving violations, or active license suspensions for a specified period-of-time (typically three- to five-years)). In California, the driving record is verified via an H-6 DMV printout.

Bus Operators are also likely to be required to pass a background check. They also must meet physical (e.g., lifting, pushing, and pulling specified weight amounts; bending, etc.); hearing; vision; language; and age (typically 21 years of age) requirements.

Bus Operators must be available to work various shifts on weekdays, weekends, evenings, and holidays.

The Bus Operator occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.



Custodian

Custodians keep buildings in clean and orderly condition; perform heavy cleaning duties such as cleaning floors, shampooing rugs, washing walls and glass; and removing rubbish. Other duties may include performing routine maintenance activities and notifying management of need for repairs⁴⁷. Other, common job titles related to this occupation are: Building Custodian, Heavy Duty Custodian, Custodial Worker, Institutional Custodian, and Building Services Technician.

Custodians typically have the following duties in transit companies and agencies.

- Operate vacuum cleaners and shampooing machines to clean carpets
- Sweep and mop and scrub hallways and stairs
- Clean, mop, and strip floors--operate buffing machines to wax floors
- Lift, move, and empty trash and garbage containers; replace discarded plastic bags with new bags
- Clean walls, windows, and ceilings
- Dust office furnishings
- Clean and sanitize bathrooms including removing graffiti from bathroom walls using heavy-duty chemical cleansers
- Stock bathrooms with supplies
- Clean and maintain tools and equipment used
- Lift, move, and replace emptied bottles of water with full bottles
- Clean spills and other hazards with appropriate equipment
- Move office furniture and other equipment and supplies between or within facilities
- Notify management of need for repairs
- Order cleaning supplies
- Operate vehicles to transport equipment and supplies to various locations
- Lock doors to secure buildings
- Utilize and dispose of cleaning supplies and materials in a safe manner and according to state and federal regulations

In addition to keeping the inside of buildings clean and orderly, some custodians work outdoors cleaning areas

surrounding buildings and may operate forklifts to move trash or supplies, as required.

The typical work experience for Custodians at transit agencies and companies is 1-year full-time, equivalent work. In some cases, training may substitute for all or some work experience. A high school diploma, GED, or equivalent is required.

Individuals in this occupation may be required to have a valid California Driver's license.

Other requirements may include passing a background check and physical requirements (e.g., lifting, pushing, and pulling specified weight amounts; standing, walking, bending, etc.).

Custodians must be available to work various shifts on weekdays, weekends, evenings, and holidays.

⁴⁷ ONet Online. Summary Report for 437-2011.00-- Janitors and Cleaners, Except Maids and Housekeeping Cleaners. On the internet at

<https://www.onetonline.org/link/summary/37-2011.00>. Downloaded April 5, 2018.



Electronic Communication Technician

Individuals in the Electronic Communication Technician occupation install, adjust, or maintain mobile

electronics communication equipment, including sound, sonar, security, navigation, and surveillance systems⁴⁸. These installers and repairers work with a range of complex electronic equipment, including digital audio and video players, navigation systems, and passive and active security systems. Other, common job titles related to this occupation in the transit industry are: Radio Technician, Transit Electrician, Electronics Mechanic, Electronic Technician, and Electronic Bench Technician.

The Electronic Communication Technician position typically has the following duties in a transit company or agency.

- Perform field service maintenance on two-way radio, headsign, public address, digital video, and silent alarm system on coaches and other vehicles
- Inspect and test electrical systems and equipment to locate and diagnose malfunctions, using visual inspections, testing devices, and computer software, and other automatic test equipment
- Perform bench repairs to circuit boards on the component level of electronic communication equipment including, but not limited to, mobile radios, digital video recorders, control heads, handsets, headsign modules, power supplies, encoder boxes, microphones, and amplifiers
- Install electronic communication and other electronic equipment, including fareboxes, electrical cables, or power sources as required on coaches and other vehicles
- Repair and maintain electronic fare collection equipment
- Locate and remove or repair circuit defects such as blown fuses or malfunctioning transistors
- Perform preventive and remedial maintenance on modules and assemblies
- Prepare routine records and narrative reports of maintenance activity

Modern transit systems use a large amount of electrical and electronics equipment and Electronic Communication

Technicians fix and maintain these complex pieces of equipment. Because automated electronic control systems are becoming more complex, repairers use software programs and testing equipment to diagnose malfunctions⁴⁹.

The typical education and work experience requirements for Electronic Communication Technicians at transit agencies and companies is a 2-year credential from an accredited electronics trade school or college or 3 years' related experience. A high school diploma, GED, or equivalent is required.

Individuals in this occupation typically must have a valid commercial General Radiotelephone Operator License issued by the Federal Communication Commission (FCC). To qualify for this license, individuals must be a legal resident of (or otherwise eligible for employment in) the United States; be able to receive and transmit spoken messages in English; and pass a written and/or telegraphy examination(s). For more information visit the FCC Commercial Radio Operator License Program website at: <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/commercial-radio-operator-license-program>.

Individuals in this occupation may be required to have a valid California Driver's license.

Some employers have additional requirements such as passing a criminal, background check; physical capabilities (e.g., lifting, pushing, and pulling specified weight amounts; bending, etc.); normal color vision; and the ability to qualify for surety bonding. And some employers may require individuals to provide their own tools.

Electronic Communication Technicians must be available to work various shifts on weekdays, weekends, evenings, and holidays and must be able to respond to emergencies 24 hours a day, 7 days per week. These emergencies may occur offsite so working in outdoor conditions is required.

This occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.

⁴⁸ ONet Online. Summary Report for 49-209300 – Electrical and Electronics Installers and Repairers, Transportation Equipment. On the internet at <https://www.onetonline.org/link/summary/49-2093.00>. Downloaded April 5, 2018.

⁴⁹ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Electrical and Electronics Installers and Repairers, On the Internet at <https://www.bls.gov/ooh/installation-maintenance-and-repair/electrical-and-electronics-installers-and-repairers.htm> (visited April 05, 2018).



Facilities System Technician

Individuals in the Facilities System Technician occupation performs work involving the skills of two or more

maintenance or craft occupations to keep the structure of an establishment in good repair. They also repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas⁵⁰. These individuals work with a range of complex electrical equipment--servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles. Other, common job titles related to this occupation are: Electrical and Instrument Mechanic, Electrical and Instrument Technician (E&I Tech), Electrical Maintenance Technician, Electrical Technician, Service Technician, Building Maintenance Mechanic, Maintenance Engineer, and Maintenance Technician.

Facilities System Technicians typically have the following duties in a transit company or agency.

- Install and maintain a wide range of electrical apparatus, including electrical circuits, switches, solenoids, control boards, motors, generators, yard lighting, and three-phase industrial systems up to 480 volts
- Test and measure voltage, current, and resistance using electrical test instruments
- Perform design, fabrication, and welding of a variety of parts and equipment
- Repair and maintain structural framing of walls, roofs, and stairs; repair jambs, drop ceilings, drywall, and partitions using basic tools of construction trades
- Troubleshoot mechanical and electrical problems using blueprints, specifications, and schematic diagrams
- Perform complex wiring, installation, and utilization of conduits
- Perform preventive and restorative maintenance of facilities equipment and electrical systems, including bus washer systems, fueling stations, and roll-up garage doors using basic tools of mechanical trade
- Troubleshoot and maintain systems with programmable logic and solid-state controllers,

including automated storage and retrieval systems, robotic equipment, and heavy equipment hoists

- Drive maintenance vehicles to various locations to repair and maintain facilities and equipment
- Prepare routine records and narrative reports of maintenance activity

The typical work experience and requirements for Facilities System Technicians at transit agencies and companies is 4-years. Completion of 2-years or more full-time training or education in Industrial Technology, Electrical Maintenance, or similar program at a recognized trade school or apprenticeship program may substitute for some experience (typically 1-year). A high school diploma, GED, or equivalent is required.

Individuals in this position may be required to have a valid California driver's license and obtain a Class A permit.

Some employers have additional requirements such as passing a criminal, background check; physical capabilities (e.g., lifting, pushing, and pulling specified weight amounts; bending, etc.), and normal color vision. And some employers may require individuals to provide their own tools.

Facilities System Technicians must be available to work various shifts on weekdays, weekends, evenings, and holidays and must be able to respond to emergencies 24 hours a day, 7 days per week. These emergencies may occur offsite so working in outdoor conditions is required. This work may also take place in tunnels and/or on bridges.

This occupation may also be considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.

⁵⁰ ONet Online. Summary Report for 49-9071.00 Maintenance and Repair Workers, General and for 49-2094.00 Electrical and Electronics Repairers, Commercial and Industrial Equipment. On the internet at

www.onetonline.org/link/summary/49-9071.00 and www.onetonline.org/link/summary/49-2094.00. Downloaded April 5, 2018.



Rail Electronic Communication Inspector

Rail Electronic Communication Inspectors inspect, test, maintain, and repair electronics equipment in

connection with the safe transport of cargo or people⁵¹ on trains and within rail/train facilities.

Rail Electronic Communication Inspectors typically have the following duties in a transit company or agency.

- Perform installation, inspection, testing, maintenance, and repair of advanced electronic equipment, including, but not limited to, public address equipment, voice and data communication, telephones, fiber optic, closed-circuit TV, security alarm, fire detection and suppression, T1 and T3 multiplex, digital microwave, and computer systems
- Review and interpret blueprints, schematics, and drawings
- Respond to equipment failure problems, determine cause, and restore equipment to service
- Monitor and oversee the work of contractors to ensure compliance with design and specifications
- Maintain records and prepare reports of inspection, testing, and repairs
- Perform electronics-related inspections on facilities

The typical work experience and education requirements for Rail Electronic Communication Inspectors at transit agencies and companies is 4-years of journey-level experience in preventive and remedial maintenance of communication equipment. Up to 2-years of full-time training or education in an electronics/electrical-related program at a recognized trade school or apprenticeship program may be substituted for equivalent experience. A high school diploma, GED, or equivalent is required.

Individuals in this occupation typically must have a valid commercial General Radiotelephone Operator License issued by the Federal Communication Commission (FCC). To qualify for this license, individuals must be a legal resident of (or otherwise eligible for employment in) the United States; be able to receive and transmit spoken messages in English; and pass a written and/or telegraphy examination(s). For more information visit the FCC

Commercial Radio Operator License Program website at: <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/commercial-radio-operator-license-program>.

Individuals in this occupation may be required to have a valid California Driver's license.

Some employers have additional requirements such as passing a criminal, background check; physical capabilities (e.g., lifting, pushing, and pulling specified weight amounts, bending, etc.); and normal color vision. And some employers may require individuals to provide their own tools.

This occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.

⁵¹ ONet Online. Summary Report for 53-6051.00 - Transportation Inspectors. On the internet at <https://www.onetonline.org/link/summary/53-6051.00>. Downloaded April 5, 2018.



Service Attendant

Individuals in the Service Attendant occupation service automobiles, buses, trucks, and other vehicles with fuel, lubricants, and accessories. They

lubricate vehicles, change motor oil, install antifreeze, or replace lights or other accessories, such as windshield wiper blades or fan belts. They also may repair or replace tires. Service Attendants additionally inspect, maintain, and repair vehicles, mostly cars and light-trucks⁵².

Another common job title related to this occupation in the transit industry is Transit Attendant.

Service Attendants in the transit industry typically have the following duties.

For transit buses they:

- Check fluid levels and dispense fuel, engine oil, and engine coolant
- Dispense fuels such as diesel, Compressed Natural Gas (CNG), or propane
- Record quantities of liquids dispensed
- Check tire pressure of vehicles and add air as needed
- Rotate and change vehicle tires as needed
- Notify fleet manager or supervisor of abnormal conditions such as excessive use of oils or coolant, air leaks, uneven braking or hard steering
- Drive buses through bus wash stations and around maintenance facility
- Align buses with vacuum system and air blow debris out of coaches
- Clean, sweep, mop, and remove graffiti from vehicle interiors
- Wash vehicle exteriors
- Park buses in designated areas of maintenance facility
- Remove and replace farebox vaults on buses returning from services and dump contents into safes
- Inspect and report torn seats, rotting floors, cracked windows, loose mirrors, worn or damaged tires, fluid leaks, improper or unusual odors, etc
- Perform periodic maintenance work on service equipment such as the bus washer

For transit cars and light-trucks they:

- Identify problems, often by using computerized diagnostic equipment
- Plan work procedures, using charts, technical manuals, and experience
- Test parts and systems to ensure that they work properly
- Follow checklists to ensure that all critical parts are examined
- Perform basic care and maintenance, including changing oil, checking fluid levels, and rotating tires
- Repair or replace worn parts
- Perform repairs to manufacturer and employer specifications
- Wash and clean vehicles
- Explain problems and repairs to fleet manager or supervisor⁵³

Typical work experience and education requirements for Service Attendants at transit agencies and companies is 1- to 2-years of experience and a high school diploma, GED, or equivalent. Education and training (usually full-time from an accredited school in automotive or truck maintenance) may substitute for experience.

Individuals in this occupation may be required to have a valid California Driver's license.

Some employers have additional requirements such as passing a criminal, background check and physical capabilities (e.g., lifting, pushing, and pulling specified weight amounts; bending, etc.). And some employers may require individuals to provide their own tools.

Industry certifications may be required or are often highly desirable. They may also enable individuals to receive additional compensation. Employers in transit industries mostly commonly recognize current and verifiable Automotive Service Excellence (ASE) certifications for this purpose. Transit employers typically recognize the ASE Automobile and Light Truck Certifications (A Series). Other ASE certification series recognized by transit employers are the F1- Compressed Natural Gas Vehicle (Alternative Fuels Certification), the G1 - Auto Maintenance and Light Repair, and the L3 – Light Duty Hybrid/Electric Vehicle Specialist certifications. More information on ASE certifications is available at www.ase.com.

⁵² ONet Online. Summary Report for 53-6031.00 – Automotive and Watercraft Service Attendants. On the internet at www.onetonline.org/link/summary/53-6031.00. Downloaded April 5, 2018.

⁵³ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Automotive Service Technicians and Mechanics,

on the Internet at <https://www.bls.gov/ooh/installation-maintenance-and-repair/automotive-service-technicians-and-mechanics.htm> (visited April 05, 2018).

Service Attendants must be available to work various shifts on weekdays, weekends, evenings, and holidays and must be able to respond to emergencies 24 hours a day, 7 days per week. These emergencies may occur offsite so working in outdoor conditions is required.

This occupation is also considered safety-sensitive and subject to drug and alcohol testing, including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.



Stock Clerk

Stock Clerks receive, store, and issue merchandise, materials, equipment, and other items from stockroom, warehouse, or storage yard to fill shelves, racks, tables, or orders⁵⁴. A Stock Clerk in a transit company or agency handles primarily vehicle parts and other transportation materials. Other, common job titles related to this occupation are: Stocker and Stockroom Clerk.

Stock Clerks typically have the following duties in transit companies and agencies.

- Issue uniforms, vehicle parts, and other materials upon request
- Pack and unpack items to be stocked on shelves in stockrooms
- Check orders received and store items in an orderly and accessible manner in tool rooms, supply rooms, or other storage areas/bins
- Examine and inspect stock items for wear or defects, reporting any damage to supervisors
- Mark stock items using identification tags, stamps, electric marking tools, or other labeling equipment
- Use computerized programs to access inventory control system to identify, retrieve, enter, or revise storeroom and warehouse data
- Conduct storeroom inventory to maintain adequate supply levels, may order supplies
- Operate forklift to move, load, and unload materials
- Respond to inquiries regarding status of requested materials and parts
- Clean and maintain work area
- Pick-up and deliver supplies to various locations
- Modify crates, pallets, or boxes to protect goods during safe storage or distribution
- Adjust pallet racking, shelving, or cabinets to maximize storage capacity

The typical work experience for Stock Clerks at transit agencies and companies is 1-year, full-time equivalent work. In some cases, training may substitute for all or some work experience. Experience in an automotive, mechanical parts counter support, or manufacturing environment may be required or is considered highly

desirable. A high school diploma, GED, or equivalent is required.

Individuals in this occupation may be required to have a valid California Driver's license. In addition, if job duties include operating a forklift, individuals will need to obtain the required permits to do so.

Some employers have physical capability requirements such as lifting, pushing, and pulling specified weight amounts; bending, etc.

⁵⁴ ONet Online. Summary Report for 43-5081.03 – Stock Clerks- Stockroom, Warehouse, or Storage Yard. On the internet at

<https://www.onetonline.org/link/summary/43-5081.03>. Downloaded April 5, 2018.



Systems Electronic Communication Technician

Systems Electronic Communication Technicians install communications equipment and wiring and service or repair telephone, television, Internet, and other communications equipment⁵⁵. Systems Electronic Communication Technicians at transit companies and agencies install, maintain, repair and modify advanced communications systems carrying voice, data, and video information.

Systems Electronic Communication Technicians in transit agencies and companies typically have the following duties.

- Install, maintain, troubleshoot, and repair advanced electronic equipment and systems, including, but not limited to, microwave systems, multiplex systems, data communications systems, radio base and repeater systems, fiber optic systems, computer-aided dispatch systems, automatic vehicle monitoring systems, alarm systems, and telephone systems
- Set up and operate audio and video equipment
- Install and maintain video cameras, video and audio tape recorders, public address systems, and related equipment
- Install network cabling in walls, ceilings and conduit; install patch panels, data plugs, jacks, and wall plates
- Program and operate manual and automated test equipment to aid in the troubleshooting and repair of electronic circuit boards and modules
- Test circuits and components of malfunctioning telecommunications equipment to isolate sources of malfunctions, using test meters, circuit diagrams, polarity probes, and other hand tools
- Test repaired, newly installed, or updated equipment to ensure that it functions properly and conforms to specifications, using test equipment and observation
- Perform bench repair of electronic equipment
- Suggest, design, and perform modifications to electronic communication equipment
- Create and update electronic-related drawings and other technical documentation
- Prepare routine records and narrative reports of maintenance activity

The typical work experience and education requirements for Systems Electronic Communication Technicians at transit agencies and companies is 4-years of journey-level experience in preventive and remedial maintenance of communication equipment. Up to 2-years of full-time training or education in an electronics/electrical-related program at a recognized trade school or apprenticeship program may substitute for equivalent experience. Certification in network cabling and/or network systems (LAN/WAN) is either required or often is considered highly desirable. A high school diploma, GED, or equivalent is required.

Individuals in this occupation typically must have a valid commercial General Radiotelephone Operator License issued by the Federal Communication Commission (FCC). To qualify for this license, individuals must be a legal resident of (or otherwise eligible for employment in) the United States; be able to receive and transmit spoken messages in English; and pass a written and/or telegraphy examination(s). For more information visit the FCC Commercial Radio Operator License Program website at: <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/commercial-radio-operator-license-program>.

Individuals in this occupation may be required to have a valid California Driver's license.

Some employers have additional requirements such as passing a criminal, background check; physical capabilities (e.g., lifting, bending, climbing, etc.); and normal color vision. And some employers may require individuals to provide their own tools.

⁵⁵ ONet Online. Summary Report for 49-2022.00 – Telecommunications Equipment Installers and Repairers. On the internet at

<https://www.onetonline.org/link/summary/49-2022.00>. Downloaded April 5, 2018.



Transit Security Officer

Individuals in Transit Security Officer occupations protect and police transit property, employees, or passengers.

Other, common job titles related to this occupation are: Transit Police Officer and Security Officer.

Transit Security Officers typically have the following duties in transit companies and agencies.

- Monitor transit areas and conduct security checks to protect transit properties, patrons, and employees
- Observe and report security and safety problems
- Direct security activities at derailments, fires, floods, or strikes involving transit property
- Direct passengers and visitors to desired locations
- Collaborate with law enforcement or security personnel who respond to incidents
- Keep written logs, write reports, and complete forms

The typical education and work experience requirements for Transit Security Officers is a high-school diploma, GED, or equivalent. One-year's related experience is preferred but not typically required.

Individuals in this occupation may be required to have a valid California Driver's license.

Some employers have additional requirements such as passing a criminal, background check; passing a psychological evaluation; physical capabilities (e.g., walking and standing, etc.); uncorrected vision and normal color vision; and ability to obtain a valid California Guard Card and Firearm Permit--both issued by the Department of Consumer Affairs.

To obtain a California Guard Card, individuals must be at least 18 years old, undergo a criminal background check through the Department of Justice and the Federal Bureau of Investigation, and complete Power to Arrest Training. More information on requirements, application, and training is available on the department's Bureau of Security and Investigative Services website at:

http://www.bsis.ca.gov/forms_pubs/guard_fact.shtml.

Information on the requirements and process for obtaining a Firearm Permit is available at:

http://www.bsis.ca.gov/forms_pubs/fire_fact.shtml.

Transit Security Officers must be available to work various shifts on weekdays, weekends, evenings, and holidays.

The Transit Security Officer occupation is also considered safety-sensitive and subject to drug and alcohol testing,

including random testing, under Federal Transportation Administration (FTA) drug and alcohol regulations.

APPENDIX D: WIN-LA CAREER PATHWAY OCCUPATIONS AND STANDARD OCCUPATION CLASSIFICATION CROSSWALK

Provided for each WIN-LA Career Pathway occupation is a brief position description, using Metro's position specifications and the equivalent Standard Occupation Classification (SOC) job classifications and SOC code using O*Net. Establishing positions' SOC codes enables the identification of postsecondary education and training programs that utilize these codes.

Position Description	Standard Occupation Classification and Description (P)primary, (S)econdary	
(Bus) Mechanic (C): Under close supervision, performs basic preventive and remedial diagnostics and troubleshooting, along with performing maintenance and repairs of transit and/or automotive vehicles, and assists other mechanics in more complex assignments.	P: Bus and Truck Mechanics and Diesel Engine Specialists SOC: 49-3031	Diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engines. Includes mechanics working primarily with automobile or marine diesel engines.
Bus Operator: Under close supervision, operates public transit buses, collects fares, transports passengers, and performs safety inspection of bus equipment.	P: Bus Drivers, Transit and Intercity SOC: 53-3021	Drive bus or motor coach, including regular route operations, charters, and private carriage. May assist passengers with baggage. May collect fares or tickets.
Custodian: Under moderate supervision, maintains Gateway Building, divisions, and stations in clean and orderly condition.	P: Janitors and Cleaners, Except Maids and Housekeeping Cleaners SOC: 37-2011	Keep buildings in clean and orderly condition. Perform heavy cleaning duties, such as cleaning floors, shampooing rugs, washing walls and glass, and removing rubbish. Duties may include tending furnace and boiler, performing routine maintenance activities, and notifying management of need for repairs.
Electronic Communication Technician: Under moderate supervision, installs, maintains, troubleshoots, and repair communications and electronic equipment used on buses and other vehicles.	P: Electrical and Electronics Installers and Repairers, Transportation Equipment SOC: 49-2093	Install, adjust, or maintain mobile electronics communication equipment, including sound, sonar, security, navigation, and surveillance systems on trains, watercraft, or other mobile equipment.
Facilities System Technician: Under moderate supervision, performs a variety of skilled and semi-skilled repairs, installation and maintenance procedures relating to mechanical and electrical components and systems of Metro's Bus & Rail facilities and Gateway Headquarters building.	P: Electrical and Electronics Repairers, Commercial and Industrial Equipment SOC: 49-2094	Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.
	S: Maintenance and Repair Workers, General SOC: 49-9071	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.
Rail Electronic Communication Inspector: Under moderate supervision, performs inspection, testing, installation, maintenance, and repair of electronic equipment on the right-of-way, public area, and other Metro locations.	P: Electrical and Electronics Repairers, Commercial and Industrial Equipment SOC: 49-2094	Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.
	S: Transportation Inspectors SOC: 53-6051	Inspect equipment or goods in connection with the safe transport of cargo or people. Includes rail transportation inspectors, such as freight inspectors; rail inspectors; and other inspectors of transportation vehicles.
Service Attendant: Under close supervision, performs unskilled servicing and cleaning of revenue and non-revenue equipment, including automobiles, buses, rail cars, and non-revenue rail equipment.	P: Automotive and Watercraft Service Attendants SOC: 53-6031	Service automobiles, buses, trucks, boats, and other automotive or marine vehicles with fuel, lubricants, and accessories. Collect payment for services and supplies. May lubricate vehicle, change motor oil, install antifreeze, or replace lights or other accessories, such as windshield wiper blades or fan belts. May repair or replace tires.
	S: Automotive Service Technicians and Mechanics SOC: 49-3023	Diagnose, adjust, repair, or overhaul automotive vehicles.
Stock Clerk: Under moderate supervision, receives, stores, monitors, orders, issues, and maintains computerized inventory records of vehicle parts and other materials.	P: Stock Clerks- Stockroom, Warehouse, or Storage Yard SOC: 43-5081.03	Receive, store, and issue sales floor merchandise, materials, equipment, and other items from stockroom, warehouse, or storage yard to fill shelves, racks, tables, or customers' orders.
Systems Electronic Communication Technician: Under moderate supervision; installs, maintains, repairs and modifies advanced communications systems carrying voice, data and video information.	P: Telecommunications Equipment Installers and Repairers SOC: 49-2022	Install, set-up, rearrange, or remove switching, distribution, routing, and dialing equipment used in central offices or headends. Service or repair telephone, cable television, Internet, and other communications equipment on customers' property. May install communications equipment or communications wiring in buildings.

Position Description	Standard Occupation Classification and Description (P)primary, (S)econdary	
Transit Security Officer I: Under moderate supervision, provides security for Metro employees and property.	P: Transit and Railroad Police SOC: 33-3052	Protect and police railroad and transit property, employees, or passengers.
	S: Security Guards SOC: 33-9032	Guard, patrol, or monitor premises to prevent theft, violence, or infractions of rules.

APPENDIX E: EMPLOYMENT REQUIREMENTS AND WORK CONDITIONS FOR WIN-LA OCCUPATIONS

Position requirements and work conditions for WIN-LA for career pathway occupations.

Typical and Additional Employment Requirements and Work Conditions	Bus Operator	Custodian	Electronic Communication Technician	Facilities System Technician	Rail Electronic Communication Inspector	Service Attendant	Stock Clerk	Systems Electronic Communication Technician	Transit Security Officer
TYPICAL REQUIREMENTS									
Work Experience (and/or Education)									
Up to 1-Year	X (6 mos.)					X			
1-Year		X							
1-Year and/or combination of education or training							X (including forklift operation)		
2-Years and/or combination of education or training									
3-Years and/or combination of education or training			X OR						
4-Years and/or combination of education or training				X	X OR			X (journey-level) AND	
Education (and/or Work Experience)									
High school diploma, GED, or equivalent	X	X	X	X	X	X	X	X	X
Up to 1-Year postsecondary education and/or training		X (sub)							
1-Year or more postsecondary education and/or training									
Up to 2-Years postsecondary education and/or training					X			X	
2-Years or more postsecondary education and/or training				X					
2-Year degree and/or apprenticeship			X						
4-Year apprenticeship (substitute for work experience)				X				X	
Commercial Driver's License									
Class A-P or A-P Permit				X					
Class B-P or B-P Permit	X								
Valid California Driver's License	X	X	X	X	X	X	X	X	X
Good Driving Record	X								
Forklift Permit		X					X		
General Radiotelephone Operator (GRO) License			X		X			X	
ADDITIONAL REQUIREMENTS									
Age									
18 or over (Commercial License Requirement)	X	X	X	X	X	X	X	X	X
21 or over	X								
Background Check		X	X	X		X		X	X
Normal Color Vision			X	X	X			X	X
Uncorrected Vision									X
Physical Capabilities (standing, walking, lifting, bending, climbing)	X	X	X	X	X (including Certificate of Fitness)	X	X	X	X

Typical and Additional Employment Requirements and Work Conditions	Bus Operator	Custodian	Electronic Communication Technician	Facilities System Technician	Rail Electronic Communication Inspector	Service Attendant	Stock Clerk	Systems Electronic Communication Technician	Transit Security Officer
Provide Own Tools			X	X	X	X		X	
Industry Certifications						X		X (highly desirable)	
English Proficiency	X	X	X (GRO license requirement)	X	X (GRO license requirement)	X	X	X (GRO license requirement)	X
Operate Forklift(s)		X					X		
Qualify for Surety Bonding			X						
Pass Psychological Evaluation									X
California Guard Card									X
Firearm Permit									X
OSHA Compliance		X	X	X	X	X	X	X	X
OTHER EMPLOYMENT CONDITIONS									
Safety-Sensitive Occupation (subject to drug, alcohol testing)	X		X	X (depending on assignment)	X	X			X
Work Conditions									
Non-traditional Work Schedule (evenings, weekends, emergencies 24/7)	X	X	X	X		X			X
Work Outdoors		X	X	X		X			X
Work in Tunnels				X					
Work on Bridges				X					

X (bold) - denote typical requirements of most transit employers.

X (italicized) – in unusual circumstances such as emergencies and/or may be required by some employers.

APPENDIX F: POSTSECONDARY EDUCATION AND TRAINING PROVIDERS

The following university, community colleges, regional occupation centers, and apprenticeship education and training providers are included in this report. Provided for each are the institution's name, address, website, and education and training programs/services they provide.

Universities

University Name	Address	Website	Industrial Technology
California State University, Los Angeles	5151 State University Drive, Los Angeles, 90032	www.calstatela.edu	X

Community Colleges

Community College Name	Address	Website	Automotive Tech	Bus (Truck) Driver	Diesel Technology	Custodian	Telecommunications, Electrical/Electronics Equipment, Communications Systems	Industrial Technology and/or Electrical/Electrical Maintenance	Security Guard/Services	Stock Clerk
Antelope Valley College	3041 West Avenue K, Lancaster, 93536	www.avc.edu	X				X	X		
Cerritos College	11110 Alondra Blvd, Norwalk, 90650	www.cerritos.edu	X				X	X	X	
Citrus College	1000 W Foothill Blvd, Glendora, 91741	www.citruscollege.edu	X		X				X	
College of the Canyons	17200 Sierra Highway, Santa Clarita, 91351	www.canyons.edu	X							
Compton College	1111 E Artesia Blvd, Compton, 90221	www.compton.edu	X							
East Los Angeles College	1301 Avenida Cesar Chavez, Monterey Park, 91754	www.elac.edu	X				X			X
El Camino College	16007 Crenshaw Blvd, Torrance, 90506	www.elcamino.edu	X				X			

Community College Name	Address	Website	Automotive Tech	Bus (Truck) Driver	Diesel Technology	Custodian	Telecommunications, Electrical/Electronics Equipment, Communications Systems	Industrial Technology and/or Electrical/Electrical Maintenance	Security Guard/Services	Stock Clerk
Glendale College	1500 N Verdugo Rd, Glendale, 91208	www.glendale.edu					X			
Long Beach City College	1305 E Pacific Coast Hwy, Long Beach, 90806 (Pacific Coast Campus)	www.lbcc.edu					X			X
Los Angeles Harbor College	111 Figueroa Place, Wilmington, 90744	www.lahc.edu	X	X	X		X			X
Los Angeles Southwest College	1600 Imperial Hwy, Los Angeles, 90047	www.lasc.edu					X			
Los Angeles Trade-Technical College	400 W Washington Blvd, Los Angeles, 90015	www.lattc.edu	X		X		X	X		
Los Angeles Valley College	5800 Fulton Ave, Van Nuys, 91401	www.lavc.edu		X			X			
Mt. San Antonio College	1100 N Grand Ave, Walnut, 91789	www.mtsac.edu					X			
Pasadena City College	1570 E Colorado Blvd, Pasadena, 91106	www.pasadena.edu	X				X			
Pierce College	6201 Winnetka Ave, Woodland Hills, 91371	www.piercecollege.edu	X				X			
Rio Hondo College	3600 Workman Mill Rd, Whittier, 90601	www.riohondo.edu	X				X			
West Los Angeles College	4800 Freshman Dr, Culver City, 90230	www.wlac.edu	X			X				

Other Education and Training Providers

Organization Name	Address	Website	Automotive Tech	Bus (or Truck) Driver	Custodian	Diesel Technology	Tele-communications, Electronics-Electrical Technology	Industrial Technology and/or Electrical/Electrical Maintenance	Security Guard/Services	Stock Clerk
Abram Friedman Occupational Center	1646 S Olive St, Los Angeles, 90015	www.abramfriedmanoc.org	X		X				X	
Baldwin Park Adult & Community Education	4640 Maine Ave, Baldwin Park, 91706	www.bpusd.net/apps/pages/index.jsp?uREC_ID=831576&type=d&pREC_ID=1245792	X							
East Los Angeles Occupational Center	2100 Marengo St, Los Angeles, 90033	https://www.elaoc.net/			X			X	X	
East San Gabriel Valley Regional Occupational Program	1501 W Del Norte St, West Covina, 91790	http://www.esgvrop.org/							X	
Electrical Training Institute	6023 S. Garfield Ave., City of Commerce, 90040	http://www.laett.com					X	X		
Hacienda La Puente Adult Education – Willow Center	14101 E. Nelson Ave., La Puente, 91746	www.hlpae.com/	X							
Hacienda La Puente Adult Education – Dibble Campus	1600 Pontenova Ave., Hacienda Heights, 91745	www.hlpae.com/	X							
Harbor Occupational Center	740 N Pacific Ave, San Pedro, 90731	www.harboroc.org/	X		X	X		X		
La Puente Valley ROP	341 La Seda Rd, La Puente, 91744	http://lpvrop.org/	X						X	
Maxine Waters Employment Preparation Center	10925 S Central Ave, Los Angeles, 90059	www.waterstrainingcenter.org	X					X		
Operating Engineers, Local 12	2200 S. Pellissier Place, Whittier, 90601	http://www.oett.net/apprenticeship/						X		

Organization Name	Address	Website	Automotive Tech	Bus (or Truck) Driver	Custodian	Diesel Technology	Tele-communications, Electronics-Electrical Technology	Industrial Technology and/or Electrical/Electrical Maintenance	Security Guard/Services	Stock Clerk
Operating and Maintenance Engineers, Local 501	2501 West Third St. Los Angeles, 90057	http://www.local501.org						X		
Southern California Regional Occupational Center	2300 Crenshaw Blvd. Torrance, 90501	www.socalroc.com/	X							

APPENDIX G: TRANSIT MODE DESCRIPTIONS

The following, five transit modes in the region were identified in Southern California Association of Government's (SCAG) 2016 *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). More specifically, from the *Transportation Transit System Appendix* to the plan. The definitions utilized by SCAG are those of the National Transit Database and are as follows:

1. Fixed Route Bus Service: Referred to as Motor Bus and defined as "A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways." Most transit service in the region is provided via this mode.
2. Demand Response: Defined as "a transit mode comprised of passenger cars, vans, or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations." OCTA Access is an example of this mode in the region.
3. Light Rail: Defined as "a transit mode that typically is an electric railway with a light volume traffic capacity compared to heavy rail. It is characterized by passenger rail cars operating on fixed rails in shared or exclusive right-of-way (ROW) and vehicle power drawn from an overhead electric line via a trolley or a pantograph." The Metro Blue, Green, Gold, and Expo lines are examples of this mode in the region.
4. Heavy Rail: Defined as "a transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by separate ROWs from which all other vehicular and foot traffic are excluded and high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails." The Metro Red and Purple Lines are examples of this mode in the region.
5. Commuter Rail: Defined as a transit mode that is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within UZAs, or between urbanized areas and outlying areas." Metrolink is an example of this mode in the region.

APPENDIX H: DATA SOURCES

Demographic Data

Demographic data in this report were collected from Economic Modeling Specialists, Inc (EMSI) that compiled data from several sources using a specialized process. Sources include annual population estimates and population projections from the US Census Bureau, birth and mortality rates from the US Health Department, and projected regional job growth.

Educational Attainment Data

Educational attainment numbers are based on EMSI's demographic data and the American Community Survey. By combining these sources, EMSI interpolates for missing years and projects data at the county level. Educational attainment data cover only the population aged 25 years or more and indicate the highest level achieved.

Industry Data

Industry data in this report were collected from EMSI. EMSI industry data comes from various sources depending on the class of worker. (1) For QCEW Employees, EMSI primarily uses the QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business Patterns and Current Employment Statistics. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, BEA State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states.

Job Posting Intensity Data

Job postings are collected from various sources and processed/enriched by Careerbuilder to provide information such as standardized company name, occupation, skills, and geography. EMSI performs additional filtering and processing to improve compatibility with EMSI data.

Occupation Data, Job Duties

General occupation descriptions and common position titles were collected from the Bureau of Labor Statistics and O*Net OnLine (and referenced throughout this report) and supplemented with local transit company position descriptions.

Occupation Data, Workforce Statistics

Occupation data for all occupations in this report were collected from EMSI. EMSI occupation employment data are based on final EMSI industry data and final EMSI staffing patterns (see Staffing Patterns Data below). Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry. This report uses state data from the California Labor Market Information Department at

<http://www.labormarketinfo.edd.ca.gov/>.

Postsecondary Community College Programs

Community college program data was compiled using the California Community Colleges Chancellor's Office course and program inventory, available at: <https://coci2.ccctechcenter.org/>, and from Los Angeles County community colleges.

Postsecondary Program Completers Data

Postsecondary program completers data in this report were collected from EMSI. EMSI takes data directly from the national Integrated Postsecondary Education Data System (IPEDS) database published by the U.S. Department of Education's National Center for Education Statistic at <http://nces.ed.gov/ipeds/datacenter>. Community college program completion data was also compiled using the Centers of Excellence's California community college program Supply Table available at: <http://www.coecccc.net/Supply-and-Demand.aspx>.

Transit Agencies and Establishments Data

Transit agency and establishment data in this report were derived from SCAG's *2016 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). More specifically, from the *Transportation Transit System Appendix* to the plan. Multiple sources were utilized and footnoted and metrics, derived from the plan and utilized in this report, were updated to reflect more current results and projections. The report is available at <http://scagrtpscscs.net/Pages/FINAL2016RTPSCS.aspx>.

Transit Use Data

This report uses data from the American Public Transportation Association's *2016 Public Transportation Fact Book, 67th Edition*.

A stylized, light gray map of Los Angeles serves as the background. It features a grid of streets with a few diagonal lines. A specific route is highlighted in a darker gray, starting from the bottom left, curving upwards, and then running horizontally across the middle of the map. Two small, rounded rectangular shapes are placed along this horizontal route.

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