



L.A. & ORANGE COUNTY **COMMUNITY COLLEGES: Powering Economic Opportunity**



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Center for a Competitive Workforce, housed at the Los Angeles County Economic Development Corporation (LAEDC), is a partnership of the 19 L.A. region community colleges in the L.A. | O.C. Regional Consortium, LAEDC, Los Angeles Area Chamber of Commerce, Southern California Leadership Council, and the Center of Excellence for Labor Market Research at Mt San Antonio College. The Center's mission is to better align supply and demand data with labor market information, support industry-driven career education and workforce development programs, and strengthen industry engagement across our region's talent development systems with the goal to train, educate and upskill a more competitive workforce in L.A. County for the knowledge-intensive industries that will come to dominate our economic future. This work will also address the talent gaps some employers face. and help balance the supply of skilled graduates with the projected demand of local employers, a balance which helps both job-seekers and local firms. Learn more at www.CompetitiveWorkforce.LA

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1 Introduction

his report is the product of a collaboration between the Los Angeles County Economic Development Corporation (LAEDC) and the Center for a Competitive Workforce (the "Center"), which was launched with funding from L.A. County's 19 community colleges in partnership with the LAEDC, Los Angeles Area Chamber of Commerce, Southern California Leadership Council, the LA/OC Center of Excellence for Labor Market Research, and JPMorgan Chase.

The goal of this report is to pinpoint select "target" industries and middle-skill occupations that will drive the regional economy, contributing to increased prosperity and improved standards of living for the residents in the economic region encompassed by Los Angeles and Orange counties (hereafter referred to as the "Los Angeles Basin" or "LA Basin").

The report's sections will address:

- The demand for labor in the LA Basin;
- The five-year detailed industry employment forecast for the LA Basin;
- A roadmap to target industries and occupations for the Los Angeles Basin; and
- An analysis of the regional community college supply of students to fill target occupations in industries of importance to the region.

This report establishes the first phase of the Center's mission to support "systems change" across the LA Basin. With data from this report serving as a baseline, further primary firm-level research and input will inform the development of career education (CE), workforce and job training programs that are better aligned with and related to the region's growing industries and occupations.

Lastly, the talent development institutions and firms from the LA Basin's target industries will be formally connected for the purpose of building industry-specific education and training programs and to create ongoing, permanent relationships that result in work-based learning opportunities (employment, internships) for the region's residents, to promote career opportunity while addressing the skills needs of our region's employers.

Economic and Labor Market Transition

The LA Basin, like much of the rest of the United States, is transitioning in many significant ways:

- from an economy which has been characterized by labor being the primary factor of production, to an information age, digital economy, where intellectual property, capital and knowledge are increasingly the primary factors;
- from traditional career paradigms to new work models such as part-time work and self-employment in the socalled "gig economy;" and
- from traditional ways of doing business to a new, technology-oriented workplace requiring vastly different skillsets and types of thinking.

Automation and robotics, along with artificial intelligence (AI) and machine learning all have the potential to displace a significant percentage of the region's jobs while dramatically changing many others as the disintermediation of supply chains accelerates and the disaggregation of job functions continues, with the skilled tasks of a job becoming increasingly more skilled, and thus more highly rewarded, and the lower skilled, more routine activities of a job becoming automated.

E-commerce and mobile apps have already disrupted a variety of industries, from new transportation innovations, such as combining the global positioning system (GPS) and a smart phone to beget Uber and Lyft, to "brick-andmortar" retail having to adapt to Amazon's business model, scale and speed in order to survive. Undoubtedly, many other industries will be similarly affected in the near future.

Finally, global interconnectivity means that industries, firms, workers, students, governments, labor unions, and educational and training institutions must also quickly adapt their traditional ways of doing business to be more connected, future-forward, flexible, quickly scalable, and globally-focused in order to survive – and thrive – in the 21st century economy.

The LA Basin's Talent Challenge

n this new innovation-intensive environment, economic development, education and training success will be shaped increasingly by the nature and composition of the region's industries, their associated labor markets, and the value placed on their workers.

Fortunately, the LA Basin has several unique advantages that will serve as a strong foundation for success in economic and employment growth, even in a rapidly changing economic climate. The region, for instance, is home to and has several key competitive advantages, such as supplier specializations and labor market pooling, in a diverse set of world-class, export-oriented industry clusters, including: aerospace vehicles and defense; entertainment; information technology and analytical instruments; biopharmaceuticals and medical device manufacturing; professional and technical services; and trade, transportation and logistics, which provide jobs and upward mobility for residents across the skills and education scale.

Additional emerging LA Basin growth industries not yet well-tracked by standard industry classification systems, but which have the potential to dramatically change the region's economy include fields such as advanced transportation, digital media and big data analytics.

These regionally-concentrated traded industry clusters and emerging fields will fuel future job growth, both in their own sectors and in the wider economy due to the spillover or multiplier effects, and are projected to create large numbers of high-skill, high-paying jobs with significant opportunities for career advancement.

The LA Basin's reservoir of educational institutions and deep talent pools provide another significant advantage, as success in the 21st century labor market requires higher levels of educational attainment and more specialized and in-demand skills than ever before.

A region's available supply of skilled talent is one of the foremost determinants of whether a business comes to and ultimately remains in a market. Thus, the LA Basin's skilled, educated workforce will help it attract and retain businesses, contributing to the growth of strong industry clusters and boosting overall economic activity.

Alongside these advantages, however, the Los Angeles Basin also has several significant vulnerabilities that could potentially hurt its labor market.

Most importantly, the current economic transformation coincides with a major, long-term demographic change in the region: aging in place. The region's median age increased from 33 in 2000 to 37 in 2016, with residents aged 55 and older now making up more than a quarter of the region's population. The region's aging will continue to accelerate for the next few decades.

While the region currently has two working-aged adults for every dependent resident (aged 17 and younger or 65 and older), this ratio will fall to 1:1 by 2040. The number of residents aged 65 and older will more than double by 2060, becoming the region's single largest age group.

This trend is predicted to affect the Los Angeles Basin much more than other neighboring counties. Simply put, the region's shrinking working-age population will make it much more difficult for employers to find qualified job candidates.

In addition, the United States as a whole continues to suffer from a skills gap—a mismatch between the skills employers need and those possessed by job candidates that could significantly constrain future workforce development. This trend could potentially affect the region in several ways, perhaps most significantly by affecting the conditions for innovation and limiting the growth of its emerging industries.

Target industry clusters such as information technology (IT), biopharmaceuticals and medical devices depend on workers with highly specialized skillsets. A lack of workers with relevant skills could make the region a less attractive business environment for important growth industries.

The region's lack of affordable workforce housing is another vulnerability, as its housing market is one of the most expensive in the nation and has already pushed many recent millennial graduates to more affordable areas. If left unchecked, this trend could grow into a serious "brain drain" of young talent that could hurt a variety of innovation-intensive industries. While the region's concentrated set of industry clusters pay higher-thanaverage salaries that help offset a high cost-of-living, many area residents struggle to afford high housing and rental costs.

Finally, the region's recent economic rebound and strong job growth do not tell the whole story because many of the new jobs being created are low-wage, low-skill, highlyroutine positions that are vulnerable to automation and without significant opportunities for career advancement. Indeed, the fastest growing occupations in the region include: waiters and waitresses; retail salespeople; home health care workers; cashiers; and food preparation and other food service sector jobs. Few of these jobs provide pathways out of poverty into the middle class. Furthermore, many of the region's low-wage, low-skill positions are parttime as opposed to full-time, which reflects an important shift in the labor market.



A variety of factors have encouraged employers in many industries—notably IT, education, retail and hospitality—to shift employment from full-time to part-time positions, forcing many workers to hold several part-time jobs in order to make ends meet. The "gig economy" also plays a key role in a major job market shift from full-time employment to self-employment, part-time and freelance work. Gig economy services such as Lyft, Uber, Airbnb and others have become increasingly important ways for workers to supplement their income.

These shifts may force many workers—especially if they are self-employed or working part-time or non-traditional jobs—to reconsider traditional expectations about jobs.

Economic Opportunities



he LA Basin's regional education, workforce development and training stakeholders have the resources and ability to address these problems, but will have to work together more closely than ever before with industry on potential strategies.

Today's stakeholders have the opportunity to collaborate on innovative solutions to the most pressing issues facing the region. The skills gap, for example, can only be closed by more cooperation between educators and employers to ensure programs, curricula and stackable certificates reflect the in-demand skills and knowledge that students will need in the industries and occupations of the future.

Education increasingly involves collaboration between educators and private sector stakeholders, reflecting a growing need for internships and other hands-on, practical ways to gain relevant workplace skills.

This is especially important because educational attainment correlates with higher lifetime earnings and, looking to the future, with lower vulnerability to automation. As a result, there is a need for expanded access to education and workforce training programs that develop relevant, non-automatable skills.

Expanding access to educational and workforce training programs for underserved residents could create major benefits for the region's economy and labor force as a whole. A larger supply of job candidates with relevant, in-demand skills, for example, could go a long way towards closing the skills gap. Stakeholders can best accomplish this by focusing on the specific needs of individual groups. Future economic prosperity will depend on stakeholders treating the rapidly changing economy not as a problem to be solved, but as an opportunity to further increase economic productivity and quality of life.

Major shifts in the job market offer education and workforce professionals, employers and other stakeholders a rare opportunity to reinvent the region's education and workforce system, and spur innovation in both emerging and traditional industries, by levering college and university basic and applied research, industry-driven research and development (R&D), and technology-transfer of commercially viable products and services.

Working toward aligning programs and curricula with the skills and knowledge needed in the regional labor market could have major benefits for both sides of this educationindustry partnership.

The skills gap itself, often thought of as a serious and growing problem, offers a potential way forward for the region's workers, especially those from disadvantaged backgrounds. Many of the industries hardest hit by the skills gap offer high wages and significant career advancement opportunities. Educational and training programs designed to develop these skills in students and young professionals could have significant benefits for both disadvantaged communities and employers in highgrowth industries.

Recent technological advances also could lead to significant growth, in some cases by creating entirely new industries and occupations that we don't even know about today, whether through cross-industry or inter-industry convergence, such as the highly touted convergence between manufacturing, medicine and media, or by recombining older products and technologies into new and more productive uses and possibilities through their intersection, such as new biology-based processes.

The rise of "Big Data," for example, has fueled the creation of new occupations such as "Business Intelligence Analyst," one of the hottest areas of the job categories in the region. Technological development has also transformed manufacturing-based industries, which directly support approximately 500,000 jobs throughout the region, as the advanced manufacturing industry offers an important case study in how new technologies in hardware and software can revitalize an entire sector of our economy.



Conclusion

The global economy's rapid transformation creates both challenges and opportunities for the Los Angeles Basin.

In this period of transition, only a deep talent pool with a strong set of non-automatable skills will allow the region to grow its major industry clusters and capitalize on other productive advantages vis-à-vis other economic regions and nations.

This talent pool, in turn, can only be created through a greater understanding of the regional economy and where it's heading, and by embracing industry-driven and future-forward strategies to build the region's education and workforce training systems for the economy of tomorrow.

Collaboration among stakeholders can foster an agile, nimble education and workforce training system that responds to the ever-changing labor market needs of industry in real time.

All that this requires is a willingness to work together to rethink conventional wisdom and address emerging challenges and future opportunities. *

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2 Resident Snapshot: **Los Angeles Basin**

Population Size

he Los Angeles Basin has a massive population base of more than 13 million residents. Over the last decade, population growth dramatically slowed compared to the pace of growth over the previous 40 years as the amount of migrants entering the region dwindled.

For various reasons, including the region's high cost of living, population growth forecasts call for continued slow growth over the next decade and beyond. The California Department of Finance projects the population will grow by 0.5 percent annually in the region over the next decade, and will slow even further through 2060.

Race and Ethnicity

A defining feature of the region is the ethnic and cultural diversity of its population. Latinos and Hispanics, who account for nearly half of the region's total population, are the largest ethnic group in the region.

White, not Hispanic or Latino, residents account for the majority of residents within Orange County and comprise 30 percent of the Los Angeles Basin's population.

However, the region's diversity is best exemplified by the presence of numerous small racial and ethnic groups that are far less represented in the rest of the nation, including Japanese, Filipino, Vietnamese, Korean and Indian residents of the Los Angeles Basin.

Language

Along with its cultural diversity, many residents in the Los Angeles Basin primarily speak a language other than English at home.

The inability to speak English less than "very well" (as defined by the U.S. Census Bureau), which is classified as "Limited English Proficient" (LEP), is a language barrier that affects employability and wage-earning potential, as workers who are LEP may face obstacles finding employment at or succeeding in establishments where English is preferred.

Educational Attainment

Educational attainment levels are varied across the Los Angeles Basin (Exhibit 2-1). Orange County has an especially well-educated population with almost 40 percent of its residents aged 25 and older holding at least a Bachelor's degree. On the other side of the educational attainment spectrum, more than 41 percent and 32 percent of Los Angeles and Orange County residents, respectively, have only a high school education or less. These are the residents who need the most attention in this transitioning economy, which, as stated earlier, rewards higher levels of education and skills attainment.



3 Economic Environment: Los Angeles Basin

Economic Snapshot

he Los Angeles Basin is the largest metropolitan area on the West Coast. Although primarily known for its motion picture, aerospace and fashion industries, the region comprises a much more diverse economy. The high-tech, trade, biomedical and hospitality industries have strong presences, as do professional and technical services.

The lingering effects of the 2009 economic recession are still impacting many residents, however economic and job growth conditions have greatly improved in recent years with the region at or approaching so-called "full employment."

Los Angeles County's unemployment rate declined to 4.5 percent in July 2017, on par with the nation. Orange County's unemployment rate fell to four percent in the same period. While the probability of an economic recession remains low over the next two years with the fundamentals underlying the region's thriving economy remaining intact, growth is, however, projected to decelerate.

As described earlier, not all of the current job news is good, as many of the new jobs being created are part-time and lowerskill occupations, such as food preparation and home health care services, that provide relatively few pathways into the middle class.

Another potential challenge is a shortage of workers in the region. Regionally, the difficulty employers are experiencing in hiring workers is beginning to impact wages. While average annual wages in the Los Angeles Basin grew by less than two percent per year from 2010 to 2014, wage increases have accelerated in more recent years. From 2014 to 2016, average annual wages have grown by nearly three percent, and national figures suggest 2017 will be another strong year for wage growth¹.

Nevertheless, many in the region's workforce face more obstacles finding employment than their counterparts elsewhere in the nation. As of July 2017, an estimated 100,000 residents had not held a job in over 26 weeks, representing 33 percent of unemployed residents in the region compared to the national rate of 26 percent.

Taking these two economic trends together: a shortage of workers and a large number of long-term unemployed workers in the region, suggests a skills gap between the talent that local employers need and the talent that's available in the region.

Industry Forecasting

The LAEDC used an economic forecast model to determine the five-year demand by occupation for workers in the Los Angeles Basin (Exhibit 3-1).

The model first projects employment by industry, which is then used to calculate the type of workers by occupation needed by the businesses in those industries throughout the regional economy.

The five-year forecast takes into account the business cycle and forthcoming structural changes, such as due to public policy, legal decisions, and technological innovation, since fundamentals in the short-run and long-run will affect employment in coming years. A qualitative analysis by industry is provided to illuminate the concepts that influence the economic forecast model.

3.1 Prominent Growth Industries

Using the economic forecast model, four industries were identified that have grown at healthy rates over the last ten years and that are projected to significantly expand over the next three to five years.

EXHIBIT 3-1

LOS ANGELES BASIN EMPLOYMENT 2016 TO 2021F

	2016 (000s)	2006 to 2016 Change	2016 to 2021 Forecast	
Health Care (Public and Private)	887.4	36.8%	6.2%	
Accommodations and Food Services	585.0	29.1%	6.6%	
Professional, Scientific and Technical Services	411.1	9.8%	5.7%	
Other Services	193.9	8.8%	5.8%	
Total LA Basin	5,910.1	4.1%	3.8 %	

Source: Bureau of Labor Statistics, QCEW; estimates and forecast by LAEDC.

Various surveys suggest that wages throughout the nation are continuing to grow in 2017, such as the Bureau of Labor Statistics, Employment Cost Index, June 2017.



Health Care and Social Assistance

Health care and social assistance is the region's largest industry by employment with 887,400 jobs in 2016, across both private and public establishments.

Job growth in health care and social assistance over the last ten years increased at a vigorous pace: 37 percent, even while overall economic growth receded. This indicates that the demand for health care and social assistance workers is more closely tied to an aging population than to the economic cycle.

It is possible that policy changes, such as the potential removal or modification of the Affordable Care Act, could impact the structure of the industry. However, these policy changes will have less impact on the demand and supply of workers than the region's aging population.

Based on projections developed by the California Department of Finance, the number of residents age 65 and older in the region will grow at an annual rate of about four percent through 2025. This is much faster than the annual rate of 0.5 percent for the overall population.

As increasing numbers of "baby boomers" retire (with "Generation X" not far behind), the health care and social assistance industry will need to keep pace with the needs of the region's aging population.

The number of health care and social assistance jobs in the LA Basin is expected to expand by six percent over the next five years.

Accommodation and Food Services

Local establishments in the accommodation and food services industry cater to tourists and the 22 million residents living across the six-county Southern California region.

The demand for accommodation and food services has been growing throughout the economic recovery and expansion. The region has experienced particularly robust growth in tourism over the last five years.

Some local regulations have impacted the accommodation and food services industry. In Los Angeles, the citywide minimum wage was raised recently and will remain above the state-imposed minimum wage, affecting businesses in food services which employ a large share of workers earning minimum or near minimum wages. Additionally, some hotels in the City of Los Angeles must now adhere to a minimum wage that is nearly 30 percent above the citywide minimum wage. Disruptive forces are also greatly impacting the industry, as new forms of accommodations are increasing consumer demand in the form of short-term rentals. While short-term rentals have existed for many years, many new households are renting their homes through companies like Airbnb and HomeAway. While these services may encourage new tourists to visit the region, there are some tourists visiting the region who would have otherwise patronized traditional hotel accommodations. Moreover, travelers are increasingly turning to their mobile devices for information about the region that hotel concierge services traditionally provided.

Like almost every industry, local food service establishments have been impacted by the increased reliance on mobile devices, as a growing number of food service establishments are adopting mobile platforms and tablets to facilitate order taking and collect payments.

Unfortunately, the food service industry is also ripe for AI, robots and automation to displace human workers. For example, a number of fast-food restaurant brands, such as McDonalds and Taco Bell, have already begun to set up and rollout automated kiosks. This trend is expected to greatly accelerate over the next decade.

To date, these changes in the industry have impacted the tasks and responsibilities that workers have been traditionally assigned, without impacting employment.

Demand for workers in the accommodation and food service industry is projected to increase, but at a more moderate pace, expanding by nearly seven percent over the next five years.

Professional, Scientific and Technical Services

The Los Angeles Basin remains a wide-ranging and leading hub of professional, scientific and technical services that serve businesses and consumers locally, nationally and globally.

For example, law firms based in the region not only serve local residents, but also export their services, representing clients across the nation and the world. Architectural and engineering firms help design buildings, bridges, road and water infrastructure, and renewable energy projects in Southern California, as well as across the United States and overseas. Likewise, scientific research firms conduct experiments and develop pharmaceuticals and new technologies that have worldwide implications.

Similar to other highly specialized industries, one major factor limiting job growth in the LA Basin's professional, scientific and technical services industry has been the availability of qualified workers. Businesses have



adopted various policies to retain local workers, such as telecommuting and flexible schedules, and to attract new ones, both locally and outside of the region and country. Altogether, there are 411,100 workers employed in the professional, scientific and technical services industry in the Los Angeles Basin (2016). Employment in this highwage industry grew by nearly ten percent over the last ten years and is poised for further growth due to an expanding global economy.

Regional employment in the professional, scientific and technical services industry is projected to expand by nearly six percent over the next five years.

Other Services

In 2016, 193,900 workers were employed in the "other services" industry in the Los Angeles Basin. Establishments in this industry include: private households, repair and maintenance businesses, and personal care and laundry services. The spectrum of services provided by this industry is broad; yet, when aggregated, the industry's employment grew by nearly nine percent from 2006 to 2016.

Job growth is attributable to increasing demand for services that simplify daily life, which also has contributed to the rise of the gig economy.

Services provided by nail salons, tanning salons, massage parlors, tattoo parlors, barbershops and pet care providers also have expanded over the last five years.

Not surprisingly, technological innovation is disrupting the other services industry, as many personal care service establishments have begun to use and rely on web-based, social media and mobile solutions to overcome certain start-up challenges and processes that used to bedevil businesses in previous generations, sometimes causing them to fail within their first few years of operation.

The number of workers in LA Basin's other services industry is projected to expand by nearly six percent over the next five years.

3.2 Emergent Growth Industries

There are two industries with particular importance to the economic landscape of the Los Angeles Basin that fall into the new growth category (Exhibit 3-2). These two industries are projected to grow substantially over the next five years, even though employment levels have barely changed over the last ten years.

EXHIBIT 3-2

LOS ANGELES BASIN EMPLOYMENT 2016 TO 2021F

	2016 (000s)	2006 to 2016 Change	2016 to 2021 Forecast
Administrative Support	402.6	-1.4%	10.4%
Education (Public and Private)	479.3	0.9%	6.5%
Total LA Basin	5,910.1	4.1%	3.8 %

Source: Bureau of Labor Statistics, QCEW; estimates and forecast by LAEDC.

Administrative and Support Services

Job counts in the administrative and support services industry are typically very sensitive to the economic cycle. From 2006 to 2016, employment in the LA Basin's administrative and support services industry declined by one percent.

Approximately 40 percent of the jobs in this industry are in employment services, such as temporary employment agencies. Lingering effects of the economic recession and the Affordable Care Act mandates, requiring employers with at least 50 full-time-equivalent employees to offer health insurance to employees working 30 or more hours per week, have made it much more common for businesses to hire temporary staff through employment agencies as a means to cut labor and health care costs, and increase staffing flexibility. This trend is expected to continue, contributing to employment services growth for at least the next five years.

Employment in the administrative and support services industry is projected to increase by ten percent over the next five years.

Education Services

Employment levels in the education industry (public and private) are generally expected to remain relatively stable, mirroring population growth. However, state budget cuts due to the economic recession and its reliance on sales and personal income tax revenues created a state fiscal crisis that deeply impacted funding appropriation-levels for the public education system during the economic downturn.

The adoption of new technologies, such as the expanded use of iPads in the classroom and the advent of massive open online courses, has begun to impact education services in recent years, and colleges and universities have greatly increased availability of their course offerings



through online platforms that better accommodate student schedules. While these technological advances have certainly enriched the experience and services provided to students, they have so far had little impact on overall staffing.

However, while overall staffing levels may be largely unaffected, the composition of staffing will almost certainly be, reflecting the changing economy, a lack of skilled workers, particularly in science, technology, engineering and mathematics (STEM) fields, and the emphasis on workforce development education as a key determinant of future earnings.

State K-12 education funding through Proposition 98, the formula that sets annual K-12 revenues, is projected to grow, and K-12 hiring is expected to continue to trend upward as state finances improve (Exhibit 3-3).

EXHIBIT 3-3

CALIFORNIA BUDGET AND PROP. 98 FUNDING (Spillions)



Source: California Governor's Budget Summary 2017-2018; California Legislative Analyst's Office, "A Historical Review of Proposition 98; Estimates by LAEDC.

Regional employment in the education services industry will increase by nearly 7 percent over the next five years.

3.3 Rebound Industries

Despite having contracted over the last ten years, construction and wholesale trade are two rebound industries projected to grow over the next five years. (Exhibit 3-4)

EXHIBIT 3-4

LOS ANGELES BASIN EMPLOYMENT 2016 TO 2021F

	2016 (000s)	2006 to 2016 Change	2016 to 2021 Forecast
Construction	229.0	-13.3%	10.2%
Wholesale Trade	306.8	-1.1%	4.0%
Total LA Basin	5,910.1	4.1%	3.8%

Source: Bureau of Labor Statistics, QCEW; estimates and forecast by LAEDC

Construction

The construction industry was particularly hard hit by the collapse of the housing market in 2008. Many businesses suffered losses from unpaid contracts, the downsizing of projects and an overall reduction in demand for new buildings. There were 89,900 fewer jobs in the Los Angeles Basin's construction industry in 2011 than in 2006.

Construction businesses are experiencing better days, and many displaced workers are returning to jobs requiring specialized skills. However, despite an employment rebound in the region, job counts in 2016 fell short of 2006 levels. Nearly 300,000 workers were employed by the construction industry in 2016, 13 percent below 2006 employment.

While LA Basin construction job counts have not returned to pre-recession levels, developers are continuing to build in and around the region. Downtown Los Angeles is experiencing a major revitalization that will continue to spur more construction. Major projects are being planned in the San Gabriel and Santa Clarita valleys, as well as in the eastern and northern portions of Los Angeles County. Similarly, construction in Orange County is flourishing in cities such as Anaheim, Irvine and Fullerton. Despite the projected growth, construction employment is not expected to reach its pre-recession high over the next five years since it's projected that investors will begin to pull back on speculative development projects.

Future construction employment in the LA Basin is projected to grow at a fast clip, with 23,500 new jobs created, representing ten percent growth over the next five years.

Wholesale Trade

The Los Angeles Basin's wholesale trade industry employed 306,800 workers (2016).

Employment declined over the last ten years due to the economic downturn. There were nearly 24,800 fewer jobs in 2016 than there were in 2006.

As an economic indicator, wholesale trade job counts are projected to follow traditional sales and inventory growth trends.

Thus far, there have been few major industry-specific technological breakthroughs that have changed the labor market. Autonomous forklifts are starting to be used by some larger companies, but the majority of the LA Basin's wholesale trade industry comprises smaller operations with fewer employees and limited warehouse space unlikely to benefit from new technologies.



Furthermore, a large share of the industry's employment remains in sales occupations that heavily depend on client relationships and management.

The number of workers in LA Basin's wholesale trade industry is projected to expand by four percent over the next five years.

3.4 Moderate Growth Industries

The financial activities industry is projected to experience moderate job growth over the next five years. (Exhibit 3-5)

EXHIBIT 3-5

LOS ANGELES BASIN EMPLOYMENT 2016 TO 2021F

	2016 (000s)	2006 to 2016 Change	2016 to 2021 Forecast	
Financial Activities	336.5	-13.2%	3.1%	
Total LA Basin	5,910.1	4.1%	3.8 %	
		005144	16	

Source: Bureau of Labor Statistics, QCEW; estimates and forecast by LAEDC.

Financial Activities

The economic recession and housing crisis impacted the financial activities industry two-fold. First, real estate firms experienced rapid and large declines in property values and much lower transaction volumes. Second, finance and insurance firms dealt with a high number of foreclosures, loan modifications and write-offs, as well as a flurry of new federal rules and regulations, such as the Dodd-Frank Wall Street Reform and Consumer Protection Act in 2010, that changed the ways commercial and investment banks operate.

Employment in the LA Basin's financial activities industry has yet to recover. In 2016, there were 336,500 workers employed in the region's financial activities industry, 51,500 fewer jobs than in 2006, representing a 13 percent decline.

Several economic forces will affect the financial activities industry over the next few years.

For example, home prices have been growing at a robust pace, and mortgage rates have yet to respond to changes in monetary policy. The number of real estate transactions should continue to grow over the next few years, while loan-refinancing activity may pick up as some homeowners take out home equity lines of credit and others try to rid themselves of private mortgage insurance.

Meanwhile, on the technological front, establishments that rely on a customer base have adopted mobile apps that let consumers make banking and investment decisions remotely. Indeed, the number of physical banks across the United States has dropped by almost half between 1995 and 2015.

The use of physical cash is being replaced by blockchainbased digital currencies, such as Bitcoin, and electronic share-payments from companies like Venmo/PayPal, Apple and Google, while banks are providing increasingly faster and more efficient ways to directly exchange money with other clients, further reducing transaction costs. And, lenders and other entities can process far more loans with digital signature services from companies like DocuSign.

For better or worse, high frequency trading has grown in market share, and the rapid rise of passively-managed exchange-traded funds (ETFs), which have grown from \$1 trillion in assets in 2010 to over \$3 trillion in 2016, as an alternative to actively-managed mutual funds has changed the financial services industry dramatically. Finally, the mass of well-capitalized, VC-backed big data, financialbased platforms and "FinTech" companies, which are not subject to the same federal regulations as traditional banks, portend major disruptions for this industry.

Through it all, total employment in the region's financial activities industry is projected to grow by three percent over the next five years. However, with the disruptive technological innovations that are sure to come, employment composition by occupation and core job activities or competencies will likely change in many ways, as will skills requirements.

3.5 Slow Growth Industries

Four industries of regional economic significance are projected to experience slow job growth over the next five years: arts and entertainment, transportation, information and government. (Exhibit 3-6)

EXHIBIT 3-6 LOS ANGELES BASIN EMPLOYMENT 2016 TO 2021F

2016 (000s)	2006 to 2016 Change	2016 to 2021 Forecast
136.0	30.4%	2.1%
225.2	5.1%	0.2%
255.2	8.0%	-2.0%
278.2	2.3%	1.9%
5,910.1	4.1%	3.8%
	2016 (000s) 136.0 225.2 255.2 278.2 5,910.1	2006 to 2016 (cooos) 136.0 30.4% 225.2 5.1% 255.2 8.0% 278.2 2.3% 5,910.1 4.1%

Source: Bureau of Labor Statistics, QCEW; estimates and forecast by LAEDC.



Arts and Entertainment

Record numbers of tourists and increased consumption by local residents in the Los Angeles Basin have propelled job growth in the arts and entertainment industry over the last ten years. Employment in the industry grew by 30 percent from 2006 to 2016, with most of that growth occurring over the last five years.

The services provided through the arts and entertainment industry are varied, including major sports stadiums and complexes, museums, theme parks and theaters, some of which have operated for decades. Recent additions like the Broad museum in downtown Los Angeles and the proposed Lucas Museum of Narrative Art will attract tourists from all over the world.

Agents and managers for public figures are a major contributor of job growth in Los Angeles County's arts and entertainment industry, with more than 6,000 jobs created from 2011 to 2016.

This industry, however, also includes many temporary placement agencies that provide staffing services for other businesses in the industry. Unfortunately, many of these jobs are not as secure as those in other industries.

In recent years, promoters with facilities have spurred robust job growth, with the addition of 2,500 jobs from 2011 to 2016. This industry sector includes many venues that serve residents, such as wedding venues and other local event organizers. With limited population growth expected in the future, job growth in this area will likely decelerate.

Establishments identified as sports teams and clubs are a major contributor to recent job growth in Orange County's arts and entertainment industry. For example, construction at the Orange County Great Park in Irvine has kicked into high gear to meet growing demand for access to sports activities.

Overall, the LA Basin's arts and entertainment industry will expand by a modest two percent over the next five years.

Transportation

In 2016, 225,200 workers were employed in the LA Basin's transportation industry, which includes rail, water, air, truck, transit transportation, courier and messenger transportation, as well as warehousing and postal service workers. From 2006 to 2016, employment growth in the transportation industry was a moderate 5 percent.

Recent technological advances in goods movement have greatly reduced costs. And, the widespread adoption of partially and fully autonomous vehicles in the near- to medium-term future will almost certainly affect the transportation industry's workforce from warehousing operations, to long haul transportation, to last-mile delivery.

Employment growth in the LA Basin's transportation industry is expected to be dramatically slower than over the last decade, increasing by only 0.2 percent over the next five years.

Information

The Los Angeles region's film industry has a long history of providing entertainment for consumers throughout the world. The motion picture and sound recording industry accounts for 60 percent of employment in the LA Basin's information industry, which employed 255,200 workers overall in 2016.

Changes in how films and other video and sound productions are produced, distributed and consumed have affected workers more so than perhaps in any other field in recent memory outside of maybe journalism and retail (see below). High quality videos can be filmed with iPhones, while on-site production is being replaced by green stages and other new technology. Still, the demand for motion pictures continues to grow globally (Exhibit 3-7), so while the composition of employment in the industry may change somewhat dramatically, total jobs will likely expand.





Regional employment in the information industry grew by eight percent from 2006 to 2016, though the industry, like almost every other, endured layoffs during the economic recession.



Hiring from 2011 to 2016 shows different trends occurring within various subsectors of the information industry. For example, employment in telecommunications has weakened over the last five years. Note, however, that this industry includes employment at retail centers where mobile electronics and mobile phone service contracts are sold. Consumers have drastically shifted to purchasing these goods and services online, reducing the need for retail sales workers.

Meanwhile, employment in data processing, hosting and related services has been growing over the last five years. These businesses provide web hosting, streaming services, application hosting and other types of services that provide digital content directly to consumers.

Employment in the LA Basin's information industry is projected to stagnate overall, although there will be changes in job types, activities and skills. Overall, information industry employment is expected to decline by two percent over the next five years in the LA Basin.

Government

When postal service, education and health care are eliminated from the equation, employment in public administration has held steady over the last ten years. More than 278,000 workers are employed by government in the Los Angeles Basin (2016), an increase of two percent from 2006.

Government employment is projected to grow in the LA Basin by nearly two percent over the next five years.

3.6 Challenged Industries

Retail trade and manufacturing are considered challenged industries, with negative job growth projections over the next five years. (Exhibit 3-8)

EXHIBIT 3-8 LOS ANGELES BASIN EMPLOYMENT 2016 TO 2021F

	2016 (000s)	2006 to 2016 Change	2016 to 2021 Forecast
Retail Trade	574.6	-2.0%	-0.5%
Manufacturing	510.3	-20.9%	-5.0%
Total LA Basin	5,910.1	4.1%	3.8%

Source: Bureau of Labor Statistics, QCEW; estimates and forecast by LAEDC.

Retail Trade

The retail trade industry largely resembles its wholesale trade counterpart in that employment counts have been sensitive to the economic cycle. Retail trade employment in the Los Angeles Basin totals 574,600 workers (2016). However, this number represents a two percent decline from 2006 employment, a loss of nearly 12,000 jobs.

Though retail trade employment fell by 51,600 jobs from 2006 to 2011, the industry has since rebounded from the economic recession, easing concerns that self-checkout machines would diminish the need for retail workers. Unfortunately, new technologies and other innovations, along with growing consumer adoption and use of platforms that further disintermediate the sector, such as Amazon, eBay and ASOS, are expected to hasten the retail industry's accelerating transition and continue to constrain employment growth over the next five years.

Employment in the Los Angeles Basin's retail trade industry is projected to decline by 0.5 percent over the next five years.

Manufacturing

The manufacturing industry remains an important component of the Los Angeles Basin's overall economic output. Over the last few decades, however, the composition of the industry has drastically changed.

Local textiles, apparel and footwear establishments are importing more products from overseas, and local operations are streamlining their focus to design and distribution. Other manufacturing industries are investing in and incorporating new technologies to replace manual labor.

A much higher proportion of workers in manufacturing are now required to have advanced degrees, specialized technical skills, or some combination of the two. Robust wage growth in the industry over the last decade supports this trend.

In 2016, the region's manufacturing industry employed more than 500,000 workers. Yet, this number is substantially lower than it was in 2006, when there were 135,000 more manufacturing jobs in the Los Angeles Basin. Between 2006 and 2016, industry employment declined by nearly 21 percent.

Overall, employment in the LA Basin's manufacturing industry is projected to decrease further, by five percent, eliminating 25,400 jobs over the next five years.

4 Occupational Analysis: Los Angeles Basin

he number of additional workers that businesses will need is referred to as net new jobs.

Replacement jobs are those jobs created by workers who permanently retire or

permanently change occupations.

When combined, net new jobs and replacement jobs constitute the total number of job openings.

Among the occupations with the highest replacement rates, various blue-collar occupations take the lead: locksmith and safe repairers; library technicians; social science research technicians; and forest and conservation technicians. In addition, some middle-skill occupations also have high replacement needs, including registered nurses and teacher assistants.

Careful examination of the occupations with the most job openings over the next five years reveals that many of these occupations require lower levels of educational attainment.

Exhibit 4-1 presents the typical entry-level education required across all projected occupations for the LA Basin.

More than 60 percent of occupations will require a high school education or less. One-third of projected openings require no high school education, and another one-third require only a high school diploma. These two categories represent entry-level jobs for unskilled workers across industries and occupations.

Of the remaining projected openings, nearly 25 percent require a bachelor's degree, while only two percent of occupations call for an Associate's degree.

One thing to consider is that education requirements will likely increase over time. As a result, technical training is expected to play a major role in helping new workers find employment in a fast-evolving labor market.



5 Community Colleges and Middle-Skill Jobs

nderstanding how industries are expected to grow or decline over a period of time and estimating their job creation potential provides one aspect of overall workforce needs. The more important aspect, however, is the composition of those expected jobs and their educational attainment and skills needs. In this section, we convert industry job creation projections into occupational projections in select industry targets for middle-skill jobs. From these target industries, twenty detailed occupations have been chosen as promising targets for post-secondary programs for Los Angeles Basin community colleges.

Why Education Matters

Education is the primary vehicle an individual uses to better his or her economic position, whether it is to increase employment opportunities, earn higher wages, or seek out a better quality of life. Unemployment rates, median earnings and poverty levels all differ according to the highest level of education obtained; that is, an individual's educational attainment.

Educational attainment is a key element in understanding challenges and opportunities present in a region's workforce. It identifies the quality of the local labor pool to potential employers, quantifies the benefits of pursuing additional education to individuals, and can reveal whether an area is economically disadvantaged requiring higher levels of public services and resources.

The highest unemployment rates exist for individuals with lower levels of educational attainment.

EXHIBIT 5-1 CIVILIAN UNEMPLOYMENT RATE 2016 by educational attainment LA Basin California 5.2% 5.5% 6.5% 8.2% 6.0% 7.0% 5.3% 5.5% 4.2% 3.6% Population Less than HS HS or Some Bachelor's college or 25 to 64 equivalent or higher years Associate's Source: 2016 ACS 1-year estimates

Earnings differentials exist among employed individuals with varying levels of educational attainment. In the Los Angeles Basin, those with the highest level of education—a graduate or professional degree—earn an annual wage premium of about \$59,000 over those with less than a high school education. Individuals with an Associate's degree, postsecondary nondegree award or some college enjoy a wage premium over lower levels of educational attainment as well; approximately \$8,400 over those with a high school diploma or equivalent annually, and more than \$15,400 over those with less than a high school education annually.



MEDIAN EARNINGS AND EDUCATIONAL ATTAINMENT 2016 Population 25 years and older



The combination of higher rates of unemployment and lower annual median earnings yield higher levels of poverty for those with lower levels of education.



Education and Automation

Automation can have a net-negative effect on employment. Robotics, digital platforms and artificial intelligence are changing the employment game. As an increasing number of industries become more capitalintensive and less labor-intensive, individuals with the lowest levels of education are most vulnerable to having their jobs eliminated as a result of automation and other forms of technological innovation.

While widespread automation is not a direct threat near-term (as it is cost prohibitive for many operations and legislation has failed to keep pace with advances in technology in certain industries), partial automation is quite prevalent in many workplaces today. This labortechnology substitution trend is expected to accelerate over time as continued innovation allows the capabilities of machines to surpass those of humans. Additionally, the cost of technology will continue to decline over time. Still, technology can also have a complementary effect on labor, increasing the demand for labor and making existing workers more productive. All things considered, it will be at least another decade, possibly two, before automation becomes a true pressing threat to employment.

Incentives exist for businesses to incorporate automation and other technology advances into their operations, while the upfront costs are steep, in the long term they can enjoy cost savings related to reduced labor costs, increased efficiencies, and increased output.

Government policy will have an important role to play as legislators balance the employment needs of their constituents with the obtainable productivity gains automation promises to the businesses operating in their districts.

The jobs most at risk of becoming automated include those that involve simple repetitive tasks and those that involve data; the first is at-risk of being replaced by machines, and the other by algorithms. Individuals who lose their jobs to automation must be upskilled or retrained to fill other occupations less susceptible to the threat of automation. This puts enormous pressure on community colleges and other education systems to create programs that will do just that.

The McKinsey Global Institute (MGI) recently released A Future That Works: Automation, Employment and Productivity² a report that identifies the technical automation potential of the global economy. In this report, MGI identified work activities that could be automated by adapting currently available technology. The report showed that these work activities exist across a large number of occupations in all industries. In particular, work activities that involve data collection, the processing of data, and work that requires a large amount of physical activity taking place in predictable environments are most vulnerable to the disemployment effects of automation.

Work activities that require the management of people, experience in decision making, planning or task requiring creativity, interactions with other people, and work with physical activity taking place in unpredictable environments have the least exposure to risk of being displaced. These skills will continue to be in demand, and represent opportunities for educational institutions, such as community colleges, to adapt their different program curricula to include more emphasis on STEM fields of study, soft skills required for successful professional interactions, and to promote more creative and critical thinking.

In today's economy, some industries are more at risk of losing jobs as a result of automation compared to others, these include leisure and hospitality industries (especially food services), retail trade (due to the rise in e-commerce), and warehousing and logistics industries (as a result of widespread use of automatic storage, retrieval handling and distribution and logistics software). Manufacturing industries have long been identified as vulnerable to disemployment related to technological innovation. For example, workers in factories have been moving away from traditional assembly functions for years and into higher-skilled positions, such as CNC (Computer Numerical Control) operators. Recent advancements in robotics, artificial intelligence and machine learning are poised to cause greater levels of disruption in the future, not only in manufacturing, but also across numerous other industries. Individuals will need skills that can be employed in conjunction with the functions of machines.

> ²Manyika, James et. al., (2017). A Future That Works: Automation, Employment and Productivity. [online] McKinsey & Company. Available at: http://www.mckinsey.com/global-themes/digital-disruption/ harnessing-automation-for-a-future-that-works [Accessed 03 Aug. 2017

AUTOMATION POTENTIAL BY INDUSTRY SECTOR CURRENT POTENTIAL WITH DEMONSTRATED TECHNOLOGY (Scale of 0 to 100)



related to several industries, such as healthcare and engineering, automotive service techs, licensed vocational nurses (LVNs), heavy and tractor truck drivers, teachers assistants, and bookkeeping, accounting and auditing clerks.



JOB DISTRIBUTION IN LA BASIN 2016

As industries continue to evolve, it will be a major challenge for educational providers to keep pace; teaching students the skills they need to be hired and remain employed in this increasingly technical world. Success will require heavy interaction with industry stakeholders and public-private partnerships for workforce development programs tailored to satisfy industry employment needs.

If educators cannot keep up and provide local industries with qualified workers with the skills they need, skills gaps will widen and result in unfilled job vacancies for businesses, causing them to seek out talent from other places or leave the region completely, which will increase unemployment and economic instability for individuals and their households and communities.

Middle-Skill Education

Another way to illustrate the value in postsecondary education is by looking at occupational employment grouped together by entry-level educational requirements.

In the Los Angeles Basin in 2016, ten percent of employment exists in occupations having the entrylevel education requirement of an Associate's degree, postsecondary nondegree award, or some college. Occupations in this category include: paralegals, computer network specialists, and technicians and technologists Occupations requiring the lowest level of education, less than high school, account for 28 percent of occupational employment in the basin, but these occupations, including cashiers and retail salespersons, janitors, food preparation workers and landscaping workers, are also associated with the lowest wages.

The net change in jobs in the Los Angeles Basin between 2012 and 2016 by entry-level education, provides insight into hiring trends over time. Over the four-year period, the number of jobs in occupations requiring an Associate's degree, postsecondary nondegree award, or some college grew by nine percent, which is a faster growth rate than jobs requiring an entry-level education of a high school diploma or equivalent (seven percent).

³ 2012 OES data used rather than 2011 data due to SOC revision

JOB GROWTH BY ENTRY-LEVEL EDUCATION Percentage change from 2012 to 2016



While jobs requiring an entry-level education of less than high school grew at the fastest rate (13 percent), over the period, this growth is primarily related to the rehiring of these jobs post-recession (December 2007 to June 2009); during a contractionary period, jobs in lower skilled occupations are shed at a disproportionately higher rate compared to middle- and high-skill occupations, and are rehired during expansionary periods in the business cycle, as has been the case from 2012 through 2016.

In conclusion, jobs in occupations with an entry-level education requirement of an Associate's degree, postsecondary nondegree award, or some college, these jobs are growing at a faster rate compared to occupation requiring high school for entry-level. Additionally, some students completing community college programs will continue on to obtain higher levels of educational attainment, as such, it is relevant to note that occupati requiring a Bachelor's degree for entry grew by 12 perc over the period, meaning employment prospects for t individuals are also promising.

The Demand for Middle-Skill Jobs

Where are middle-skill jobs found? Demand for labor is generated by local and regional businesses across all industries. This is a function of the economic health of the regional economy and its expected growth, as well locational and hiring decisions made by growing busines

Projected demand for labor (total openings, including new jobs and replacement jobs) from 2016 to 2021 by industry sector is broken out according to the job's ent level education requirements.

Occupations requiring an education of an Associate's degree, postsecondary nondegree award, or some coll figure prominently in every industry, but especially in health care services (23.6 percent of projected total openings), other services (20.6 percent of total openings), which includes maintenance and repair industries, and transportation industries (11.3 percent of total openings).

In conclusion, jobs in occupations with an entry-level education requirement of an Associate's degree, postsecondary nondegree award, or some college, these jobs are growing at a faster rate compared to occupations requiring high school for entry-level. Additionally, some students completing community college programs will continue on to obtain higher levels of educational attainment, as such, it is relevant to note that occupations requiring a Bachelor's degree for entry grew by 12 percent over the period, meaning employment prospects for these individuals are also promising.

Industry employment projections can be combined with other metrics to provide an indication of whether a particular industry has the potential to be an attractive target for postsecondary nondegree award, career education programs, and Associate's degree programs.

In the next two sections, we identify target industries that are most promising in terms of middle-skill jobs, and use the occupational composition of the expected jobs in those industries to identify the top 20 detailed occupations classified as middle-skill, presenting their predicted job needs from 2016 to 2021.

PROJECTED JOB DEMAND BY INDUSTRY 2016 TO 2021F Distribution of total projected openings by entry-level education requirements

10115		
e	Health Care (public and private)	17.2% 23.8% 23.6% 23.0% 12.3
	Accomodation and Food Services	84.2% 13.1% 0.4%, 2.2%, 0.0%
ions	Administrative Support	29.4% 48.5% 8.1%, 13.8%, 0.2%
cent	Retail Trade	73.4% 16.3%, 2.6%, 6.7%, 1.0%
nese	Education (public and private)	7.2%, 18.7%, 11.8%, 53.8%, 1.0%
	Prfnl, Scientific, Technical Srvcs	1.8%, 27.9%, 10.5%, 51.2%, 8.7%
	Wholesale Trade	16.6%, 52.0%, 4.3%, 26.8%, 0.3%
	Construction	27.1%, 47.7%, 10.0%, 15.2%, 0.0%
5	Government (ex. postl/edu/hlth care)	11.1%, 49.6%, 10.2%, 25.6%, 3.4%
	Other Services	39.3%, 25.6%, 20.6%, 13.9%, 0.7%
as	Real Estate	0.7%, 43.5%, 2.4%, 53.2%, 0.1%
sses.	Manufacturing	15.3%, 58.6%, 0.6%, 25.1%, 0.4%
net	Transportation (in <mark>c. postal svc)</mark>	19.3%, 59.4%, 11.3%, 10.1%, 0.0%
	Information	16.3%, 17.8%, 11.8%, 53.8%, 0.3%
try-	Arts and Entertainment	51.6%, 21.8%, 0.0%, 26.2%, 0.4%
	Finance and Insurance	27.6%, 44.7%, 4.8%, 22.9%, 0.0%
	Management	2.0%, 9.4%, 0.7%, 87.9%, 0.0%
lege	Natural Resources	50.8%,30.2%, 3.9%, 14.9%, 0.1%
as)	Less than High School	Postsecndry Cert/ Graduate or Professional e College

Bachelor's degree

High School or equiv

6 Identifying Target Industries

conomic development efforts are organized around several priorities, including encouraging job growth in industries that are export-oriented, most competitive, regionally concentrated, and that will generate high paying jobs that, through their spillover effects,

will drive economic growth, further job creation, and increased wages for a greater number of residents.

The LAEDC identified industries in the Los Angeles Basin that would be prime targets for new or continued investments made to programs specializing in the training and/or education for individuals to fill the projected demand for middle-skill jobs over the next five years. These training and education programs, to be provided by community colleges, include postsecondary nondegree awards, career education (CE) and Associate's degree programs.

With an industry base as diverse as exists in the Los Angeles Basin, there are a number of ways in which to identify target industries.

Industries with the most middle-skill job growth potential are an obvious choice, but these industries may be localserving and thus not the most impactful to the regional economy in terms of overall wealth generation. Therefore, consideration is given to whether an industry is exportoriented, and the economic output and value added it brings to the region. Average annual wages in an industry are also a consideration, as higher earnings translate into increased levels of spending, which is associated with a larger ripple of economic activity (induced effects) in the regional economy.

Additionally, the competitiveness of an industry is a valuable metric in determining what industries are more prominent in the Los Angeles Basin compared to other areas. Using this metric allows for the identification of industries in which the region holds a comparative or productive advantage, such as industries with deep roots, a well-developed and specialized supply chain, a deep and concentrated talent pool, requisite infrastructure, etcetera.

Emerging and growing sectors are also key in establishing targets, these include nascent industries, for example, autonomous vehicles, privatized space flight, alternative energy and clean-tech industries, in addition to established industries that are exhibiting strong growth and building capacity in the basin. While these industries might not be obvious workforce development targets, they help to identify industries on the rise and aid in anticipating potential workforce needs in the future.

To choose target industries in the Los Angeles Basin that incorporate all these considerations, the LAEDC identified five target industries in each the following three categories: prominent industries; emerging and growing industries; and so-called "matrix" industries. Matrix industry selection uses a multi-metric matrix developed to identify industries providing the greatest economic benefit, in terms of both wealth generation and the most opportunities for middleskill job growth. The final six industry targets were selected from these three listings.

6.1 Targets: Prominent Industries

While large employing industries are valuable in terms of their ability to provide job opportunities for local residents, other industries, while still relatively small in terms of employment, may be important for promoting overall economic growth and prosperity. These industries are likely to be exposed to the larger global market, and if they are competitive with their counterparts elsewhere, they can gain market share by growing the number and/or output of their companies and creating jobs.

EXHIBIT 6-1

Prominent Industries - Targets in LA Basin

NAICS	Industry	LQ 2016	Jobs 2016	Openings 2016-21
512,515,711	Entertainment	6.51	223,320	5,690
3364	Aerospace	2.36	47,920	1,250
334	Electronic Product Manufacturing	1.79	70,756	2,700
541 less 5417	Professional and Technical Services	1.24	383,290	17,030
481,483,488	Port Related Transport and Support Activities	1.76	83,750	3,095

Source: Estimates by LAEDC

Total Total MS

Industry competitiveness in this sense is measured using relative employment shares. An industry with a presence in the Los Angeles Basin that is larger (as a percentage of total employment in the region) than its presence elsewhere would indicate that the LA Basin has a concentration of this industry and is evidence of the region having a competitive advantage.

The LA Basin is home to numerous prominent industries that are concentrated more heavily here versus other parts of the nation. Still, not all prominent industries are suitable for workforce development intervention. For example, textile and apparel manufacturing industries and food manufacturing, while these are highly concentrated industries in the region, there are few middle-skill jobs



associated with the industries and average annual wages tend to be low. As such, they are not suitable targets.

Exhibit 6-1 presents the top five industries (prominent industries) with both large relative employment shares and a significantly large share of middle-skill employment. Projected middle-skill job openings (new jobs and replacement jobs) between 2016 and 2021 are also provided.

6.2 Targets: Emerging and Growing Industries

Emerging and growing industries are those that are building capacity in the region. These can be either nascent industries, such as the autonomous vehicle industry, or existing industries, that are in the midst of developing a cluster of activity in the LA Basin, such as the bio-medical industry, which combines pharmaceutical and medicine manufacturing; and medical equipment and supplies manufacturing. An industry's job creation potential is a product of its projected growth rate and the industry's current size. A small industry growing quickly may add jobs, but the absolute number of jobs added will likely be smaller than a large industry growing more slowly. Both metrics are considered when selecting the top five emerging and growing industries to target. Additionally, an industry that is increasing its concentration in the region is also becoming stronger. Over time, the change in location quotient (LQ), which is calculated by comparing the industry's share of regional employment with its share of national employment, will reveal changes in industry concentration.

Exhibit 6-2 presents the top five industries with the change in industry concentration (LQ) relative to the nation and the net job change (number and percentage) from 2011 to 2016, along with the expected growth rate of middle-skill jobs in the industry and total projected middle-skill job openings (new jobs and replacement jobs) between 2016 and 2021.

EXHIBIT 6-2

Emerging and Growing Industries - Targets in LA Basin

NAICS	Industry
512,515,711	Entertainment
3254, 3391	Bio-Medical
481,483,488	Port Related Transport and Support Activities
42, 454	Wholesale and eCommerce
541 less 5417	Professional and Technical Services

		2011 4	- 2010	2016 2016	
		<u>2011 t</u>	<u>2011 to 2016</u>		<u>to 20211</u>
	Change in LQ 2011-16	Net Job Change	Net Job Change	Net Job Change	Total MS Openings 2016-21
	0.86	48,050	20.6%	-0.9%	5,960
	0.34	6,990	10.9%	-7.8%	650
es	0.34	17,620	22.3%	1.2%	3,095
	0.00	9,910	3.1%	4.4%	13,361
	0.09	18,060	10.4%	5.4%	17,030



6.3 Targets: Matrix Industries

Matrix industries were selected by developing a multimetric matrix to identify industries in the Los Angeles Basin with the most economic benefit, in terms of both wealth generation and the most opportunities for middle-skill job growth.

Our criteria for choosing the matrix target industries include:

- middle-skill jobs those industries with the highest job share and a high proportion of middle-skill jobs are given preference;
- (2) middle skill jobs growth rate those industries demonstrating high rates of middle skill job growth are given preference;

- (3) potential middle-skill job creation those industries with a greater number of middle-skill job projected to be added are given preference;
- (4) *industry competitiveness* -those industries that are prominent, or competitive against other regions, are given preference;
- (5) *prevailing wages* those industries with higher wages are given preference; and
- (6) economic output and value added those industries with high value adds are given preference, as they produce the largest ripple effects in terms of their indirect and induced economic activity in the region.

EXHIBIT 6-3	4	Middle Skill J			
Matrix Industries - Targets in LA Basin		Total Jobs	Total	Projected Openings	
NAICS	Industry	2016	2016	2016-21	
512,515,711	Entertainment	223,320	122,280	5,960	
621,622,623	Health Care Services	591,940	382,900	27,740	
23	Construction	229,000	129,610	16,110	
481,483,488	Port Related Transport and Support Activities	83,750	50,765	3,095	
42, 454	Wholesale and eCommerce	325,510	143,810	9,910	



6.4 Selected Industry Targets

The three industry targets lists provided: matrix industries, prominent industries, and emerging and growing industries, present nine distinct industries from which to select the final six target industries with the most promising middle-skill potential.

Industries present in more than one list were natural selections; these industries include entertainment, port-related transportation and supporting activities, and professional and technical business services.

Additionally, one target industry unique to each list was chosen. The leading industry target using the multi-metric matrix was health care services. For prominent industries in the region, aerospace was selected. And finally, bio-medical manufacturing was selected as a target from the growing and emerging industries list.

EXHIBIT 6-4

Comprehensive Listing of Industry Targets

NAICS	Industry
3364	Aerospace Product Parts and Manufacturing
3254, 3391	Bio-Medical Manufacturing
23	Construction
334	Electronic Product Manufacturing
512,515,711	Entertainment
621,622,623	Health Care Services
481,483,488	Ports and Supporting Transportation Activities
541 less 5417	Professional and Technical Business Services
42,454	Wholesale and eCommerce

Source: Estimates by LAEDC

Final Target Industries

The six selected target industries with promising middle-skill potential in alphabetical order are as follows: (1) aerospace; (2) biomedical manufacturing; (3) entertainment; (4) health care services; (5) ports and related transportation support activities; (6) professional and technical services.

Together these six industries are expected to have an estimated 55,725 total openings for middle-skill jobs over the five-year period of 2016 through 2021.

These industries are discussed individually below, including a brief overview of each in the region.

Aerospace

With a 100-year history in the Los Angeles Basin, the aerospace vehicles and parts manufacturing industry remains one of the region's prominent industries, serving private and government consumers worldwide. Industry employment is nearly two and a half times more concentrated in the LA Basin versus nationwide.

Though the industry suffered drastically during the 1990s as federal contracts plummeted and the industry consolidated, private investment has picked up over the last few decades, particularly in the form of private space exploration and commercial aircrafts. The combination of continued federal contracts and increasing amounts of private investment directed towards new consumer-facing aerospace products and services bode well for the future of the LA Basin's aerospace industry as the industry will be less susceptible to the ups and downs of fiscal policy.

Employment in the industry will continue to comprise many mid- to high-skill workers in the near future.

Middle Skills Jobs

EX	HI	BI	Τ.	6-	5

Selected Targe	t Industries in LA Basin	Total Jobs	Total	Projected	
NAICS	Industry	2016	2016	2016-21	
3364	Aerospace	47,920	19,920	1,250	
3254, 3391	Bio-Medical	38,630	15,350	650	
512,515,711	Entertainment	223,320	122,280	5,960	
621,622,623	Health Care Services	591,940	382,900	27,740	
481,483,488	Port Related Transport and Support Activities	83,750	50,765	3,095	
541 less 5417	Professional and Technical Services	383,290	157,280	17,030	



The demand for workers with technical skills, as well as in-depth knowledge of mathematics and science will continue to remain a high priority for aerospace establishments. Simultaneously, many workers in the industry across all occupations are nearing retirement age, including those in middle-skill occupations such as aircraft mechanics and service technicians, representing a critical training opportunity for local community colleges.

Bio-Medical

The biomedical industry is an emerging industry in the Los Angeles Basin, with pharmaceutical operations primarily concentrated in Los Angeles County and medical device manufacturing primarily concentrated in Orange County. From 2011 through 2016, employment grew by 10.9 percent and industry concentration increased, with a positive change in the industry LQ (up by 0.34) over the period.

A wide-range of world-renowned academic institutions and health care establishments support local businesses in the industry through research and workforce preparation. The industry remains poised for growth as demand for innovations that will improve the health and well-being of the population continues to grow.

Aside from the hundreds of high-skill, high-wage workers employed as chemists, industrial and medical engineers, and software developers, many workers in the industry are also middle-skill workers. For example, hundreds of workers in the industry are employed as laboratory technicians, inspectors, testers, sorters, samplers, and weighers.

Entertainment

The Los Angeles motion picture and video production industry has a long established history of providing entertainment for consumers throughout the world. The rise in digital media (characterized by digitized content that is encoded and can be distributed over computer networks) has become a transformative change for the industry. Entertainment-related businesses have been contending with and/or adapting to increased use of social media, while a traditional television set is being persistently replaced by computer monitors, tablets and smart phones.

Despite changes in how entertainment is produced, distributed and consumed, the demand for middle-skill workers will continue to be a primary driver of future job openings. Among the wide range of occupations in the industry, thousands of middle-skill workers serve as audio and video equipment technicians, and film and video editors.

Health Care Services

Health care establishments provide services for residents of the Los Angeles Basin that extend far beyond the hospital. These include outpatient services, diagnostics, in-home services, and nursing and residential care facilities. Policy changes related to the Affordable Care Act have had less overall impact on the demand and supply of workers than the region's aging population. Augmented by its anticyclical nature, the Los Angeles Basin's health care industry expanded persistently even as the economy was in recession.

Perhaps more than any other industry, health care establishments employ a wide range of workers by occupation, skill level, educational attainment, and experience. Middle-skill occupations account for a large portion of workers in the industry. For example, tens of thousands of registered nurses, medical and nursing assistants, medical secretaries, and dental assistants are employed throughout the Los Angeles Basin.

Port-Related Transportation and Support Activities

The Los Angeles Customs District is the nation's busiest customs district by total trade value, and the LA Basin is home to the two largest seaports in the United States and one of the busiest origin and destination airports in the world.

While recent technological advances in goods movement have greatly reduced costs, the widespread adoption of partially and fully autonomous vehicles in the near- to medium-term future will almost certainly affect the transportation industry's workforce, from warehousing operations, to long-haul transportation, to last-mile delivery.

Thousands of workers in middle-skill occupations within the ports and supporting transportation activities industry are employed as cargo and freight agents, drivers of heavy and tractor trailer trucks, and aircraft mechanics and service technicians. With the rapid technological changes expected in the industry, the demand for highly specialized technical training will almost certainly grow.

Professional and Technical Services

The Los Angeles Basin is headquarters to a number of worldwide industry leaders in the professional and technical services industry, serving businesses and consumers locally, nationally and globally. Some of the most prestigious law, accounting, architectural, and



engineering firms are either based in the region or have secondary offices.

While often associated with high-skill, high-wage jobs, the industry also offers a wide range of middle-skill employment opportunities. For example, there are thousands of workers employed at law firms as legal secretaries, paralegals, and legal assistants; thousands of workers employed at accounting and bookkeeping firms as clerks and office and administrative support managers; and thousands of workers employed at architectural and engineering firms as architectural and civil drafters. Even so, the professional and technical services industry, along with its associated middle-skill occupations, is ripe for major disruptions brought on by technological innovation.

Careful examination of the detailed middle-skill occupations within these six target industries that will provide the most job openings in the next five years are covered in section seven, following the target industry pages.



6.5 Target Industry Pages

Together, these six target industries account for approximately 23.2 percent of total employment and 33.2 percent of all middle-skill jobs in the LA Basin in 2016, with 55,725 total middle-skill openings expected from 2016 to 2021 in the region.

In the pages that follow, each of the industries shown in Exhibit 6-5 is detailed in an infographic providing the following:

- *Description* and definition of the industry is outlined and detailed
- The *employment* level in this industry is presented in both 2016 and 2021f
- Total employment in the industry along with its middleskill job share in 2016
- Average annual wages paid in 2016 for workers in this industry in the LA Basin
- The *distribution* of workers by major occupation group across the industry
- *Middle-skill jobs* data and projected openings for workers in the LA Basin in 2016 and through 2021
- The *automation potential* of workers in the sector in which this industry is a part; this potential is expressed as the share of workers' activities which could be automated based on current demonstrated technology
- A selection of several *industry* occupations most vulnerable to displacement in the future due to automation

• A selection of other *metrics* specific to this industry, including economic output, value added, industry concentration and wage data. Additional middle-skill jobs data

The focus of the occupational analysis that follows will be on occupations specific to these target industries and which stand to benefit from either a postsecondary nondegree award or career and technical education provided by community colleges.

Directory of Target Industries

- Aerospace Manufacturing (NAICS 3364)
- Bio-Medical Manufacturing (NAICS 3254 and 3391)
- Entertainment (NAICS 512, 515 and 711)
- Health Care Services (NAICS 621, 622 and 623)
- Ports and Supporting Transportation Activities (NAICS 481, 483 and 488)
- Professional and Technical Business Services (NAICS 541 less 5417)

Aerospace Product and Parts Manufacturing (NAICS 3364)

Aerospace manufacturing includes establishments primarily engaged in: (1) manufacturing complete aircraft, missiles, or space vehicles; (2) manufacturing aerospace engines, propulsion units, auxiliary equipment or parts; (3) developing and making prototypes of aerospace products; (4) aircraft conversion (i.e., major modifications to systems); and (5) complete aircraft or propulsion systems overhaul and rebuilding (i.e., periodic restoration of aircraft to original design specifications).





Grinding and Polishing Workers, Hand	risk
Fiberglass Laminators and Fabricators	Automated systems risk
Shipping, Receiving, and Traffic Clerks	Automated systems risk

Source: LAEDC

51-2091

43-5071

Bio-Medical (NAICS 3254 and 3391)

This industry comprises establishments primarily engaged in one or more of the following: (1) manufacturing biological and medicinal products; (2) processing (i.e., grading, grinding and milling) botanical drugs and herbs; (3) isolating medicinal principals from botanical drugs and herbs; and (4) manufacturing pharmaceutical products intended for internal and external consumption. This industry also comprises establishments that manufacture medical equipment and supplies.



EMPLOYMENT DISTRIBUTION BY OCCUPATION LA BASIN 2016



soc	Detailed Occupation	Displacement Threat
27-3042	Technical Writers	Data automation risk
51-9195	Molders, Shapers, and Casters, Except Metal and Plastic	Automated systems risk
43-9021	Data Entry Keyers	Data automation risk
51-6031	Sewing Machine Operators	Automated systems risk
51-9198	HelpersProduction Workers	Robotics risk

Source: LAEDC

Entertainment (NAICS 512, 515 and 711)

This industry comprises establishments involved in the production and distribution of motion pictures and sound recordings as well as establishments that create content or acquire the right to distribute content and broadcast the content. The indsutry also comprises establishments that produce or organize and promote live presentations involving the performances of actors, singers, dancers, musical groups, artists, athletes and other entertainers.





53-3032	Heavy and Tractor-Trailer Truck Drivers	Autonomous vehicle risk
53-6021	Parking Lot Attendants	Automated systems risk
53-3041	Taxi Drivers and Chauffeurs	Autonomous vehicle risk
43-2011	Switchboard Operators, Including Answering Service	Automated systems risk

Source: LAEDC



Health Care Services (NAICS 621, 622 and 623)

This industry comprises businesses that offer health care services directly and indirectly to ambulatory patients as well as hospitals that provide medical, diagnostic and treatment services to patients as well as specialized accommodation services required by inpatients. This industry includes establishments that provide residential care combined with either nursing, supervisory or other types of care as required by residents.





Source: LAEDC

Data automation risk

Data Entry Keyers

43-9021

Ports and Supporting Transportation Activities (NAICS 481, 483 and 488)

This industry comprises establishments primarily engaged in: air transportation of passengers and/or cargo using aircraft; water transportation of passengers and cargo using ships, barges or boats; and services that support transportation. These services may be provided to transportation carrier establishments or the general public.





SOC Detailed Occupation		Displacement Threat		
53-3032	Heavy and Tractor-Trailer Truck Drivers	Autonomous vehicle risk		
53-7051	Industrial Truck and Tractor Operators	Autonomous vehicle risk		
53-3033	Light Truck or Delivery Services Drivers	Data automation risk		
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	Robotics risk		

Source: LAEDC

Professional and Technical Business Services (NAICS 541 Less 5417)

This industry comprises establishments primarily engaged in processes where human capital is the major input. These establishments make available the knowledge and skills of their employees, often on an assignment basis, where an individual or team is responsible for the delivery of services to the client.



EMPLOYMENT DISTRIBUTION BY OCCUPATION LA BASIN 2016



soc	Detailed Occupation	Displacement Threat
13-2011	Accountants and Auditors	Data automation risk
13-2041	Credit Analysts	Data automation risk
13-1051	Cost Estimators	Data automation risk
17-1022	Surveyors	UAV and data automation risk

Source: LAEDC

7 Target Industry Occupations

n this section, we convert industry job creation projections into occupational projections and select twenty middle-skill detailed occupations from our identified target industries as promising targets for post-secondary programs for community colleges.

7.1 Selecting Occupations

The growth of industries in the region will precipitate the growth of particular occupations. From each of the six target industries, the occupations with the most job creation potential and the highest replacement rate were selected and compiled in a comprehensive list. These occupations were looked at, not only for their prominence in the target industry, but also for their skill and competency relevance across all industries, as other industries hiring this occupation are also viable job targets for student completing a training program. The overall net growth of an occupation is a consequence of its contribution to industries that are growing and to industries that are declining. Additionally, workers within industries leave current positions, either through retirement or through promotion, or for other reasons, leaving positions open and in need of replacement.

This may result in an occupation experiencing no or little growth as workers that had been employed in a failing industry shift to similar roles in industries that are growing, or as workers in certain occupations are replaced with improved technologies or processes.

Exhibit 7-1 presents the top 20 detailed middle-skill occupations selected as target industry occupations with the most potential for community college programs.

In this section, we provide a detailed occupational data sheet for each identified detailed occupation selected as a target industry occupation from our six identified target industries outlined in the previous section.

Projected

Total

EXHIBIT 7-1

Target Industry Occupations in LA Basin Middle-Skill Occupations

SOC	Detailed Occupation	Jobs 2016	Openings 2016-21
11-3071	Transportation, Storage and Distribution Managers	6,210	1,330
15-1134	Web Developers	8,680	1,780
15-1151	Computer User Support Specialists	23,500	3,880
27-1022	Fashion Designers	5,270	760
27-1024	Graphic Designers	12,650	2,410
27-4011	Audio and Video Equipment Technicians	10,710	1,880
27-4032	Film and Video Editors	12,588	1,070
29-1141	Registered Nurses	102,749	18,470
29-2061	Licensed Practical/Licensed Vocational Nurses	28,170	5,220
31-1014	Nursing Assistants	42,070	6,540
43-3031	Bookkeeping, Accounting and Auditing Clerks	76,510	3,920
43-3051	Payroll and Timekeeping Clerks	9,220	1,900
43-5061	Production, Planning and Expediting Clerks	23,110	4,610
47-2111	Electricians	17,180	2,990
49-3011	Aircraft Mechanics and Service Technicians	5,250	650
49-3042	Mobile Hvy Equipmnt Mechanics, Except Engines	3,800	880
49-9041	Industrial Machinery Mechanics	7,810	1,670
51-4011	Computer-Controlled Machine Tool Operators, Metal/Plastic	6,610	1,490
51-4121	Welders, Cutters, Solderers and Brazers	9,610	2,170
51-9061	Inspectors, Testers, Sorters, Samplers/Weighers	22,380	3,840
TOTAL	Target Industry Occupations	434,070	67,450



7.2 Target Industry Occupational Pages

The focus of this occupational analysis will be on middleskill occupations in selected target industries that are predicted to have significant job prospects over the next five years and that stand to benefit from investment in postsecondary nondegree and career education programs.

Together, these twenty target industry occupations account for approximately 21.2 percent of all projected new jobs in the Los Angeles Basin from 2016 through 2021.

In the pages that follow, each of the occupations listed in the directory is detailed as follows:

- Description and core tasks and importance are outlined and detailed. Importance is the degree of importance, on a scale of zero to 100, of a particular core task to the occupation. Core tasks, those with the criteria a relevance of ≥ 67 percent, are considered critical to the occupation.
- *Hourly wages* paid in 2016 for workers in this occupation in the Los Angeles and Orange Counties compared to the living wage
- The *distribution* of workers in this occupation across industry sectors in the LA Basin
- Metrics for this occupation including: number of current jobs and projected openings, community college supply data, and identified technology used (or which must be taught)
- Worker characteristics, such as educational attainment, age distribution, race and ethnicity, and gender of workers in this occupation
- *Related occupations* with similar skills, knowledge and abilities, as a potential source for projected workforce needs
- A crosswalk between work activities performed in this occupation and in similar, related occupations

Directory of Target Industry Occupations

- Transportation, Storage and Distribution Managers (SOC 11-3071)
- Web Developers (SOC 15-1134)
- Computer User Support Specialists (SOC 11-1151)
- Fashion Designers (SOC 27-1022)
- Graphic Designers (SOC 27-1024)
- Audio and Video Equipment Technicians (SOC 27-4011)
- Film and Video Editors (SOC 27-4032)
- Registered Nurses (SOC 29-1141)
- Licensed Practical and Licensed Vocational Nurses (SOC 29-2061)
- Nursing Assistants (SOC 31-1014)
- Bookkeeping, Accounting and Auditing Clerks (SOC 43-3031)
- Payroll and Timekeeping Clerks (SOC 43-3051)
- Production, Planning and Expediting Clerks (SOC 43-5061)
- Electricians (SOC 47-2111)
- Aircraft Mechanics and Service Technicians (SOC 49-3011)
- Mobile Heavy Equipment Mechanics (not engines) (SOC 49-3042)
- Industrial Machinery Mechanics (SOC 49-9041)
- Computer-Controlled Machine Tool Operators, Metal and Plastic (SOC 51-4011)
- Welders, Cutters, Solderers and Brazers (SOC 51-4121)
- Inspectors, Testers, Sorters, Samplers and Weighers (SOC 51-9061)

Transportation, Storage and Distribution Managers (SOC 11-3071)

Transportation, storage and distribution managers are identified as a middle-skill occupation. They plan, direct, or coordinate transportation, storage, or distribution activities in accordance with organizational policies and applicable government laws or regulations. Includes logistics managers.



INDUSTRY DISTRIBUTION



Industry Distribution:

Transportation, storage and distribution managers are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Warehousing and transportation hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of transportation, storage and distribution managers in the LA Basin are:

- Support Activities for Transportation(NAICS 488)
- Wholesalers, Nondurable Goods (NAICS 424)
- Wholesalers, Durable Goods (NAICS 423)



At A Glance

Projected Openings 2021:

• 1,330 Total Openings (5-yr)

- 650 Net Job Change
- 680 5-yr Replacements

Community Colleges Supply:

- 1,258 awards
- 4 Programs
- 21 colleges

Technology:

- Analytical or scientific software
 FRCOS software; IMSure Solutions SHIPflex
- Route navigation software
 - ALK Technologies FleetSuite; CoPilot Truck; Integrated Decision Support Corporation Route Systems Fleet Commander
- Inventory management software
 - Aljex Inventory; Iptor Supply Chain; MRA Technologies MRATrack Warehouse Management System
- Materials requirements planning logistics and supply chain software
 - Cadre Technologies Cadence Transportation Management System

Sources: BLS OES, O*NET, LAEDC

Core Tasks and Importance:

- 89 Supervise the activities of workers engaged in receiving, storing, testing and shipping products or materials.
- 83 Plan, develop or implement warehouse safety and security programs and activities.
- 83 Inspect physical conditions of warehouses, vehicle fleets, or equipment and order testing, maintenance, repairs or replacements.
- 82 Plan, organize or manage the work of subordinate staff to ensure that the work is accomplished in a manner consistent with organizational requirements.
- 82 Direct activities related to dispatching, routing or tracking transportation vehicles, such as aircraft or railroad cars.
- **78** Collaborate with other departments to integrate logistics with business systems or processes, such as customer sales, order management, accounting or shipping.



Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of Associate's degree or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the regional average.
- The workforce in this occupation is diverse, with the largest shares held by Hispanic, White and Asian workers, accounting for 91 percent
- The workforce is predominantly male, accounting for 83 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- **SOC 51-4031** Cutting, punching and press machine setters, operators and tenders, metal and plastic (6,430 workers)
- SOC 13-1081 Logisticians (6,040 workers),
- SOC 11-3061 Purchasing Managers (3,390 workers),
- **SOC13-1023** Purchasing Agents, Except Wholesale, Retail, and Farm Products (11,970 workers), and
- **SOC 11-1021** General and Operations Manager (101,490 workers).

EDUCATIONAL ATTAINMENT 2016

10.6% 27. 1%		37.8 %		3.3%	- 6.2 %		
Target occupation							
16.0%	19.4	%	30.4%	22.69	% 11.5	5%	
Total, all occupations Less than HS Associate's/Some College Master's or Higher AGE DISTRIBUTION 2016 4.5%							
	31.4%		41.6%		22.5 %	6	
Target o	Target occupation 5.3%						
26.	7 %	' :	32.1%	36	. 6 %		
Total, all occupations Under 24 years 40 to 54 years 25 to 39 years 55 years and over							

RACE AND	7.1%				
37.0% 14.2%		14.2%	21.9%		- 2.1%
Target occupation			2.4	4%	
43.1	%	33.0%	15.8%	. '	
Total, all occupations			5.7%	6	
Hispanic	Asian	Other			
White	Black				

GENDER 2016

83.1%	16.9%			
Target occupation				
54.8%	45.2%			
Total, all occupations				

Male Female

Transportationn/Strg/Distb Mgrs

Decision Making/ Problem Solving Getting Information Communicate Sups/Peer/Subords Interact w/ Computers Communicate w/ Outside Orgs Eval/Determ Standrds Compliance Identify Objects/Actions/Events Organize, Plan & Prioritize Work Coordinate Work & Activities, Others Developing and Building Teams

Logisticians

Communicate w/ Outside Orgs Organize, Plan & Prioritize Work Decision Making/ Problem Solving Cetting Information Interact w/ Computers Establish & Maintain Relationships Communicate w/ Outside Orgs Developing and Building Teams

Purchasing Managers

Resolve Conflicts & Negotiating Communicate w/ Outside Orgs Communicate Sups/Peer/Subords Establish & Maintain Relationships Getting Information Decision Making/ Problem Solving Interact w/ Computers Monitor & Control Resources

Prchsng, Expt Whis, Rtl, Frm

Getting Information Communicate Sups/Peer/Subords Interact w/ Computers Communicate w/ Outside Orgs Establish & Maintain Relationships Resolve Conflicts & Negotiating Decision Making/ Problem Solving Organize, Plan & Prioritize Work

Ceneral and Operations Managers

Decision Making/ Problem Solving Communicate Sups/Peer/Subords Getting Information Coordinate Work & Activities, Others Guide/ Direct/ Motivate Subords Identify Objects/Actions/Events Interact w/ Computers Monitor Process/ Materls/ Surroundings

Sources: U.S. Census Bureau ACS PUMS, O*NET, LAEDC

Web Developers (SOC 15-1134)

Web developers are identified as a middle-skill occupation. Design, create, and modify Web sites. Analyze user needs to implement Web site content, graphics, performance, and capacity. May integrate Web sites with other computer applications. May convert written, graphic, audio, and video components to compatible Web formats by using software designed to facilitate the creation of Web and multimedia content.



INDUSTRY DISTRIBUTION



Industry Distribution:

Web developers are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Professional and business services hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of web developers in the LA Basin are:

- Profnl, Scientific and Technical Srvcs (NAICS 541)
- Mgmt of Companies and Enterprises (NAICS 551)
- Data Processing, Hosting and Related (NAICS 518)



At A Glance

Projected Openings 2021:

- 1,780 Total Openings (5-yr)
 - 1,220 Net Job Change
 - 560 5-yr Replacements

Community Colleges Supply:

- 52 awards
- 2 Programs
- 10 colleges

Technology:

- Data base management system software
 - Apache Hadoop; NoSQL; Teradata Database
- Development environment software
 Apache Maven; C; Integrated
 - Development Environment IDE software
- Object or component oriented development software
 - Apache Spark, C++; Oracle Java; Python
- Operating system software
 Linux; Oracle Solaris; Ubuntu
- Web platform development software
 ATAX_Drugsd_TaysSprint_Dubuon_Drugs
 - AJAX; Drupal; JavaScript; Ruby on Rails

Sources: BLS OES, O*NET, LAEDC

Core Tasks and Importance:

- 90 Write supporting code for Web applications or Web sites.
- Besign, build or maintain Web sites, using authoring or scripting languages, content creation tools, management tools and digital media.
- 84 Back up files from Web sites to local directories for instant recovery in case of problems.
- 83 Write, design or edit Web page content, or direct others producing content.
- 79 Select programming languages, design tools or applications.
- 77 Evaluate code to ensure that it is valid, is properly structured, meets industry standards, and is compatible with browsers, devices, or operating systems.


The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of a Bachelor's degree, but 29 percent have an Associate's or some college.
- A very small share of workers are ages 55 years and over in this occupation.
- The workforce in this occupation is predominantly White, accounting for 57 percent of all workers.
- The workforce is predominantly male, accounting for 65 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 15-1121 Computer systems analysts (20,871 workers),
- SOC 15-1141 Database administrators (4,490 workers),
- **SOC 15-1133** Software developers, systems software (24,160 workers), and
- **SOC 15-1143** Computer network architects (4,580 workers).

EDUCATIONAL ATTAINMENT 2016

	4.0 /0							
0.4% -	_	29.1%		56.0	%			
	Target occ	upation						
	16.0%	19.4%	30.4%	6 2	2.6 %	11.5%		
or	Total, all occupations Less than HS Associate's/Some College Master's or Higher AGE DISTRIBUTION 2016							
1		57.	8%		27.5%	ó '		
	Target occ	upation 5.3 %						
-	26.7	%	32.1%		36.6%			
5	Total, all o	ccupations						

10.0%

5 3%

Under 24 years 40 to 54 years

25 to 39 years 🛛 🖬 55 years and over

RACE AND ETHNICITY 2016

12.1%					
	56.7 %	24.8%	-1.1%		
Target occupat	ion	2.4%			
43.1	%	33.0%	15.8%		
Total, all occup	ations	5.7%			
Hispanic	Asian	Other			
White	Black				

GENDER 2016

65.4%	34.6%						
Target occupation							
54.8%	45.2%						
Total, all occupations							

Male Female

Web Developers

Interact w/ Computers Getting Information Thinking Creatively Update & Use Relevant Knowledge Decision Making/ Problem Solving Process Information Organize, Plan & Prioritize Work Communicate Sups/Peer/Subords Identify Objects/Actions/Events Analyze Data/ Information

Computer Systms Analysts

Interact w/ Computers Getting Information Process Information Communicate Sups/Peer/Subords Analyze Data/ Information Decision Making/ Problem Solving Update & Use Relevant Knowledge Thinking Creatively

Database Administrators

Interact w/ Computers Process Information Analyzing Data or Information Decision Making/ Problem Solving Getting Information Organize, Plan & Prioritize Work Update & Use Relevant Knowledge Documenting/Recording Information Software Developers, Systems Software Interact w/ Computers Decision Making/ Problem Solving Thinking Creatively Update & Use Relevant Knowledge Getting Information Analyze Data/ Information Communicate Sups/Peer/Subords Organize, Plan & Prioritize Work

General and Operations Managers

Interact w/ Computers Update & Use Relevant Knowledge Getting Information Communicate Sups/Peer/Subords Decision Making/ Problem Solving Identify Objects/Actions/Events Thinking Creatively Organize, Plan & Prioritize Work

Computer User Support Specialists (SOC 15-1151)

Computer User Support Specialists are identified as a middleskill occupation. Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.



INDUSTRY DISTRIBUTION



Industry Distribution:

Computer user support specialists are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Professional and business services hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of computer user support specialists in the LA Basin are:

- Profnl, Scientific and Technical Srvcs (NAICS 541)
- Administrative and Support Services (NAICS 561)
- Wholesalers, Durable Goods (NAICS 423)



At A Glance

Projected Openings 2021:

- 3,880 Total Openings (5-yr)
 - 2,370 Net Job Change
 - 1,510 5-yr Replacements

Community Colleges Supply:

- 430 awards
- 4 Programs
- 23 colleges

Technology:

- Data base management system software
 FileMaker Pro; MySQL; Oracle JDBC
- Desktop communications software
 CrossTec NetOp Remote Control; Stac Software ReachOut
- Development environment software
 Apache Maven; C; Eclipse IDE; Microsoft PowerShell
- Operating system software
 Cisco Systems IOS; Hewlett Packard HP-UX; Linux
- Web platform development software
 Apache Tomcat; Drupal; LAMP Stack

Sources: BLS OES, O*NET, LAEDC

- 90 Answer user inquiries regarding computer software or hardware operation to resolve problems.
- 82 Oversee the daily performance of computer systems.
- 81 Read technical manuals, confer with users or conduct computer diagnostics to investigate and resolve problems or to provide technical assistance and support.
- 79 Set up equipment for employee use, performing or ensuring proper installation of cables, operating systems or appropriate software.
- 77 Develop training materials and procedures, or train users in the proper use of hardware or software.
- 76 Refer major hardware or software problems or defective products to vendors or technicians for service.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of an Associate's degree or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the reginal average.
- The workforce in this occupation is diverse, Hispanic, White and Asian workers account for 89 percent of all workers.
- The workforce is predominantly male, accounting for 76 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 27-4012 Broadcast technicians (2,800 workers),
- SOC 43-9011 Computer operators (1,320 workers),
- SOC 27-4011 Audio and video equipment technicians (10,710 workers), and
- **SOC 25-9011** Audio-visual and multimedia collections specialists (630 workers).

EDUCATIONAL ATTAINMENT 2016

	8	.0%		9.5%			
0.7 %		42.8 %			38		
	Targ	et occu					
	16	. 0 %	19.4%	30.	4%	22.6 %	11.5%
	Tota	l, all oc	cupations				
	Less than HS Assoc High School Bach			Associate's/ Bachelor's	Some Colleg	le Mas or H	ter's ligher

o vo/

AGE DISTRIBUTION 2016

4	43.4%				11.7%		
Target occupation 5.3%							
26.7 %		32.1%		36.6	%		
Total, all occupati	on	5					
Under 24 years		40 to 54 years					
25 to 39 years		55 years and ov	er				

RACE A	ND ETHNICI		7.3%			
22.3%	38.7 9	6	28	.0%		-3.7%
Target oco	cupation			2.	4%	
	43.1%	33.0	0%	15.8%		
Total, all d	occupations		5.7 9	6		
Hispani White	ic Asian Black	Ot	her			

GENDER 2016

76.4%	23.6%					
Target occupation						
54.8%	45.	.2 %				
Total, all occupations						

Male Female

Computer User Support Spcist Interact w/ Computers **Getting Information** Communicate Sups/Peer/Subords Update & Use Relevant Knowledge Decision Making/Problem Solving Organize, Plan & Prioritize Work Rpr/Maint Electric Equip Process Information Documenting/Recording Info Thinking Creatively Audio-Visual and Multimedia **Computer Operators** Audio/Vid Equip Technicians **Broadcast Technicians Collections Specialists** Interact w/ Computers Interact w/ Computers Interact w/ Computers Getting Information Identifying Objects, Actions, **Cetting Information** Interact w/ Computers Communicate Sups/Peer/Subords and Events Decision Making/Problem Solving **Getting Information** Processing Information Decision Communicate Sups/Peer/Subords Communicate Sups/Peer/Subords Identify Objects/Actions/Events Rpr/Maint Electric Equip Making/Problem Solving Decision Making/ Problem Solving Update & Use Relevant Knowledge Identify Objects/Actions/Events **Controlling Machines and Processes** Establish & Maintain Relationships Monitor Process/Materls/ Schedule Work & Activities **Getting Information** Documenting/Recording Info Decision Making/ Problem Solving Update & Use Relevant Knowledge Surroundings Organize, Plan & Prioritize Work Monitor Process/Materls/ Organize, Plan & Prioritize Work Identify Objects/Actions/Events



Fashion Designers (SOC 27-1022)

Fashion Designers are identified as a middle-skill occupation. They design clothing and accessories. Create original designs or adapt fashion trends.



INDUSTRY DISTRIBUTION



Industry Distribution:

Fashion designers are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Information (NAICS 51) hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of fashion designers in the LA Basin are:

- Motion Picture and Sound Recording(NAICS 512)
- Wholesalers, Nondurable Goods (NAICS 424)
- Apparel Manufacturing (NAICS 315)



At A Glance

Projected Openings 2021:

• 760 Total Openings (5-yr)

- 130 Net Job Change
- 630 5-yr Replacements

Community Colleges Supply:

- 199 awards
- 2 Programs
- 12 colleges

Technology:

- Accounting software
- Computer aided design CAD software Hot technology
 - Autodesk AutoCAD Design Suite; C-DESIGN Fashion
- Development environment software
 Apache Maven; C; Eclipse IDE; Microsoft PowerShell
- Electronic mail software
- Graphics or photo imaging software
 Adobe Systems Adobe Illustrator; Adobe Photoshop
- Spreadsheet software

Sources: BLS OES, O*NET, LAEDC

- **89** Direct and coordinate workers involved in drawing and cutting patterns and constructing samples or finished garments.
- 89 Examine sample garments on and off models, modifying designs to achieve desired effects.
- 87 Sketch rough and detailed drawings of apparel or accessories, and write specifications such as color schemes, construction, material types, and accessory requirements.
- 86 Confer with sales and management executives or with clients to discuss design ideas.
- 82 Identify target markets for designs, looking at factors such as age, gender, and socioeconomic status.
- Attend fashion shows and review garment magazines and manuals to gather information about fashion trends and consumer preferences.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of a Bachelor's, but 36 percent have an Associate's or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the reginal average.
- The workforce in this has a large share of Asian workers, White and Asian workers each account for 35 percent of all workers.
- The workforce is predominantly female, accounting for 76 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 51-6092 Fashion and apparel patternmakers (1,280 workers),
- SOC 27-1025 Interior designers (3,380 workers),
- SOC 11-2021 marketing managers (11,250 workers), and
- SOC 43-9031 Desktop publishers (760 workers).

EDUCATIONAL ATTAINMENT 2016

	3.1 /0		0.070				
1.3%		36.3%			48.9 %		
	Target occu						
	16.0%	19.4%	3	0.4%	22.6%	6 11.5%	
	Total, all oc	cupations					
	Less than HS High School		Associate's/Some College Bachelor's		ollege N o	laster's r Higher	

38%

AGE DISTRIBUTION 2016

0.070						
5	55.9%				10.8%	
Target occupation	5	.3%				
26.7 %	32.1%			36.6%		
Total, all occupatio	ons	3				
Under 24 years 25 to 39 years		40 to 54 years 55 years and over				

0.4% **RACE AND ETHNICITY 2016** 27.4% 34.6% 34.6% 3.0% Target occupation 2.4% 43.1% 33.0% 15.8% 5.7% Total, all occupations Hispanic Asian Other White Black

GENDER 2016

23.9 %		71.6%					
Target occupation							
54	4.8%	45.2%					
Total, all occupations							

Male Female

Fashion Designers Thinking Creatively Establish & Maintain Relationships Organize, Plan & Prioritize Work **Getting Information** Judge Qual of Things/Services/People Schedule Work & Activities Communicate w/ Outside Orgs Communicate Sups/Peer/Subords Decision Making/Problem Solving Selling or Influencing Others Fabric/Apparel Patternmakers **Marketing Managers Desktop Publishers Interior Designers** Communicate Sups/Peer/Subords Interact w/ Computers Communicate Sups/Peer/Subords Monitor Process/ Materls/ Thinking Creatively Interact w/ Establish & Maintain Relationships **Cetting Information Computers Getting Information** Interact w/Computers Thinking Creatively Draft/Lay Out/Specify Tech Equip Decision Making/Problem Solving Communicate Sups/Peer/Subords Identify Objects/Actions/Events Thinking Creatively Decision Making/ Problem Solving Communicate w/ Outside Orgs Organize, Plan & Prioritize Work Update and Use Relvnt Knowledge Decision Making/ Problem Solving **Getting Information** Process Information Communicate Sups/Peer/Subords Selling or Influencing Others Decision Making/ Problem Solving Organize, Plan & Prioritize Work **Thinking Creatively** Communicate w/ Outside Orgs

Graphic Designers (SOC 27-1024)

Craphic designers are identified as a middle-skill occupation. They design or create graphics to meet specific commercial or promotional needs, such as packaging, displays, or logos. May use a variety of mediums to achieve artistic or decorative effects.



INDUSTRY DISTRIBUTION



Industry Distribution:

Graphic designers are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Professional and business services hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of graphic designers in the LA Basin are:

- Profnl, Scientific and Technical Srvcs (NAICS 541)
- Printing and Related Support (NAICS 323)
- Motion Picture and Sound Recording (NAICS 512)



At A Glance

Projected Openings 2021:

- 2,410 Total Openings (5-yr)
 - 910 Net Job Change
 - 1,510 5-yr Replacements

Community Colleges Supply:

- 342 awards
- 4 Programs
- 23 colleges

Technology:

- Computer aided design CAD software Hot technology
 - Autodesk aided design CAD; Dassault Systemes CATIA
- Desktop publishing software
 Adobe InDesign; QuarkXPress
- Graphics or photo imaging software
- Adobe Flash; Adobe Photoshop; Microsoft Visio
- Video creation and editing software
 Apple Final Cut Pro; MAXON CINEMA 4D
- Web platform development software
 AJAX; Drupal; Hypertext markup language HTML

Sources: BLS OES, O*NET, LAEDC

- 86 Determine size and arrangement of illustrative material and copy, and select style and size of type.
- 85 Confer with clients to discuss and determine layout design.
- 85 Create designs, concepts, and sample layouts, based on knowledge of layout principles and esthetic design concepts.
- 83 Develop graphics and layouts for product illustrations, company logos, and Web sites.
- 81 Use computer software to generate new images.
- 80 Review final layouts and suggest improvements as needed.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of a Bachelor's, but 18 percent have an Associate's or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the regional average.
- The workforce in this occupation is predominantly White and Asian, accounting for 74 percent of all workers.
- The workforce is almost evenly split between both genders.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 27-1011 Art directors(3,970 workers),
- **SOC 27-1014** Multimedia artists and animators (6,490 workers),
- SOC 27-4032 Film and video editors (12,590 workers), and
- **SOC 11-2011** Advertising and promotions managers (1,700 workers).

EDUCATIONAL ATTAINMENT 2016

0.9%		17.5	7%		70.5%		7.8 %		
	Targ	et occ	upati	ion					
	16	. 0 %	19	.4%	30.4%	22.6 %	11.5%		
	Total, all occupations								
	Less than HS Associate's/Some College Master						er's		
	📕 High School 👘 📕 Ba			B	achelor's	or Hi	gher		

AGE DISTRIBUTION 2016

5:	3.5%	27.8 %	14.4%					
Target occupation 5.3%								
26.7 %	32.1%	36.6%						
Total, all occupatio	ns							
Under 24 years	40 to 54 years							
25 to 39 years	55 years and over							

RACE AND	ETHNICITY	0.	. 8%	
19.9%	53.5	%	20.0%	-5.8%
Target occupat	tion		2.4	•%
43.1	1%	33.0%	15.8%	
Total, all occup	oations		5.7%	, o
Hispanic	Asian	Other		
White	Black			

GENDER 2016

55.5%	44.5%				
Target occupation					
54.8%	45.2%				
Total, all occupations					

Male Female

Graphic Designers

Thinking Creatively Getting Information Interact w/ Computers Update & Use Relevant Knowledge Decision Making/ Problem Solving Organize, Plan & Prioritize Work Establish & Maintain Relationships Communicate w/ Outside Orgs Communicate Sups/Peer/Subords Identify Objects/Actions/Events

Art Directors

Thinking Creatively Interact w/ Computers Cetting Information Establish & Maintain Relationships Organize, Plan & Prioritize Work Decision Making/ Problem Solving Judge Qual of Things/ Services/People Communicate w/ Outside Orgs

Multimedia Artists and Animators

Interact w/ Computers Thinking Creatively Update & Use Relevant Knowledge Communicate w/ Outside Orgs Getting Information Decision Making/ Problem Solving Process Information Communicate Sups/Peer/Subords

Film and Video Editors

Interact w/ Computers Thinking Creatively Identify Objects/Actions/Events Communicate Sups/Peer/Subords Getting Information Update & Use Relevant Knowledge Establish & Maintain Relationships Organize, Plan & Prioritize Work

Advrtising/Promotions Managers

Communicate w/ Outside Orgs Thinking Creatively Decision Making/ Problem Solving Cetting Information Communicate Sups/Peer/Subords Interact w/ Computers Establish & Maintain Relationships Perform/Work w/ Public



Audio and Video Equipment Technicians (SOC 27-4011)

Audio and video equipment technicians are identified as a middle-skill occupation. They set up, or set up and operate audio and video equipment including microphones, sound speakers, video screens, projectors, video monitors, recording equipment, connecting wires and cables, sound and mixing boards, and related electronic equipment for concerts, sports events, meetings and conventions, presentations, and news conferences. May also set up and operate associated spotlights and other custom lighting systems.



INDUSTRY DISTRIBUTION



Industry Distribution:

Audio and video equipment technicians are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Information (NAICS 51) hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of audio and video equipment technicians in the LA Basin are:

- Motion Picture and Sound Recording (NAICS 512)
- Performing Arts, Spectator Sports and Related (NAICS 711)
- Rental and Leasing Services (NAICS 532)



At A Glance

Projected Openings 2021:

- 1,880 Total Openings (5-yr)
- 860 Net Job Change
 - 1,010 5-yr Replacements

Community Colleges Supply:

- 294 awards
- 2 Programs
- 15 colleges

Technology:

- Graphics or photo imaging software
 Adobe Flash; Adobe Illustrator; Adobe Photoshop
- Operating system software
- Spreadsheet software
- Video creation and editing software
 Adobe AfterEffects; Apple Final Cut Pro
- Web page creation and editing software
 Adobe Dreamweaver; Adobe Flash Player

Sources: BLS OES, O*NET, LAEDC

- 77 Install, adjust, and operate electronic equipment to record, edit, and transmit radio and television programs, motion pictures, video conferencing, or multimedia presentations.
- 75 Diagnose and resolve media system problems.
- 74 Switch sources of video input from one camera or studio to another, from film to live programming, or from network to local programming.
- 72 Mix and regulate sound inputs and feeds or coordinate audio feeds with television pictures.
- 72 Compress, digitize, duplicate, and store audio and video data.
- Perform minor repairs and routine cleaning of audio and video equipment.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Just over 40 percent of workers have the educational attainment of an Associate's or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the regional average.
- The workforce in this occupation is predominantly White, accounting for 69 percent of all workers.
- The workforce is predominantly male, accounting for 93 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 27-4012 Broadcast technicians (2,800 workers),
- **SOC 27-4014** Sound engineering technicians (4,040 workers),
- **SOC 25-9011** Audio-Visual and multimedia collections specialists (630 workers), and
- SOC 43-9011 Computer operators (1,320 workers).

EDUCATIONAL ATTAINMENT 2016 4.2% 11.1% 41.2% 36.3% Target occupation

16.0%	19.4%	30.4%	22.6%	11.5%
Total, all oc	cupations			
Less thar	n HS 📃 A	ssociate's/Some Colle	ege 📃 Mast	er's
High Sch	ool B	achelor's	or Hi	gner

AGE DISTRIBUTION 2016

4.0 /0			
44.9	9%	33.9 %	16.4%
Target occupation	5.3%		
26.7%	32.19	%	36.6%
Total, all occupatio	ons		
Under 24 years	📕 40 to 54 yea	ars	
25 to 39 years	55 years and		
			9 60/ 3 30/

RACE AND ETHNICITY 2016			0.0 % I.	2%
17.9%	6	9.1%		-3.3%
Target occupation			2.49	%
43	5.1%	33.0%	15.8%	
Total, all occu	upations		5.7%	
Hispanic White	Asian Black	Other		
GENDER	2016	7	7.5%	

92.5%					
Farget occupation					
54.8% 45.2%					
Total, all occupations					

Male Female



Film and Video Editors (SOC 27-4032)

Film and video editors are identified as a middle-skill occupation. They edit moving images on film, video, or other media. May edit or synchronize soundtracks with images.



INDUSTRY DISTRIBUTION



Industry Distribution:

Film and video editors are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Information (NAICS 51) hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of film and video editors in the LA Basin are:

- Motion Picture and Sound Recording (NAICS 512)
- Broadcasting (except Internet) (NAICS 515)
- Performing Arts, Spectator Sports, and Related Industries (NAICS 711)



At A Glance

Projected Openings 2021:

- 1,070Total Openings (5-yr)
 - 500 Net Job Change
 - 570 5-yr Replacements

Community Colleges Supply:

- 468 awards
- 3 Programs
- 17 colleges

Technology:

- Graphics or photo imaging software
 - Adobe After Effects; Adobe Creative Cloud; Adobe Illustrator; Adobe Photoshop
- Music or sound editing software
 Avid Digidesign Pro Tools
- Video creation and editing software
 Adobe After Effects; Apple Final Cut Pro; Boris FX Continuum Complete
- Web page creation and editing software - Adobe Flash Player; Brightcove
- Web platform development software
 AJAX; Hypertext markup language HTML; JavaScript

Sources: BLS OES, O*NET, LAEDC

- 82 Organize and string together raw footage into a continuous whole according to scripts or the instructions of directors and producers.
- 82 Review assembled films or edited videotapes on screens or monitors to determine if corrections are necessary.
- 82 Trim film segments to specified lengths and reassemble segments in sequences that present stories with maximum effect.
- 80 Determine the specific audio and visual effects and music necessary to complete films.
- 79 Set up and operate computer editing systems, electronic titling systems, video switching equipment, and digital video effects units to produce a final product.
- 79 Select and combine the most effective shots of each scene to form a logical and smoothly running story.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of a Bachelor's, but 28 percent have an Associate's or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the regional average.
- The workforce in this occupation is predominantly White, accounting for 68 percent of all workers.
- The workforce is predominantly male, accounting for 87 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 51-5111 Prepress technicians and workers (1,580 workers),
- **SOC 27-4011** Audio and video equipment technicians (10,710 workers),
- SOC 43-9011 Computer operators (1,320 workers), and
- SOC 43-9031 Desktop publishers (760 workers).

EDUCATIONAL ATTAINMENT 2016

1.8 % -		27.7%		51.9%		10.0%		
	Target occupation							
	16.0%	19.4%	30.4%	22	.6%	11.5%		
	Total, all occupations Less than HS Associate's/Some College Master's High School Bachelor's Or Higher							
	11.4%	40.6	%	36.2	%	11.9%		
	Target occ	upation <mark>5.3</mark>	%					
	26.7	%	32.1%		36.6%			
	Total, all occupations							
	Under 24 25 to 39	4 years 🗧 40 years 📕 55	D to 54 years 5 years and ov	er				
					c c c			

RACE ANI	DETHNICITY	0.0% 5.7%	/0	
17.4%	6	5 7.8 %		-2.5%
Target occup	ation		2.4%	
43	.1%	33.0%	15.8%	
Total, all occu	ıpations		5.7%	
Hispanic White	Asian Black	Other		

GENDER 2016

86.8 %	13.2%				
Target occupation					
54.8%	45.2%				
Total all occupations					

Male Female

Film & Video Editors

Interact w/ Computers Thinking Creatively Identify Objects/Actions/Events Communicate Sups/Peer/Subords Getting Information Update & Use Relevant Knowledge Establish & Maintain Relationships Organize, Plan & Prioritize Work Decision Making/ Problem Solving Documenting/Recording Information

Prepress Technicians and Workers

Interact w/ Computers Getting Information Communicate Sups/Peer/Subords Decision Making/ Problem Solving Update & Use Relevant Knowledge Thinking Creatively Organize, Plan & Prioritize Work Monitor Process/Matrls/ Surroundings Audio & Vid Equip Technicians Interact w/ Computers Identify Objects/Actions/Events Getting Information Decision Making/ Problem Solving Control Machines/Processes Schedule Work & Activities Update & Use Relevant Knowledge Monitor Process/Matrls/ Surroundings

Computer Operators

Interact w/ Computers Getting Information Communicate Sups/Peer/Subords Process Information Decision Making/ Problem Solving Identify Objects/Actions/Events Monitor Process/Matrls/ Surroundings Organize, Plan & Prioritize Work

Desktop Publishers

Interact w/ Computers Getting Information Thinking Creatively Communicate Sups/Peer/Subords Update & Use Relevant Knowledge Process Information Decision Making/ Problem Solving Communicate w/ Outside Orgs

Registered Nurses (SOC 29-1141)

Registered nurses are identified as a middle-skill occupation. They assess patient health problems and needs, develop and implement nursing care plans, and maintain medical records. Administer nursing care to ill, injured, convalescent, or disabled patients. May advise patients on health maintenance and disease prevention or provide case management.



INDUSTRY DISTRIBUTION



Industry Distribution:

Registered nurses are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Health Services hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of registered nurses in the LA Basin are:

- Hospitals (NAICS 622)
- Ambulatory Health Care Services (NAICS 621)
- Nursing Residential Care Facilities (NAICS 623)



At A Glance

Projected Openings 2021:

• 18,470 Total Openings (5-yr)

- 6,350 Net Job Change
- 12,120 5-yr Replacements

Community Colleges Supply:

- 1,943 awards
- 1 Program
- 21 colleges

Technology:

- Categorization or classification software
- Data base user interface and query software
 Data entry software; IDX Systems; Microsoft Access
- Electronic mail software
- IBM Notes
- Medical software
 - Epic Systems; Medical procedure coding software; MEDITECH software
- Spreadsheet software

Sources: BLS OES, O*NET, LAEDC

Core Tasks and Importance:

- 96 Maintain accurate, detailed reports and records.
- 95 Administer medications to patients and monitor patients for reactions or side effects.
- ⁹³ Record patients' medical information and vital signs.
- 93 Monitor, record, and report symptoms or changes in patients' conditions.
- 87 Consult and coordinate with healthcare team members to assess, plan, implement, or evaluate patient care plans.
- 87 Modify patient treatment plans as indicated by patients' responses and conditions.

Middle Skills Relevance:

Registered nurses do not need a Bachelor's degree. Individuals can complete a nursing program at a either a community or career college. A minimum number of clinical hours must be booked and they must successfully pass the licensing exam to practice.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of a Bachelor's, but a third have an Associate's or some college.
- Workers ages 55 years and over in this occupation account for a quarter of all workers.
- The workforce in this has a large share of Asian workers, accounting for 42 percent.
- The workforce is predominantly female, accounting for 86 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 29-1126 Respiratory therapists (6,540 workers),
- SOC 29-2061 Licensed practical and licensed vocational nurses (29,170 workers),
- **SOC 29-2031** Cardiovascular technologists and technicians (1,660 workers), and
- SOC 29-2041 Emergency medical technicians and paramedics (6,170 workers).

EDUCATIONAL ATTAINMENT 2016

).2 % [_]	32	. 7 %	54.0%	6		11.8%
	Target occupation					
	16.0%	19.4%	30.4%	22	.6%	11.5%
	Total, all occupations Less than HS Associate's/Some College Master's High School Bachelor's					ter's ligher
	AGE DISTRIBUTION 2016 2.7%					
	3	5.7 %	36.2%		25	.3%

Target occupation	י _ן 5	5.3%	
26.7 %			32.1%

Total, all occupations

Under 24 years 🗧 40 to 54 years

25 to 39 years 55 years and over

8.4% **RACE AND ETHNICITY 2016** 42.0% 16.8% 30.0% 2.8% Target occupation 2.4% 43.1% 33.0% 15.8% 5.7% Total, all occupations Hispanic Asian Other White Black

36.6%

GENDER 2016

14.4%	85.6%					
Target occupation						
	54.8% 45.2%					
Total, all occupations						

Male Female

Registered Nurses Assist & Care for Others Document/Record Info **Getting Information** Decision Making/Problem Solving Update & Use Relevant Knowledge Organize, Plan & Prioritize Work Communicate Sups/Peer/Subords Identify Objects/Actions/Events Monitor Process/Materls/Surroundings Perform/Work w/ Public **Emergency Medical Technicians Cardiovascular Technologists Licensed Practical and Respiratory Therapists Licensed Vocational Nurses** and Paramedics and Technicians Document/Record Info Assist & Care for Others Assist & Care for Others Document/Record Info Assist & Care for Others Document/Record Info Assist & Care for Others Document/Record Info Interact w/ Computers Communicate Sups/Peer/Subords Decision Making/ Problem Solving Inspect Equip/Structures/Material Decision Making/ Problem Solving Update & Use Relevant Knowledge Getting Information Establish & Maintain Relationships Perform/Work w/ Public **Getting Information** Identify Objects/Actions/Events Inspect Equip/Structures/Material Control Machines & Processes Decision Making/ Problem Solving Operate Vehicles/ Equipment Organize, Plan & Prioritize Work Communicate Sups/Peer/Subords Communicate Sups/Peer/Subords Organize, Plan & Prioritize Work **Cetting Information Identify** Eval/Determ Standrds Compliance **Eval/Determ Standrds Compliance Objects/Actions/Events**

Licensed Practical and Licensed Vocational Nurses (SOC 29-2061)

Licensed practical and licensed vocational nurses (LPNs and LVNs) are identified as a middle-skill occupation. They care for ill, injured, or convalescing patients or persons with disabilities in hospitals, nursing homes, clinics, private homes, group homes, and similar institutions. May work under the supervision of a registered nurse. Licensing required.



INDUSTRY DISTRIBUTION



Industry Distribution:

LPNs and LVNs are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Health Services hires the most workers in this occupation in the LA Basin.The three industry subsectors who employ the largest number of LPNs and LVNs in the LA Basin are:

- Hospitals (NAICS 622)
- Ambulatory Health Care Services (NAICS 621)
- Nursing Residential Care Facilities (NAICS 623)



At A Glance

Projected Openings 2021:

• 5,220 Total Openings (5-yr)

- 1,210 Net Job Change
- 4,010 5-yr Replacements

Community Colleges Supply:

- 115 awards
- 1 Program
- 5 colleges

Technology:

- Categorization or classification software
 - Diagnostic and procedural coding software
- Medical software
 - Medical procedure coding software; MEDITECH software
- Object or component oriented development software
 - Apache Spark, C++; Oracle Java; Python
- Office suite software
- Spreadsheet software
- Word processing software

Sources: BLS OES, O*NET, LAEDC

Core Tasks and Importance:

95 Administer prescribed medications or start intravenous fluids, noting times and amounts on patients' charts.

93 Observe patients, charting and reporting changes in patients' conditions, such as adverse reactions to medication or treatment, and taking any necessary action.

- ⁸⁹ Answer patients' calls and determine how to assist them.
- 89 Measure and record patients' vital signs, such as height, weight, temperature, blood pressure, pulse, or respiration.

Provide basic patient care or treatments, such as taking temperatures or blood pressures, dressing wounds, treating bedsores, giving enemas or douches, rubbing with alcohol, massaging, or performing catheterizations.

88 Work as part of a healthcare team to assess patient needs, plan and modify care, and implement interventions.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of an Associate's or some college.
- A smaller share of workers are ages 55 years and over in this occupation compared to the reginal average.
- The workforce in this occupation is predominantly Hispanic and Asian, accounting for 65 percent of all workers.
- The workforce is predominantly female, accounting for 80 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 31-9092 Medical assistants (31,010 workers),
- SOC 29-1141 registered nurses (102,750 workers),
- SOC 31-1014 Nursing assistants (42,070 workers), and
- **SOC 29-2054** Respiratory therapy technicians (310 workers).

EDUCATIONAL ATTAINMENT 2016

1.9%				1.1%				
20.2	%	69.6 %	7.2%					
Target occupation								
16.0%	19.4%	30.4%	22.6 %	11.5%				
Total, all occupations								
Less tha High Scl	n HS Annool	ssociate's/Some Col achelor's	lege Mas or H	ter's ligher				

AGE DISTRIBUTION 2016

	42.2%			30.5%	20.2%			
Ta	Target occupation 5.3%							
	26.7 %		32.1%		36.6%			
То	tal, all occupatio	ons						
	Under 24 years 25 to 39 years	4 5	0 to 54 y 5 years a	ears and over				

RACE AND ETHNICITY 2016

35.4%	17.2%	29.0 %		16.4%	-1.9	%
Target occupation				2.4%		
43.1%		33.0%	15	.8%	1	
Total, all occupations				5.7%		
Hispanic White	Asian Black	Other				

GENDER 2016

20.5%		79.5%					
Target occupation							
	54.8%	45.2%					
Total, all occupations							

Male Female

Licensd Practical & Licensd Vocational Nurses

Interact w/ Computers Document/Record Infor Assist/Care for Others Communicate Sups/Peer/Subords Establish & Maintain Relationships Getting Information Decision Making/ Problem Solving Organize, Plan & Prioritize Work Eval/Determ Standrds Compliance Update & Use Relevant Knowledge

Medical Assistants

Assist/Care for Others Document/Record Infor Cetting Information Communicate Sups/Peer/Subords Interacting With Computers Interpret Info for Others Eval/Determ Standrds Compliance Organize, Plan & Prioritize Work

Registered Nurses

Assist/Care for Others Document/Record Infor Getting Information Decision Making/ Problem Solving Update & Use Relevant Knowledge Organize, Plan & Prioritize Work Communicate Sups/Peer/Subords Identify Objects/Actions/Events

Nursing Assistant

Assist/Care for Others Communicate Sups/Peer/Subords Identify Objects/Actions/Events Establish & Maintain Relationships Getting Information Eval/Determ Standrds Compliance Monitor Process/ Materls/ Surroundings Perform General Physical Activities

Respiratory Therapy Technicians

Assist/Care for Others Decision Making/ Problem Solving Identify Objects/Actions/Events Getting Information Update & Use Relevant Knowledge Inspect Equip/Structrs/Material Communicate Sups/Peer/Subords Organize, Plan & Prioritize Work

Nursing Assistants (SOC 31-1014)

Nursing assistants are identified as a middle-skill occupation. They provide basic patient care under direction of nursing staff. Perform duties such as feed, bathe, dress, groom, or move patients, or change linens. May transfer or transport patients. Includes nursing care attendants, nursing aides, and nursing attendants.



INDUSTRY DISTRIBUTION



Industry Distribution:

Nursing assistants are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Health services hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of nursing assistants in the LA Basin are:

- Nursing and Residential Care Facilities (NAICS 623)
- Hospitals (NAICS 622)
- Administrative and Support Services (NAICS 561)



- 94 Answer patient call signals, signal lights, bells or intercom systems to determine patients' needs.
- 94 Turn or reposition bedridden patients.
- 91 Provide physical support to assist patients to perform daily living activities, such as getting out of bed, bathing, dressing, using the toilet, standing, walking or exercising.
- 91 Review patients' dietary restrictions, food allergies and preferences to ensure patient receives appropriate diet.
- 90 Measure and record food and liquid intake or urinary and fecal output, reporting changes to medical or nursing staff.
- 90 Record vital signs, such as temperature, blood pressure, pulse or respiration rate, as directed by medical or nursing staff.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of an Associate's or some college.
- A quarter of workers are ages 55 years and over in this occupation.
- The workforce in this occupation is predominantly Hispanic and Asian, accounting for 73 percent of all workers.
- The workforce is predominantly female, accounting for 77 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 31-9092 Medical Assistants (31,010 workers),
- SOC 29-2052 Pharmacy Technicians (13,220 workers),
- SOC 29-2061 Licensed Practical and Licensed Vocational Nurses (28,170 workers), and
- SOC 29-2053 Psychiatric Technicians (1,490 workers).

EDUCATIONAL ATTAINMENT 2016 3.2% 19.3% 27.1% 10.6% 39.7% Target occupation 16.0% 19.4% 30.4% 22.6% 11.5% Total, all occupations Associate's/Some College Less than HS Master's or Higher High School Bachelor's **AGE DISTRIBUTION 2016** 9.8% 29.3% 24.7% 36.2% Target occupation | 5.3% 26.7% 32.1% 36.6%

Total, all occupations

Under 24 years 🗧 40 to 54 years

25 to 39 years 55 years and over

RACE AND ETHNICITY 2016

50.7	%	11.9%	21.7%	13.7%	6	- 2.0 %
Target occupation	1			2.49	<u>%</u>	
43.1%		33.0%	5 15 .	8%		
Total, all occupati	ons			5.7%		
Hispanic White	Asian Black	Othe	r			

GENDER 2016

23.4%		76.6%					
Target occupation							
5	4.8%	45.2%					
Total, all occupations							

Male Female

Nursing Assistants

Assisting & Caring for Others Communicate Sups/Peer/Subords Identify Objects/Actions/Events Establish & Maintain Relationships Cetting Information Eval/Determ Standrds Compliance Monitor Process/ Materls/ Surroundings Perform General Physical Activities Inspect Equip/Structrs/Material Decision Making/ Problem Solving

Medical Assistants

Assisting & Caring for Others Document/ Record Info Getting Information Communicate Sups/Peer/Subords Interact w/ Computers Interpret Meaning of Info for Others Eval/Determ Standrds Compliance Organize, Plan & Prioritize Work Pharmacy Technicians Getting Information Interact w/ Computers Perform/Work w/ Public Identify Objects/Actions/Events Process Information Communicate Sups/Peer/Subords Organize, Plan & Prioritize Work Monitor Process/ Materls/ Surroundings

Licensed Practical and Licensed Vocational Nurses

Assisting & Caring for Others Document/ Record Info Communicate Sups/Peer/Subords Establish & Maintain Relationships Getting Information Decision Making/ Problem Solving Organize, Plan & Prioritize Work Eval/Determ Standrds Compliance

Psychiatric Technicians

Assisting & Caring for Others Communicate Sups/Peer/Subords Document/ Record Info Getting Information Decision Making/ Problem Solving Develop & Build Teams Identify Objects/Actions/Events Eval/Determ Standrds Compliance

Bookkeeping, Accounting and Auditing Clerks (SOC 43-3031)

Bookkeeping, Accounting and Auditing Clerks are identified as a middle-skill occupation. They compute, classify, and record numerical data to keep financial records complete. Perform any combination of routine calculating, posting, and verifying duties to obtain primary financial data for use in maintaining accounting records. May also check the accuracy of figures, calculations, and postings pertaining to business transactions recorded by other workers.





Industry Distribution:

Bookkeepers, accountants and auditing clerks are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Professional and business services hire the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of bookkeepers, accountants and auditing clerks in the LA Basin are:

- Professional, Scientific, and Technical Services (NAICS 541)
- Administrative and support services (NAICS 561)
- Merchant wholesalers, durable goods (NAICS 423)



At A Glance

Projected Openings 2021:

• 3,920 Total Openings (5-yr)

- 17- Net Job Change
- 3,750 5-yr Replacements

Community Colleges Supply:

- 1,190 awards
- 1 Program
- 28 colleges

Technology:

- Accounting software
 - FlexiFinancials FlexiLedger; Intuit
 - Quickbooks; Sage 50 Accounting
- Compliance software
 - FLS eDP.Payrolltax; Intrax ProcedureNet; Paisley Cardmap
- Data base user interface and query software
 - Data entry software; Microsoft Access; Yardi
- Financial analysis software
 - Oracle E-Business Suite Financials; AuditWare
- Medical software
 - Healthcare common procedure coding system HCPCS; Medical condition coding software

Sources: BLS OES, O*NET, LAEDC

- **94** Operate computers programmed with accounting software to record, store, and analyze information.
- 92 Check figures, postings, and documents for correct entry, mathematical accuracy, and proper codes.
- 89 Comply with federal, state, and company policies, procedures, and regulations.
- 87 Operate 10-key calculators, typewriters, and copy machines to perform calculations and produce documents.
- 87 Receive, record, and bank cash, checks, and vouchers.
- 83 Code documents according to company procedures.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of some college or an associate's degree.
- Nearly one third of workers are ages 55 years and over in this occupation.
- The workforce in this occupation is predominantly Hispanic or White, accounting for 70 percent of all workers.
- The workforce is predominantly female, accounting for 80 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 13-2082 Tax Preparers (4,480 workers),
- SOC 43-3021 Billing and posting clerk (25,540 workers),
- **SOC 43-3051** Payroll and timekeeping clerks (9,220 workers), and
- SOC 43-4011 Brokerage Clerks (2,080 workers).

EDUCATIONAL ATTAINMENT 2016

5.1%						5.2%	
2	2.4%		49.9%			5%	
Target occupation							
16.0%	6 19	.4%	30.4%	22.	6%	11.5%	
Total, al	loccup	ations					
Less than HS Associate's/Some College Master's High School Bachelor's or Higher							

AGE DISTRIBUTION 2016

	28.4%	28.4%			28.4%			
Target occupation 5.3%								
	26.7 %		32.1%		36.6%			
Tota	l, all occupati	ons						
Ur	Under 24 years 📃 40 to 54 years							
25 to 39 years 55 years and over								

RACE AND ETHNICITY 2016

28.8%		40.9%	23.6%	
Target occupation			2.49	61
43.1%		33.0%	15.8%	Ľ
Total, all occupations			5.7%	
Hispanic White	Asian Black	Other		

2.5%

4.2%

GENDER 2016

19.4%	80.6%						
Target occupation							
	54.8%	45.2%					
Total, all occupations							

Male Female

Bookkeeping, Accounting and Auditing Clerks

Interact w/ Computers Getting Information Document/Record Info Establish & Maintain Relationships Communicate Sups/Peer/Subords Identify Objects/Actions/Events Organize, Plan & Prioritize Work Process Information Performing Admin Activities

Tax Preparers

Getting Information Interact w/ Computers Update & Use Relevant Knowledge Process Information Work Directly w/ Public Document/Record Info Establish & Maintain Relationships Eval/Determ Standrds Compliance

Billing and Posting Clerk

Communicate Sups/Peer/Subords Communicate w/ Outside Orgs Performing Admin Activities Work Directly w/ Public Interact w/ Computers Getting Information Process Information Decision Making/ Problem Solving

Payroll and Timekeeping Clerk

Getting Information Process Information Document/Record Info Interact w/ Computers Performing Admin Activities Communicate Sups/Peer/Subords Eval/Determ Standrds Compliance Organize, Plan & Prioritize Work

Brokerage Clerk

Cetting Information Interact w/ Computers Process Information Communicate w/ Outside Orgs Establish & Maintain Relationships Eval/Determ Standrds Compliance Decision Making/ Problem Solving Update & Use Relevant Knowledge

Payroll and Timekeeping Clerks (SOC 43-3051)

Payroll and timekeeping clerks are identified as a middleskill occupation. They compile and record employee time and payroll data. May compute employees' time worked, production, and commission. May compute and post wages and deductions, or prepare paychecks.





Industry Distribution:

Payroll and timekeeping clerks are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Professional and business services hire the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of accounting technicians, HR assistants, payroll administrators and payroll clerks in the LA Basin are:

- Professional, Scientific, and Technical Services (NAICS 541)
- Administrative and support services (NAICS 561)
- Educational services (NAICS 611)



At A Glance

Projected Openings 2021:

• 1,900 Total Openings (5-yr)

- 660 Net Job Change
- 1,240 5-yr Replacements

Community Colleges Supply:

- 1,190 awards
- 1 Program
- 28 colleges

Technology:

- Accounting software
 - Intuit Quickbooks; Sage 50 Accounting; Intuit Quicken
- Electronic mail software
 IBM Notes
- Enterprise resource planning ERP software Hot technology
 - Microsoft Dynamics; NetSuite ERP; Oracle People Soft; SAP
- Human resources software
 - Human Resource Management Software HRMS
- Time accounting software - Kronos Workforce Payroll; UNITIME

Sources: BLS OES, O*NET, LAEDC

- 94 Process and issue employee paychecks and statements of earnings and deductions.
- 94 Compute wages and deductions, and enter data into computers.
- 93 Review time sheets, work charts, wage computation, and other information to detect and reconcile payroll discrepancies.
- 91 Compile employee time, production, and payroll data from time sheets and other records.
- **90** Process paperwork for new employees and enter employee information into the payroll system.
- 88 Verify attendance, hours worked, and pay adjustments, and post information onto designated records.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of some college or an associate's degree.
- A smaller share of workers are ages 55 years and over in this occupation compared to the reginal average.
- The workforce in this occupation is predominantly Hispanic or White, accounting for 70 percent of all workers.
- The workforce is predominantly male, accounting for 80 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 43-3031 Bookkeeping, Accounting and Auditing Clerks (76,510 workers),
- SOC 43-4171 Reception & Information Clerks (44,620 workers),
- SOC 43-9041 Insurance Claims & Policy Processing Clerks (13,430 workers), and
- SOC 43-3011 Bill& Account Collectors (17,050 workers).

EDUCATIONAL ATTAINMENT 2016

12.9	9%						5.7%
1	16.7 %		54	4.2 %		22.4	•%
Targe	et occup	ation					
16.	0%	19.4%		30.4%	22	.6%	11.5%
Total	, all occu	ıpations					
Less than HS Associate's/Some College Master's or Higher High School Bachelor's or Higher							
AGE DISTRIBUTION 2016							
		36 5%		35.09	%	2	0.0%

				Ŭ		
Target occupation 5.3%						
2	6. 7 %	3	2.1%	36	.6%	
Total,	all occupati	ons				
Und	er 24 years	40 to 54	years			
25 t	o 39 years	55 years	s and over			

RACE AND ETHNICITY 2016

			4.570	
39.3%	6	31.9 %	19.7%	
Target occupati	on		2.49	%
43.19	%	33.0%	15.8%	
Total, all occupe	itions		5.7%	
Hispanic White	Asian Black	Other		

4 9% 4.1%

GENDER 2016

19.3%	80.7%		
Target occup	ation		
	54.8%	45.2%	
Total, all occ	upations		

Male Female

Payroll and Timekeeping Clerks

Getting Information Process Information Document/Record Info Interact w/ Computers Performing Admin Activities Communicate Sups/Peer/Subords Eval/Determ Standrds Compliance Organize, Plan & Prioritize Work Establish & Maintain Relationships Identify Objects/Actions/Events

Bookkeeping, Accounting and Auditing Clerk

Interact w/ Computers Getting Information Document/Record Info Establish & Maintain Relationships Communicate Sups/Peer/Subords Identify Objects/Actions/Events Organize, Plan & Prioritize Work Process Information

Receptionists and Information Clerks

Interact w/ Computers Performing Admin Activities Work Directly w/ Public Getting Information Communicate Sups/Peer/Subords Establish & Maintain Relationships Document/Record Info Process Information

Insurance Claims and Policy Processing Clerks

Interact w/ Computers Eval/Determ Standrds Compliance Communicate Sups/Peer/Subords Document/Record Info Getting Information Process Information Establish & Maintain Relationships Identify Objects/Actions/Events

Bill and Account Collectors Getting Information Interact w/ Computers Communicate w/Sups/Peers/ Subords Communicate w/Outside Orgs Organize, Plan & Prioritize Work Process Information Resolve Conflicts & Negotiating Decision Making/ Problem

Production, Planning and Expediting Clerks (SOC 43-5061)

Production, Planning and Expediting Clerks are identified as a middle-skill occupation. They compile information and records to draw up purchase orders for procurement of materials and services.





Industry Distribution:

Production, planning, and expediting clerks are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Manufacturing hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of schedulers, planners and production assistants in the LA Basin are:

- Motion picture and sound recording industries (NAICS 512)
- Professional, Scientific, and Technical Services (NAICS 541)
- Administrative and support services (NAICS 561)



At A Glance

Projected Openings 2021:

- 4,610 Total Openings (5-yr)
 - 1,470 Net Job Change
 - 3,140 5-yr Replacements

Community Colleges Supply:

- 217 awards
- I Program
- 4 colleges

Technology:

- Accounting software
 - Fund Accounting Software; Intuit QuickBooks
- Analytical or scientific software
 KAPES; Micro Estimating FabPlan
- Data base user interface and query software - FileMaker Pro; Microsoft Access; SQL
- Enterprise resource planning ERP software Hot technology
 - Oracle JD Edwards Enterprise One; SAP
- Materials requirements planning logistics and supply chain software
 - LSA Visual Easy Lean; Bill of lading software

Sources: BLS OES, O*NET, LAEDC

- 84 Distribute production schedules or work orders to departments.
- 83 Review documents, such as production schedules, work orders, or staffing tables, to determine personnel or materials requirements or material priorities.
- 82 Requisition and maintain inventories of materials or supplies necessary to meet production demands.
- 79 Arrange for delivery, assembly, or distribution of supplies or parts to expedite flow of materials and meet production schedules.
- **78** Confer with department supervisors or other personnel to assess progress and discuss needed changes.
- 74 Revise production schedules when required due to design changes, labor or material shortages, backlogs, or other interruptions, collaborating with management, marketing, sales, production, or engineering.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of some college or an associate's degree.
- The workforce in this occupation is predominantly under the age of 40, accounting for 58 percent of all workers.
- A larger share of workers are white in this occupation compared to the regional average.
- A smaller share of workers are male in this occupation compared to the regional average.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 43-3061 Procurement Clerks (2,710 workers),
- SOC 43-5011 Cargo and Freight Agents (8,160 workers),
- SOC 43-5111 Weighers, Measurers, Checkers, and Samplers, Recordkeeping (5,380 workers), and
- SOC 43-5071 Shipping, Receiving and Traffic Clerk (38,780 workers).

EDUCATIONAL ATTAINMENT 2016 2 00%

							0.770
	16.7 %	6	54.2%			22.4	%
Tar	get occi	upati	ion				
10	6. 0 %	19	9.4% 30.4%		22	2.6 %	11.5%
Tot	al, all o	ccup	ations				
Less than HS As High School Ba			As Ba	ssociate's/Some Coll achelor's	ege	Mast or H	ter's igher

Z 70/

AGE DISTRIBUTION 2016

17.7%		40.4%	27.1%	14.9%
Target occu	pation	5.3%		
26.7%	6	32.1%	36.6%	
Total, all oc	cupatio	าร		
Under 24	years	40 to 54 years		
25 to 39 v	ears	55 years and over	r	

RACE AND ETHNICITY 2016

RACE AND ETHNICITY 2016			8.7%	2.1
27.2%	4	46.3%		
Target occupati	on		2.4	%
43.19	%	33.0%	15.8%	. '
Total, all occupa	ıtions		5.7%	
Hispanic White	Asian Black	Other		

GENDER 2016

54.8 %	55.0%
Target occupation	
54.8%	45.2%
Total, all occupations	

Male **Female**

Production, Planning, and Expediting Clerks

Getting Information Communicate Sups/Peer/Subords Interact w/ Computers Decision Making/Problem Solving Monitor Process/ Materls/ Surroundings Identify Objects/Actions/Events Organize, Plan & Prioritize Work **Process Information** Schedule Work & Activities

Procurement Clerks

Communicate Sups/Peer/Subords Performing Admin Activities Decision Making/ Problem Solving Update & Use Relevant Knowledge

Cargo and Freight Agents

Getting Information Decision Making/ Problem Solving Process Information Communicate Sups/Peer/Subords Update & Use Relevant Knowledge Organize, Plan & Prioritize Work Interact w/ Computers Communicate w/ Outside Orgs

gh<mark>e</mark>rs, Measurers, Checkers and Samplers, Recrodkeep

Interact w/ Computers **Getting Information** Document/Record Info Communicate Sups/Peer/Subords Identify Objects/Actions/Events Analyze Data/Information **Process Information** Establish & Maintain Relationships

Shipping, Receiving and Traffic Clerk

Cetting Information Interact w/ Computers Communicate Sups/Peer/Subords **Process Information** Handle/Move Objects Monitor Process/ Materls/ <u>Sur</u>roundings Organize, Plan & Prioritize Work

Electricians (SOC 47-2111)

Electricians are identified as a middle-skill occupation. They install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems.



INDUSTRY DISTRIBUTION



Industry Distribution:

Electricians are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Construction hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of electricians, craft workers and inside wiremen in the LA Basin are:

- Specialty trade contractor (NAICS 238)
- Motion picture and sound recording industries (NAICS 512)
- Local government (NAICS 93)



At A Glance

Projected Openings 2021:

- 2,990 Total Openings (5-yr)
 - 1,680 Net Job Change
 - 1,310 5-yr Replacements

Community Colleges Supply:

- 577 awards
- 3 Programs
- 18 colleges

Technology:

- Analytical or scientific software
 - Construction Master Pro; Elite Software Inpoint
- Computer aided design CAD software Hot technology
 - One Mile Up Panel Planner; SmartDraw
- Data base user interface and query software
 Insight Direct ServiceCEO; Resolve Systems Service Management
- Spreadsheet software
- Word processing software
 - Socrates Contractor's Library

Sources: BLS OES, O*NET, LAEDC

- 89 Plan layout and installation of electrical wiring, equipment, or fixtures, based on job specifications and local codes.
- 87 Connect wires to circuit breakers, transformers, or other components.
- 86 Test electrical systems or continuity of circuits in electrical wiring, equipment, or fixtures, using testing devices, such as ohmmeters, voltmeters, or oscilloscopes, to ensure compatibility and safety of system.
- 85 Use a variety of tools or equipment, such as power construction equipment, measuring devices, power tools, and testing equipment, such as oscilloscopes, ammeters, or test lamps.
- 85 Inspect electrical systems, equipment, or components to identify hazards, defects, or the need for adjustment or repair, and to ensure compliance with codes.
- **83** Prepare sketches or follow blueprints to determine the location of wiring or equipment and to ensure conformance to building and safety codes.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of some college or an associate's degree.
- A smaller share of workers are ages 55 years and over in this occupation compared to the regional average.
- A larger share of workers are Hispanic in this occupation compared to the regional average.
- The workforce is predominantly male, accounting for 99 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 47-4021 Elevator installers and repairers (940 workers),
- SOC 49-2022 telecommunications equipment installers and repairers (12,280 workers),
- SOC 49-2094 Electric repairers, commercial and industrial (2,230 workers), and
- **SOC 49-9071** Maintenance and Repair Workers (47,180 workers).

EDUCA	TIONAL A	TTAINME	ENT 201	6	7.8%
14.2%	29.6 %		46.9	9%	
Target occ	cupation				1.5%
16.0%	19.4%	30.4	%	22.6 %	11.5%
Total, all occupations Less than HS Associate's/Some College Master's High School Bachelor's or Higher					
AGE DISTRIBUTION 2016					
	39 6%		37.0	0/6	16 4%

Target occupatio	n 5 .	3%		
26.7 %		32.1%	36.6	%
Total, all occupa	tions			
Under 24 years		40 to 54 years		
25 to 39 years		55 years and over		

RACE AND	ACE AND ETHNICITY 2016				<mark>6%</mark>	.9% 2	6 2.29
Į		46	.3%		' '		
Target occupa	tion				2.4	%	
43.1	1%	33	3.0 %	15.	8%	. '	
Total, all occup	oations				5.7%	T	
Hispanic White	Asian Black		Other				

GENDER 2016	1.1%
98.9%	b
Target occupation	
54.8%	45.2%
Total, all occupations	

Male Female

Electricians

Getting Information Identify Objects/Actions/Events Decision Making/ Problem Solving Handle/Move Objects Inspect Equip/Structrs/Material Monitor Process/ Materls/ Surroundings Update & Use Relevant Knowledge Organize, Plan & Prioritize Work Eval/Determ Standrds Compliance Perform Gen Phys Activities

Elevator Installers and Repairers

Repair/Maint Mech Equip Repair/Maint Elec Equip Decision Making/ Problem Solving Perform Gen Phys Activities Handle/Move Objects Getting Information Control Machine/Process Update & Use Relevant Knowledge Telecommunications Equip Installers and Repairers

Interact w/ Computers Getting Information Decision Making/ Problem Solving Operate Vehicles or Equip Communicate Sups/Peer/Subords Update & Use Relevant Knowledge Identify Objects/Actions/Events Work w/ Public Electric Repairers, Comm and Industrial Repair/Maint Elec Equip Getting Information Interact w/ Computers Communicate Sups/Peer/Subords Decision Making/ Problem Solving Inspect Equip/Material Update & Use Relevant Knowledge Identify Objects/Actions/Events

Maintenance and Repair Workers

Inspect Equip/Material Handling/Moving Objects Perform Gen Phys Activities Getting Information Repair/Maint Mech Equip Establish & Maintain Relationships Monitor Process/ Materls/ Surroundings Identify Objects/Actions/Events

Aircraft Mechanics and Service Technicians (SOC 49-3011)

Aircraft mechanics and service technicians are identified as a middle-skill occupation. They diagnose, adjust, repair, or overhaul aircraft engines and assemblies, such as hydraulic and pneumatic systems. Includes helicopter and aircraft engine specialists.





Industry Distribution:

Aircraft mechanics and service technicians are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Warehousing and transportation hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of aircraft maintenance directors, technicians and mechanics in the LA Basin are:

- Support activities for transportation (NAICS 488)
- Air transportation (NAICS 481)
- Transportation Equipment (NAICS 336)



publications.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of some college or an associate's degree, accounting for 59 percent of all workers.
- A larger share of workers are ages 25-54 years in this occupation compared to the regional average.
- The workforce in this occupation is predominantly Hispanic or White.
- The workforce is predominantly male, accounting for 95 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- SOC 49-9071 Maintenance and repair workers (6,430 workers),
- SOC 49-9041 Industrial machinery mechanics (3,750 workers)
- SOC 17-3029 Engineering technicians (2,540 workers), and
- SOC 17-3027 Mechanical engineering technicians (1,690) workers).

EDUCATIONAL ATTAINMENT 2016

8.0%			10	.8%	
2	2.1%	58.6%			
Target occ	upation			0.4%	
16.0%	19.4%	30.4%	22.6 %	11.5%	
Total, all o	ccupations				
Less than HS Associate's/Some College Master's High School Bachelor's Or Higher ACE DISTRIBUTION 2016					
32.1% 36.6% 26.0%					
Target occ	upation <mark>5</mark> .	3%			
26.7	%	32.1%	36.6%	6	
Total, all o	ccupations				

Under 24 years 40 to 54 years

25 to 39 years 55 years and over

RACE AND ETHNICITY 2016

Y 2016	4.5%	0.9%
38.5%	13.8%	
	2.4%	
33.0%	15.8%	
	5.7%	
Other		
	38.5% 33.0%	Y 2016 4.5% 38.5% 13.8% 2.4% 33.0% 15.8% 5.7%

GENDER 2016	5.1%
94.99	%
Target occupation	
54.8%	45.2%
Total, all occupations	

Male **Female**

Aircraft Mechanics and Service Technicians Getting Information Document/Record Info Inspect Equip/Structrs/Material **Eval/Determ Standrds Compliance** Repaire/Maint Mechanical Equip Identify Objects/Actions/Events Monitor Process/Materls/Surroundings Communicate Sups/Peer/Subords Update & Use Relevant Knowledge

Maintenance/Repair Workers

Handling/Moving Objects Perform Gen Phys Activities Establish & Maintain Relationships Monitor Process/ Materls/

Industrial Machinery Mechanics

Repair/Maint Mech Equip **Control Machine/Process** Inspect Equip or Material Handle/Move Objects Perform Gen Phys Activities Communicate Sups/Peer/Subords **Getting Information Operate Vehicles or Equip**

Engineering Technicians Eval/Determ Standrds Compliance Inspect Equip/Structrs/Material **Getting Information** Communicate Sups/Peer/Subords Document/Record Info Monitor Process/Materls/ Surroundings Identify Objects/Actions/Events Train/Teach Others

Mechanical Engineering Technicians

Getting Information Identify Objects/Actions/Events Inspect Equip/Structrs/Material Decision Making/ Problem Solving Eval/Determ Standrds Compliance Monitor Process/Materls/ Surroundings Communicate Sups/Peer/Subords Document/Record Info

Mobile Heavy Equipment Mechanics, Except Engines (SOC 49-3042)

Mobile heavy equipment mechanics, except engines are identified as a middle-skill occupation. They diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in construction, logging, and surface mining.



INDUSTRY DISTRIBUTION



Industry Distribution:

Mobile heavy equipment mechanics, except engines are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Merchant wholesalers hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of construction equipment mechanics, field mechanics and technicians in the LA Basin are:

- Merchant wholesalers, durable goods (NAICS 423)
- Rental and leasing services (NAICS 532)
- Local Government (NAICS 93)



Core Tasks and Importance:

86 Repair and replace damaged or worn parts.

86 Test mechanical products and equipment after repair or assembly to ensure proper performance and compliance with manufacturers' specifications.

- 84 Operate and inspect machines or heavy equipment to diagnose defects.
- 82 Read and understand operating manuals, blueprints, and technical drawings.
- 81 Dismantle and reassemble heavy equipment using hoists and hand tools.
- Overhaul and test machines or equipment to 80 ensure operating efficiency.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- A smaller share of workers have an educational attainment of a bachelor's degree or higher in this occupation compared to the regional average.
- A larger share of workers are ages 25 to 39 years in this occupation compared to the reginal average.
- The workforce in this occupation is predominantly Hispanic, accounting for 61 percent of all workers.
- The workforce is predominantly male, accounting for 99.5 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- **SOC 49-2092** Electric motor, power tool and related repairers (700 workers),
- **SOC 49-3041** Farm equipment and mechanics and service technicians (240 workers),
- SOC 49-3031 Bus and truck mechanics and diesel engine specialists (5,800 workers), and
- **SOC 49-9071** Maintenance and repair workers (47,180 workers).

EDUCATIONAL ATTAINMENT 2016 7.0%					
20.1%	3	33.7 %	39		
Target occu	ıpation				0.0%
16.0%	19.4%	30.4	%	22.6%	11.5%
Total, all oc	cupations				
AGE DIS		Bachelor's	ome Conege	or H	ligher
	33.4%	34	4.4%	26	. 7 %
Target occu	pation <mark>5</mark>	.3%			
26.79	%	32.1%		36.69	6
Total, all oc	cupations				
Under 24	years	40 to 54 years			

RACE AND ETHNICITY 2016

4.8% 7.1% | 1.0%

.5%

	61.1%		25	. 9 %	
Target occupat	ion				2.4%
43.1	%	33.09	%	15.8%	, '
Total, all occup	ations			5.'	7%
Hispanic White	Asian Black	Oth	er		

55 years and over

GENDER 2016

25 to 39 years

99.5%						
Target occupation						
54.8% 45.2%						
Total, all occupations						

Male Female

Mobile Heavy Equip Mechanics, Except Engines Repair/Maintain Mech Equip Operate Vehcls/Mech Dvcs/Equip Inspect Equip/Structrs/Material Handling/Moving Objects Decision Making/ Problem Solving Control Machine/Process Getting Information Document/Record Info Perform Gen Phys Activities Identify Objects/Actions/Events

Electric Motor, Power Tool/ Related Repairers

Cetting Information Identify Objects/Actions/Events Repair/Maintain Mech Equip Repair/Maintain Elec Equip Monitor Process/ Materls/ Surroundings Communicate Sups/Peer/Subords Inspect Equip/Structrs/Material Control Machine/Process Farm Equipment & Mechanics/ Service Technicians

Getting Information Operate Vehicles or Equipment Decision Making/ Problem Solving Repair/Maintain mech equip Identify Objects/Actions/Events Inspect Equip/Structrs/Material Handle/Move Objects Perform Gen Physical Activity Bus and Truck Mechanics and Diesel Engine Specialists Repair/Maintain Mech Equip Getting Information Operate Vehicles or Equipment Inspect Equip/Structrs/Material Eval/Determ Standrds Compliance Identify Objects/Actions/Events Communicate Sups/Peer/Subords Document/Record Info

Maintenance and Repair Workers

Inspect Equip/Structrs/Material Handle/Move Objects Perform Gen Physical Activity Getting Information Repair/Maintain mech equip Establish & Maintain Relationships Monitor Process/ Materls/ Surroundings Identify Objects/Actions/Events

Industrial Machinery Mechanics (SOC 49-9041)

(300 49-9041)

Industrial Machinery Mechanics are identified as a middleskill occupation. They repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.



INDUSTRY DISTRIBUTION



Industry Distribution:

Industrial Machinery Mechanics are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Manufacturing hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of fixers, industrial mechanics, machine adjusters and mechanics in the LA Basin are:

- Merchant wholesalers, durable goods (NAICS 423)
- Repair and maintenance (NAICS 811)
- Food Product (NAICS 311)



Total Openings **1,670** 2016 to 2021

At A Glance

Projected Openings 2021:

- 1,670 Total Openings (5-yr)
 - 670 Net Job Change
 - 1,010 5-yr Replacements

Community Colleges Supply:

- 49 awards
- 2 Programs
- 12 colleges

Technology:

- Computer aided manufacturing CAM software Hot technology
 - Extranet machine tools suite
- Enterprise resource planning ERP software Hot technology
- SAPFacilities management software
 - Maintenance management software
- Industrial control software
- BIT Corp ProMACS PLC; KEYENCE PLC Ladder Logic
- Spreadsheet software

Sources: BLS OES, O*NET, LAEDC

- Repair or maintain the operating condition of industrial production or processing machinery or equipment.
- 86 Repair or replace broken or malfunctioning components of machinery or equipment.
- 86 Disassemble machinery or equipment to remove parts and make repairs.
- 86 Observe and test the operation of machinery or equipment to diagnose malfunctions, using voltmeters or other testing devices.
- 86 Reassemble equipment after completion of inspections, testing, or repairs.
- 86 Clean, lubricate, or adjust parts, equipment, or machinery.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- Most workers have the educational attainment of high school or less.
- A smaller share of workers are under 24 years in this occupation compared to the reginal average.
- The workforce in this occupation is predominantly Hispanic, accounting for 66 percent of all workers.
- The workforce is predominantly male, accounting for 95 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- **SOC 49-9043** Machinery maintenance workers(2,330 workers),
- **SOC 49-9071** General maintenance and repair workers (47,180 workers),
- **SOC 49-2094** Commercial and industrial electric equipment repairers (2,230 workers), and
- SOC 51-4041 Machinists (16,450 workers).

EDUCATIONAL ATTAINMENT 2016 4.4%						
32.2% 27.9% 33.6%						
Target occu	upation			1.8%		
16.0%	19.4%	30.4%	22.6 %	11.5%		
Total, all occupations Less than HS Associate's/Some College Master's High School Bachelor's AGE DISTRIBUTION 2016 7.00(
24.	5%	44.8%	26	. 9 %		
Target occu	upation 5 .	3%				
26.79	%	32.1% 36.6%				
Total, all occupations						
Under 24 years 🗧 40 to 54 years						

25 to 39 years 55 years and over

1.5% **RACE AND ETHNICITY 2016** 10.0% 0.7% 66.4% 20.4% Target occupation 2.4% 43.1% 33.0% 15.8% 5.7% Total, all occupations Hispanic Asian Other White Black

GENDER 2016	5.5%
94.5	%
Target occupation	
54.8%	45.2%
Total, all occupations	

Male Female

Industry Machinery Mechanics Repair/Maintain Mech Equip Control Machine/Process Inspect Equip/Structrs/Material Handling/Moving Objects Perform Gen Phys Activities Communicate Sups/Peer/Subords Getting Information Operate Vehicles/Equip Identify Objects/Actions/Events Decision Making/ Problem Solving

Maintenance Workers, Machinery

Repair/Maintain Mech Equip Inspect Equip/Structrs/Material Getting Information Control Machine/Process Handling/Moving Objects Identify Objects/Actions/Events Perform Gen Phys Activities Communicate Sups/Peer/Subords

Maintenance and Repair Workers, General

Inspect Equip/Structrs/Material Handling/Moving Objects Perform Gen Phys Activities Getting Information Repair/Maintain Mech Equip Establish & Maintain Relationships Monitor Prcss/ Materls/ Surroundings Identify Objects/Actions/Events Electric Repairers, Comm/Industrial Equip Repair/Maintain Mech Equip Getting Information Interact w/ Computers Communicate Sups/Peer/Subords Decision Making/ Problem Solving Monitor Procss/ Materls/ Surroundings Inspect Equip/Structrs/Material Update & Use Relevant Knowledge

Machinists

Cetting Information Control Machine/Process Decision Making/ Problem Solving Handle/Move Objects Inspect Equip/Structrs/Material Process Information Update & Use Relevant Knowledge Perform Gen Phys Activities

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

Computer-Controlled Machine Tool Operators are identified as a middle-skill occupation. They operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.





Industry Distribution:

Computer-Controlled Machine Tool Operators are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Manufacturing hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of brake press operators, Computer Numerical Control (CNC) Lathe Operator and CNC machinists in the LA Basin are:

- Fabricated Metal Product (NAICS 332)
- Transportation Equipment (NAICS 336)
- Computer and Electronic Product (NAICS 334)



At A Glance

Projected Openings 2021:

• 1,490 Total Openings (5-yr)

- 490 Net Job Change
- 1,000 5-yr Replacements

Community Colleges Supply:

- 292 awards
- 2 Programs
- 15 colleges

Technology:

- Analytical or scientific software
 - CNC Consulting Machinists' Calculator; Kentech Trig Kalculator
- Computer aided design CAD software Hot technology
 - Autodesk Auto CAD; Dassault Systems SOLIDWORKS; KCD
 - Computer aided manufacturing CAM software Hot technology
 - 1CadCam Unigraphics; CNC Mastercam; SmartCAM
 - Project management software
 - Spreadsheet software

Sources: BLS OES, O*NET, LAEDC

- 90 Measure dimensions of finished workpieces to ensure conformance to specifications, using precision measuring instruments, templates, and fixtures.
- 87 Mount, install, align, and secure tools, attachments, fixtures, and workpieces on machines, using hand tools and precision measuring instruments.
- 86 Stop machines to remove finished workpieces or to change tooling, setup, or workpiece placement, according to required machining sequences.
- 86 Transfer commands from servers to computer numerical control (CNC) modules, using computer network links.
- 85 Check to ensure that workpieces are properly lubricated and cooled during machine operation.
- 85 Set up and operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic workpieces.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- A larger share of workers have the educational attainment of some college or an associate's degree in this occupation compared to the regional average.
- Most workers in this occupation are 40 to 54 years, accounting for 47 percent of all workers.
- The workforce in this occupation is predominantly Hispanic, accounting for 52 percent of all workers.
- The workforce is predominantly male, accounting for 97 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- **SOC 51-4081** Multiple machine tool setters, operators, and tenders, metal and plastic (2,880 workers),
- **SOC 51-4191** Heat treating equipment setters, operators, and tenders, metal and plastic (930 workers),
- **SOC 51-4033** Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic (4,340 workers), and
- **SOC 51-7041** Sawing machine setters, operators, and tenders, wood (1,010 workers).

EDUCATIONAL ATTAINMENT 2016

31.1	1%	25.1%	41.2%					
Target occ	upation		1.3%					
16.0%	19.4%	30.4%	22.6% 11.5%					
Total, all o	Total, all occupations							
Less than HS Associate's/Some College Master's or Higher High School Bachelor's or Higher								

1.3%|

4.0% | 3.2%

4.4%

AGE DISTRIBUTION 2016

36.7%		39.3%		19.1%		
Target occupation 5.3%						
26.7 %		32.1%		.6%		
Total, all occupati	ons					
Under 24 years 📃 40 to 54 years						
25 to 39 years	55 yea	55 years and over				

RACE AND ETHNICITY 2016

77.9%		14.2%	-0.7%	
Target occupat	ion		2.4%	L
43.1	%	33.0%	15.8%	
Total, all occup	ations		5.7%	-
Hispanic	Asian	Other		
White	Black			

GENDER 2016

95.6%	,				
Target occupation					
54.8% 45.2%					
Total, all occupations					

Male Female

Computer-Controlled Machine Tool Operators, Metal & Plastic

Control Machine/Process Getting Information Communicate Sups/Peer/Subords Decision Making/ Problem Solving Inspect Equip/Structrs/Material Handling/Moving Objects Identify Objects/Actions/Events Monitor Process/ Materls/ Surroundings Update & Use Relevant Knowledge

Mult Machine Tool Setters/ Operators/Tenders

Control Machine/Process Getting Information Handling/Moving Objects Inspect Equip/Structrs/Material Decision Making/ Problem Solving Communicate Sups/Peer/Subords Monitor Process/ Materls/ Surroundings

Heat Treating Equip Setters/ Operators/Tenders

Handling/Moving Objects Control Machine/Process Perform Gen Phys Activities Identify Objects/Actions/Events Operate Vehicles/Equip Communicate Sups/Peer/Subords Getting Information Inspect Equip/Structrs/Material

Grinding/Lapping/Polish/ Buffing Mach Tool Operators

Control Machine/Process Handling/Moving Objects Document/Record Info Monitor Procss/ Materls/ Surrndings Identify Objects/Actions/Events Getting Information Communicate Sups/Peer/Subords Update & Use Relevant Knowledge Sawing Machine Setters, Operators and Tenders, Wood

Control Machine/Process Handling/Moving Objects Perform Gen Phys Activities Inspect Equip/Structrs/Material Identify Objects/Actions/Events Communicate Sups/Peer/Subords Getting Information Operate Vehicles or Equip

Welders, Cutters, Solderers & Brazers (SOC 51-4121)

Welders, cutters, solderers and brazers are identified as a middle-skill occupation. They use hand-welding, flamecutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.



INDUSTRY DISTRIBUTION



Industry Distribution:

Welders, cutters, solderers and brazers are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Manufacturing hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of welders, cutters, solderers and brazers in the LA Basin are:

- Fabricated Metal Product Mfg (NAICS 332)
- Transportation Equipment Mfg (NAICS 336)
- Specialty Trade Contractors (NAICS 238)



At A Glance

Projected Openings 2021:

• 2,170 Total Openings (5-yr)

- 790 Net Job Change
- 1,370 5-yr Replacements

Community Colleges Supply:

- 207 awards
- 1 Program
- 12 colleges

Technology:

- Analytical or scientific software
- Scientific Software Group Filter Drain FD
- Calendar and scheduling software
 OmniFleet Equipment Maintenance Management
- Computer aided design CAD software
 EZ Pipe
- Data base user interface and query software

Sources: BLS OES, O*NET, LAEDC

Core Tasks and Importance:

- 90 Weld components in flat, vertical, or overhead positions
- 89 Operate safety equipment and use safe work habits.
- 87 Layout, position, align, and secure parts and assemblies prior to assembly, using straightedges, combination squares, calipers, and rulers.
- 85 Examine workpieces for defects and measure workpieces with straightedges or templates to ensure conformance with specifications.
- 79 Recognize, set up, and operate hand and power tools common to the welding trade, such as shielded metal arc and gas metal arc welding equipment.

Middle Skill Relevance

Welders, cutters, solderers and brazers can learn the required skills in a variety of ways, including on-the-job training, apprenticeships and career technical training programs. A professional certification, Certified Welder (CE), will increase access to positions associated with the higher wages in this occupation.



The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- While the entry level education is high school, most workers have the educational attainment of less than high school.
- A smaller share of workers are ages 55 years and over in this occupation compared to the reginal average.
- The workforce in this occupation is predominantly Hispanic, accounting for 80 percent of all workers.
- The workforce is predominantly male, accounting for 96 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- **SOC 51-4031** Cutting, punching and press machine setters, operators and tenders, metal and plastic (6,430 workers),
- SOC 51-4034 Lathe and turning machine tool setters, operators and tenders, metal and plastic (2,211 workers),
- SOC 51-4072 Molding, coremaking and casting machine setters, operators and tenders (3,745 workers), and
- **SOC 51-4122** Welding, soldering and brazing machine setters, operators and tenders (1,496 workers).

EDUCATIONAL ATTAINMENT 2016

41.4%		32.5%		22.3%		-0.59
Target occ	upation					
16.0%	19.4%	30.4%	22	2.6 %	11.5%	
Total, all o	ccupations					
Less that High Sch	n HS 📃 A nool 📃 B	ssociate's/Some Col achelor's	lege	Mast or Hi	ter's igher	

3.3%

8 7% 2.1%

AGE DISTRIBUTION 2016

4.8%

36.7%	6	39.3%		19.1%			
Target occupation 5.3%							
26.7 %		32.1% 36.6%		. 6 %			
Total, all occupati	Total, all occupations						
Under 24 years	40 to	40 to 54 years					
25 to 39 years	55 ye	5 years and over					

RACE AND ETHNICITY 2016

			0.770	
27.2%		46.3%	15.7%	
Target occupation			2.4	%
43.1%		33.0%	15.8%	
Total, all occupations			5.7 %	
Hispanic White	Asian Black	Other		

GENDER 2016

54.8%	55.0%			
Target occupation				
54.8%	45.2%			
Total, all occupations				

Male Female

Welders/Cutters/Solderers/Brazers Control Machine/Process Handling/ Moving Objects Identify Objects/ Actions/Events Operate Vehcls/ Mech Dvcs/Equip Communicate Sups/Peer/Subords Getting Information Perform Gen Phys Activities Inspect Equip/Structrs/Material Thinking Creatively Training & Teaching Others

Molding/Coremaking/Casting Machine Setters/Oprtrs/Tendrs

Handling/Moving Objects Perform Gen Phys Activities Inspect Equip/ Structrs/Material Getting Information Communicate Sups/ Peer/Subords Identify Objects/ Actions/Events Decision Making/ Problem Solving Control Machine, Process Welding/Soldering/Brazing Machine Setters, Operators & Tenders

Getting Information Handling/Moving Objects Inspect Equip/Structrs/Material Control Machine/Process Identify Objects/ Actions/Events Monitor Process/ Materls/ Surroundings Perform Gen Phys Activities Decision Making/ Problem Solving

Cut/Punch/Press Mchne Sttrs/ Oprtrs/Tendrs, <u>Metal & Plastic,</u>

Control Machine/Process Handling/Moving Objects Communicate Sups/Peer/Subords Inspect Equip/Structrs/Material Document/Record Info Identify Objects/Actions/Events Getting Information Perform Gen Phys Activities

Lathe/Turning Machine Tool Setters/ Operators/Tenders, Metal & Plastic Control Machine/Process Getting Information Handling/Moving Objects Decision Making/ Problem Solving Perform Gen Phys Activities Inspect Equip/ Structrs/Material Communicate Sups/Peer/Subords Monitor Process/ Materls/ Surroundings

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

Inspectors, Testers, Sorters, Samplers and Weighers are identified as a middle-skill occupation. They inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.





Industry Distribution:

Inspectors, testers, sorters, samplers and weighers are hired across a number of different industries. These industries are where individuals who have acquired the necessary training and skills may seek employment opportunities post-program. Manufacturing hires the most workers in this occupation in the LA Basin. The three industry subsectors who employ the largest number of inspectors, pickers, quality assurance auditors and quality technicians in the LA Basin are:

- Fabricated Metal Product (NAICS 332)
- Computer and Electronic Product (NAICS 334)
- Administrative and support services (NAICS 561)



At A Glance

Projected Openings 2021:

• 3,840 Total Openings (5-yr)

- 1,030 Net Job Change
- 2,810 5-yr Replacements

Community Colleges Supply:

- 111 awards
- 3 Programs
- 13 colleges

Technology:

- Analytical or scientific software
 - Design of experiments DOE software; Minitab; Tolerance analysis software
- Computer aided design CAD software Hot technology
 - Autodesk AutoCAD; Dassault Systemes CATIA
- Data base user interface and query software
 Data entry software; FileMaker Pro; Microsoft Access
- Electronic mail software
- Industrial control software
 Coordinate measuring machine software; Cybermetrics GAGETrak

Sources: BLS OES, O*NET, LAEDC

Core Tasks and Importance:

91 Inspect, test, or measure materials, products, installations, or work for conformance to specifications.

88 Measure dimensions of products to verify conformance to specifications, using measuring instruments such as rulers, calipers, gauges, or micrometers.

88 Read blueprints, data, manuals, or other materials to determine specifications, inspection and testing procedures, adjustment methods, certification processes, formulas, or measuring instruments required.

86 Record inspection or test data, such as weights, temperatures, grades, or moisture content, and quantities inspected or graded.

- 86 Mark items with details such as grade or acceptance-rejection status.
- 84 Notify supervisors or other personnel of production problems.


Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

- A larger share of workers have the educational attainment of high school or less in this occupation compared to the regional average.
- Most workers in this occupation are ages 25 to 54 years, accounting for 70 percent of all workers.
- The workforce in this occupation is predominantly Hispanic, accounting for 54 percent of all workers.
- The workforce is predominantly male, accounting for 62 percent of all workers.

Related Occupations

Individuals with similar skill sets that are transferable with retraining or additional training being offered:

- **SOC 51-4031** Shipping, receiving and traffic clerks (38,380 workers),
- SOC 51-2092 Team assemblers (34,710 workers),
- **SOC 51-4031** Cutting, punching and press machine setters, operators and tenders, metal and plastic (6,430 workers), and
- **SOC 53-7063** Machine feeders and offbearers (2,290 workers).

EDUCA	EDUCATIONAL ATTAINMENT 2016					2.1%
24.09	6	2	B.7 %	3	2.3%	12.9 %
Target occ	upatio	n				
16.0%	19.	4%	30.4	%	22.6 %	11.5%
Total, all o	ccupa	tions				
Less tha	n HS	A	ssociate's/S	ome Coll	ege 📃 M	laster's
High Scl	nool	B	achelor's		0	r Higher
AGE DISTRIBUTION 2016						
	35.	4%		34.7%		22.5%
Target occupation 5.3%						
26.7	%		32.1%		36.	5%

Total, all occupations

Under 24 years 📃 40 to 54 years

25 to 39 years 🛛 📕 55 years and over

RACE AND ETHNICITY 2016

3.5%

1.8%

5	54.3%		23.8%		16.6%		ľ
Target occupat	ion				2.4	•%	
43.1	%	33	6.0 %	1	5.8%		1
Total, all occup	ations				5.7%	5	
Hispanic White	Asian Black		Other				

GENDER 2016

62.4%	37.6 %	
Target occupation		
54.8%	45.2%	
Total, all occupations		

Male Female

Inspectors/Testers/Sorters/ Samplers/Weighers

Cetting Information Inspect Equip/Structrs/Material Communicate Sups/Peer/Subords Identify Objects/Actions/Events Eval/Determ Standrds Compliance Judging Qual of Things/Services/People Monitor Process/Material/Surroundings Document/Record Information Perform Gen Phys Activities

Shipping, Receiving and Traffic Clerks

Getting Information Interact w/ Computers Communicate Sups/Peer/Subords Process Information Identify Objects/Actions/Events Handling/Moving Objects fonitor Prcess/Matrial/Surroundings Organize, Plan & Prioritize Work

Team Assemblers

Cetting Information Communicate Sups/Peer/Subords Identify Objects/Actions/Events Monitor Prcess/Matrial/ Surroundings Inspect Equip/Structrs/Material Eval/Determ Standrds Compliance Document/Record Information Decision Making/ Problem Solving

Cut/Punch/Press Mchne Sttrs/ Oprtrs/Tend<u>rs, Metal & Plastic</u>

Cetting Information Control Machine/Process Handling/Moving Objects Inspct Equip/Structrs/Material Monitor Prcess/Matrial/Surroundings Perform Gen Phys Activities Decision Making/ Problem Solving Communicate Sups/Peer/Subords

Machine Feeders and Offbearers

Handling/Moving Objects Control Machine/Process Getting Information Perform Gen Phys Activities Inspect Equip/Structrs/Material Identify Objects/Actions/Events Communicate Sups/Peer/Subords Monitor Process/Matrial/ Surroundings

Sources: U.S. Census Bureau ACS PUMS, O*NET, LAEDC



8 Middle-skill Occupations

In the sections that follow, the nine occupational clusters representing the 20 target occupations are examined in more detail:

- Management
- Computer and Mathematical
- Arts, Design, Entertainment, Sports and Media
- Health Care Practitioners
- Health Care Support
- Office and Administrative Support
- Construction and Extraction
- Installation, Maintenance and Repair
- Production

Within each occupational cluster, one to four occupations were selected for closer examination that offer promising career prospects for community college students.

The 20 occupations identified by this study are middleskill occupations with strong employment projections and the potential for facilitating economic mobility.

Middle-skill jobs are particularly relevant to community colleges because they typically require some college coursework, but less than a bachelor's degree.

It is estimated that half of all jobs in the nation are middle skill.⁴ However, there have been mounting concerns in recent years that a shortage of skilled workers to fill middle-skill jobs could hamper the nation's future economic growth.⁵

Regional Community College Supply

TOTAL NUMBER OF STUDENTS: **775,956**

NUMBER OF CAREER EDUCATION STUDENTS: **523,331**

200+ NUMBER OF CAREER EDUCATION PROGRAMS

As a result, employers and educational providers have been directing more attention toward the training of middle-skill workers. Middle-skill jobs can be highly technical and have great potential to lift individuals out of poverty, offering strong wages and requiring only a few years of educational preparation.



 $^{\rm 4}$ "The future of the U.S. Workforce: Middle skills jobs and the growing importance of postsecondary education." 2012. Achieve.

http://www.achieve.org/files/MiddleSkillsJobs.pdf

⁵ Modestino, Alicia Sasser. "The importance of middle-skill jobs." Vol. 33, Issue 1. Fall 2016. Issues in Science and Technology. http://issues.org/33-1/the-importance-of-middle-skill-jobs/



EXHIBIT 8-2

Of the 20 occupations studied, middle-skill jobs with the most job openings (new + replacement) through 2021.



Some of the selected occupations have a typical entrylevel education of bachelor's degree according to the Bureau of Labor Statistics, but still qualify as middle skill. This is because at least 33 percent of the occupation's current workers have completed some college coursework or an associate degree as their highest level of education.

Other occupations included in the analysis may not require college coursework, but are still considered middle skill because they may require more than 12 months of onthe-job training or an apprenticeship.

Looming Supply Gap

During the 2014-15 academic year, nearly 776,000 students enrolled in one or more community college courses in the Los Angeles Basin.

Of those students, 523,331 students, about 67 percent, enrolled in career education courses.

Regionally, students can choose from more than 200 career education programs offered by 19 community colleges in Los Angeles County and nine community colleges in Orange County.

In the region there will be **approximately 67,450 job openings over the next five years** for the 20 occupations highlighted in supply/demand section of this report.

However, there appears to be a looming gap in the supply of skilled workers to enter these jobs.

According to the latest data available, from the academic year 2014-15, there were fewer than 27,000 career education award earners in the Los Angeles Basin. And nearly 7,800 awards were conferred in programs training for the 20 target occupations.

If this trend continues, 42 percent of the demand in the region will not be met over the next five years by community colleges alone.

Since community colleges play a leading and vital role in training students to enter these target occupations, it is incumbent that more attention be given toward meeting forecasted employer demand. Closing the supply gap is critical to the growth and prosperity of the economy in the Los Angeles Basin.

The following sections further examine each occupational cluster and provide detailed information about the current workforce and available training.

Student Demographic Portrait

In the Los Angeles Basin, community college students are predominantly young, with many under the age of 19 years. Moreover, a very high percentage of students study business administration, the most popular career education program in the region.

Overall, the award completion demographics in both counties seem to mirror the overall demographics of the region.

In general, there are more male community college students than female students in Los Angeles County, but a higher proportion of career education award earners are women.

Program choices vary by gender. Male students in Los Angeles County have the highest completion rates in business administration, administration of justice and automotive technology. Female students have high completion rates in child development/early care and education, registered nursing and business administration.

Hispanic students account for the largest proportion of award holders in Los Angeles County. In fact, most Hispanic completions in 2014-15 were child development/early care and education, followed by administration of justice.

Analysis of the more than 200 community college career education (CE) programs training for the 20 priority occupations, revealed the following:

Management

Women comprise the majority of business management award earners in both Los Angeles and Orange counties, 59 percent and 51 percent, respectively.

• Logistics

The majority, 72 percent, of logistics and materials transportation award earners in Los Angeles County were Hispanic, while the majority, 75 percent, of award earners in Orange County were African-American.

• Entertainment

In Los Angeles County, commercial art and ilm production award completers are primarily male, 81 percent and 100 percent, respectively.

Fashion

Fashion and fashion design award earners are predominately female in Los Angeles and Orange counties, 100 percent and 84 percent, respectively.

• Health Care

Approximately 80 percent of registered nursing award earners in both counties are female; and over half, 51 percent, of registered nursing award holders in Los Angeles County are between the ages of 20 and 29 years.

Installation, Maintenance & Repair

Award earners in both counties are exclusively male. And the majority of award earners are Hispanic, comprising 62 percent in Los Angeles County and 58 percent in Orange County.

Construction & Extraction

Nearly 60 percent of construction-and-extraction award earners in Los Angeles County are under the age of 25. Orange County's award earners are older in comparison, with 77 percent of award recipients ages 25 to 34 years.

	Los Angeles		Orange County
~	Higher proportion of female award earners for CE programs (58 percent female)	~	Higher proportion of male award earners for CE programs (51 percent male)
~	Higher proportion of Hispanic CE award earners (57 percent), followed by white (17 percent)	~	Higher proportion of white CE award earners (39 percent), followed by Hispanic (35 percent)
✓	Highest percentage of CE award earners are 19 years old or younger (34 percent), followed by ages 20-24 years (26 percent)	1	Highest percentage of CE award earners are 19 years old or younger (24 percent), followed closely by ages 20-24 years (23 percent)
~	Highest percentage of students earn awards in business administration (ten percent), followed by child development/ early care and education (nine percent)	~	Highest percentage of students earn awards in business administration (17 percent), followed by accounting (eight percent)

Talent Supply and Demand

In this section, we examine employer demand for middleskill occupations in relation to the supply of talent from related community college programs. However, supplyand-demand matching do not result in an absolute value for unmet or oversupplied labor market need due to the fact that a single community college program can train students to enter more than one occupation. In fact, most community college programs train students to enter an array of occupations related to a specific area. However, analysis of program completion data can serve as a somewhat broad indicator of whether an adequate number of students are being prepared to enter highgrowth occupations.

(For the complete list of associate degrees and certificates awarded in programs related to the 20 target occupations, refer to Appendix Exhibit A-1)

Management

Overview

Management occupations are critical to many industries, from logistics to aerospace and advanced manufacturing. They play a central role in ensuring the prosperity and fulfillment of economic goals for many different types of businesses and firms.

Occupations within the management cluster are characterized by their role in planning, directing or coordinating operational activities. Managers, and supervisors alike, may be responsible for scheduling, strategic planning and training employees.

They often oversee financial activities, such as budgeting, and they must make certain that activities are carried out in accordance with organizational policies.

Job to Watch

In the Los Angeles Basin, the occupation of transportation, storage and distribution managers is important for industries providing transportation, warehousing and storage of goods.

This occupation is valuable for operations providing scenic and sightseeing transportation, and businesses offering support activities related to various modes of transportation—air, rail, water, roads and pipelines.

MANAGEMENT SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Transportation, Storage and Distribution Managers	6,211	266	\$47.37

Supply

CC Programs	2015-16 Awards
Business Management	995
Logistics and Materials Transportation	217
Aviation and Airport Management	31
Aviation and Airport Management and Services	15
TOTAL	1,258

In 2016, the region employed 6,211 transportation, storage and distribution managers. It is projected there will be 1,329 job openings over the next five years, or the equivalent of 266 annual openings.

A compelling aspect of the transportation, storage and distribution managers occupation is its high wage. Workers in this occupation can expect to earn on average \$47/hour, or more than \$98,000/year.

Student Supply

There are four programs offered in the Los Angeles Basin that prepare students for the target management occupation. Collectively, these programs conferred 1,258 awards in the 2015-16 academic year.

In the 2014-15 academic year (the most recent data available), only one award in business management was conferred by one program at a technical/proprietary college in the region.

Computer & Mathematical

Overview

Occupations in the computer and mathematical cluster are responsible for collecting data, analyzing computer systems and networks, and designing software to help businesses with their day-to-day operations.

Workers in this cluster design websites or provide technical assistance to computer users. They may create computer programs, or plan and design computer systems that integrate computer hardware, software and communication technologies.

Community college programs related to this cluster teach students about information storage and processing, as well as computer support. Curriculum may include networking design (installation, maintenance and troubleshooting), website development and managing computer systems and networks.

Job to Watch

There are two occupations of regional importance within the computer and mathematical occupational cluster:

- Web developers, and
- Computer user support specialists.

In 2016, the region employed 32,172 workers in these occupations. Between the two, computer user support specialists comprised 73 percent of employment in 2016.

With an average wage of \$33.28/hour, web developers can expect to earn around \$69,000 annually. Computer user support specialists earn slightly less, \$27.68/hour, which translates to around \$57,500/year. However, there are two times as many annual openings for computer support specialists than web developers in the Los Angeles Basin.

This number is substantial and most likely due to the differences in education requirements for the two occupations. Generally, less education and training is required for computer user support specialists compared to web developers.

Another factor for the significant difference in jobs is that overall employment of web developers may not be accurately represented in the dataset because this occupation tends to be self-employed as independent contractors. For example, in 2016 there were nearly 2,200 self-employed workers in the region.

COMPUTER & MATHEMATICAL SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Computer User Support Specialists	23,497	776	\$27.68
Web Developers	8,675	356	\$33.28

Supply

CC Programs	2015-16 Awards
Computer Networking	171
Computer Infrastructure and Support	122
Computer Information Systems	101
Website Design and Development	37
Computer Support	36
World Wide Web Administration	15
TOTAL	482

Student Supply

Six programs offered by community colleges in the Los Angeles Basin were identified that prepare students for the occupations mentioned above. In total, 482 awards were conferred by these programs in the 2015-16 academic year. This number falls far below the projected job openings for web developers and computer user support specialists.

In the 2014-15 academic year, 173 awards also were conferred by technical/proprietary colleges in the following programs:

- Computer Networking (78 awards);
- Computer Information Systems (40);
- Computer Infrastructure and Support (1);
- Website Design and Development (34);
- Computer Support (13); and
- World Wide Web Administration (7).

Arts, Design, Entertainment, Sports & Media

Overview

Given that the Los Angeles Basin is widely considered the creative capital of the nation, it's no surprise that the arts, design, entertainment, sports and media cluster was identified as a priority area by this study. Work responsibilities in this cluster primarily revolve around creating original artwork, editing moving images on film or video, and operating audio and video equipment.

Employers in the region include motion picture and sound recording industries, broadcasting companies, the performing arts and spectator sports.

Community college programs related to this cluster teach students artistic techniques that can be applied to commercial and technical projects. Learning how to use computer software programs with consumer, commercial and industrial applications is integral to many educational programs.

Job to Watch

Four occupations within the cluster were selected for closer analysis:

- Graphic Designers,
- Film and Video Editors,
- Audio and Video Equipment Technicians, and
- Fashion Designers.

In 2016, the region employed 41,215 workers in these four occupations, which are projected to generate over 6,100 new jobs over the next five years, translating to 1,200 job openings per year.

The graphic designers occupation has the greatest employment in the region and the most annual openings, 482 per year, followed by audio and video equipment technicians, 375 openings per year.

Occupations in this group earn hourly wages between \$25.16 and \$47.20, with film and video editors earning the highest average wage.

Of these four occupations, audio and video equipment technicians require the least education (a postsecondary certificate), whereas the other three typically require a bachelor's degree. However, approximately 30 percent of the workforce in each of the three occupations holds a community college degree or certificate, qualifying these occupations as middle-skill jobs.

ARTS, DESIGN, ENTERTAINMENT, SPORTS & MEDIA SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Graphic Designers	12,651	482	\$25.16
Film and Video Editors	12,588	214	\$47.20
Audio and Video Equipment Technicians	10,707	376	\$26.57
Fashion Designers	5,270	152	\$36.77

Supply

CC Programs	2015-16 Awards
Television (including combined TV/Film/Video)	208
Film Production	174
Graphic Art and Design	169
Fashion Design	165
Radio and Television	86
Commercial Art	70
Computer Graphics and Digital Imagery	67
Digital Media	36
Fashion	34
TOTAL	1,009

Student Supply

Nine community college programs preparing students for the four occupations conferred more than 1,000 awards in the 2015-16 academic year.

In addition, technical/proprietary colleges conferred 112 awards through the following programs:

- Graphic Art and Design (51 awards);
- Fashion Design (20);
- Film Production (32); and
- Radio and Television (19).

Health Care Practitioners

Overview

The health care practitioner cluster is expected to undergo rapid growth both statewide and regionally in coming years. This is attributed to the aging baby boomer generation which will place greater demands on regional health systems and an aging workforce, which will have an increase in retirements in health care occupations.

Health care practitioners care for their patients in a range of environments, from hospitals and nursing homes to clinics, private homes and group homes.

Community college programs train students how to assess patient health problems and needs, maintain records and develop care plans for patients.

Community college programs prepare students for licensure by either the California Board of Registered Nursing or the state's Board of Vocational Nursing and Psychiatric Technicians.

Job to Watch

Most occupations within this cluster require a bachelor's degree or higher. However, two occupations are considered middle skill, with a significantly higher proportion of workers having completed community college training.

The two occupations projected to undergo robust growth and offer strong wages are:

- Registered nurses, and
- Licensed vocational nurses.

In 2016, the region employed 130,919 workers as registered nurses and licensed vocational nurses. These two occupations are projected to have 23,685 job openings over the next five years, or 4,700 job openings per year.

There will be far more openings for registered nurses, nearly 3,694 each year, compared to licensed vocational nurses, around 1,043 each year.

Of the two occupations, registered nurses require more training and specialization, which translates to higher compensation—an average wage of \$44.98/hour.

The average wage of registered nurses is nearly twice that of licensed vocational nurses, \$24.43/hour. While registered nurses can earn around \$93,000/year, licensed vocation nurses earn closer to \$50,000/year. Still, this occupation offers a strong wage compared to many other careers.

HEALTH CARE PRACTITIONERS SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Registered Nurses	102,749	3,694	\$44.98
Licensed Vocational Nurses	28,170	1,043	\$24.43

Supply

CC Programs	2015-16 Awards
Registered Nursing	1,943
Licensed Vocational Nursing	115
TOTAL	2,058

Student Supply

Community college programs preparing students for the two nursing occupations in the region conferred slightly more than 2,000 awards in the 2015-16 academic year.

Only 115 of those awards were for licensed vocational nursing programs, whereas this occupation is projected to have 1,043 annual openings.

In should be noted in the 2014-15 academic year, technical/ proprietary college programs conferred more than 1,000 awards related to the two occupations:

- Registered Nursing (167 awards); and
- Licensed Vocational Nursing (952).

With more than 4,700 job openings expected each year for registered nurses and licensed vocational nurses combined, and with only about 3,000 awards conferred per year, there may be a supply gap for these professions.



Health Care Support

Overview

Health care support occupations provide administrative and clinical assistance at clinics, hospitals and other institutions.

Workers generally complete a postsecondary certificate that allows them to provide basic nursing care under the direction of a health care practitioner, as well as perform office and laboratory duties.

Students interested in a career as a nursing assistant can enroll in a certified nurse assistant program offered by a community college where they will be trained to conduct routine nursing services.

These services typically involve the care of patients in hospitals or long-term care facilities.

Health care support occupations are supervised by nursing or medical staff. Workers must pass a nurse assistant certification examination and background check to be employed in health care support occupations.

Health care support workers must be well versed in the technology necessary to keep up with the fast-paced and ever-changing health care industry.

Job to Watch

In this cluster, the nursing assistants occupation is important for the region.

In 2016, the region employed 42,073 health care support workers as nursing assistants.

Moreover, it is projected that there will be more than 6,500 job openings for this occupation over the next five years. That equates to more than 1,300 job openings each year.

The average wage for this occupation, \$14.95/hour, is considerably lower than that of registered nurses or licensed vocational nurses.

In general, a nursing assistant receiving an average wage in the region can expect to earn around \$31,000 per year.

HEALTH CARE SUPPORT SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Nursing Assistants	42,073	1,308	\$44.98

Supply

CC Programs	2015-16 Awards
Certified Nurse Assistant	16

Student Supply

In the 2015-16 academic year, community colleges only conferred 16 certified nurse assistant awards in the region.

In the 2014-15 academic year, representing the latest available data, the total number of associate degrees and certificates from technical/proprietary schools for certified nurse assistants was 134 in the region.

Still, this number falls below the more than 1,300 projected annual openings that are expected for nursing assistants in the region.

Office & Administrative Support

Overview

Office and administrative support workers have a significant role in the advancement of the business services industry, specifically in the areas of accounting and other financial services.

These occupations perform a wide range of activities. For example, workers in office and administrative occupations may be tasked with preparing, transcribing, systematizing and preserving written communications and records.

They may also gather and distribute information and maintain stores of materials. Operating telephone switchboards and coordinating the flow of work and materials within or between departments are other skills associated with this occupational cluster.

The ability to systemize information is critical to this field of study.

Community colleges train students to verify accuracy of data by applying accounting, internal reporting and decision-making principles. Students also learn about many aspects of the day-to-day operations of businesses and financial establishments.

Job to Watch

Three occupations critical to the Los Angeles Basin's economic landscape within the office and administrative support occupational cluster were identified:

- Bookkeeping, accounting and auditing clerks;
- Production, planning and expediting clerks; and
- Payroll and timekeeping clerks.

In 2016, the region employed 108,834 workers in these four occupations, which are projected to have 10,428 openings over the next five years, or nearly 2,100 job openings per year.

Out of the three occupations, 70 percent of the jobs in 2016 were for bookkeeping, accounting and auditing clerks.

This occupation also typically requires the most education. Yet, it has the lowest average wage, \$21.80/hour, around \$45,300 per year.

The occupation of production, planning and expediting clerks pays a higher wage, \$23.21/hour, about the equivalent of \$48,300 per year. This occupation will have 921 annual openings in the region.

OFFICE & ADMINISTRATIVE SUPPORT SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Bookkeeping, Accounting and Auditing Clerks	76,508	784	\$44.98
Production, Planning and Expediting Clerks	23,106	921	\$23.21
Payroll and Timekeeping Clerks	9,220	380	\$21.95

Supply

CC Programs	2015-16 Awards
Accounting	1,193
Logistics and Materials Transportation	217
TOTAL	1,410

Student Supply

Community colleges programs related to this occupational cluster conferred about 1,400 awards in the 2015-16 academic year.

Accounting programs conferred by far the most awards, 1,193, compared to logistics and materials transportation, 217.

Technical/proprietary colleges conferred 26 awards in accounting in the region in the 2014-15 academic year.

Construction & Extraction

Overview

Occupations in the construction and extraction cluster are characterized by their role in building and maintaining buildings.

Workers may drive, maneuver or control the heavy machinery used in the construction of buildings, as well as work with electrical wiring, equipment and fixtures.

A critical field of expertise within construction and extraction is related to electrical systems.

At the community college level, programs related to this area prepare students to install, maintain and repair electrical systems in buildings.

Students learn about residential, commercial and industrial electric power wiring, as well as motors, controls and electrical-distribution panels.

Job to Watch

An occupation identified as being particularly critical to the construction and extraction workforce in the Los Angeles Basin is electricians.

In 2016, the region employed 17,178 workers in this occupation, and it is projected that there will be nearly 600 annual openings for electricians between 2016 and 2020.

This occupation pays a solid average wage, \$27.65/hour, which translates to around \$57,500 per year.

CONSTRUCTION & EXTRACTION SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Electricians	17,178	597	\$27.65

Supply

CC Programs	2015-16 Awards
Electronics and Electric Technology	361
Electrical	191
Electrical Systems Power Transmission	27
TOTAL	579

Student Supply

There are several types of community college programs that train electricians in the region.

These programs conferred a total of 579 awards in the 2015-16 academic year in the region.

Electronics and electric technology programs conferred the most awards, 361, followed by electrical programs, 191 awards.

The smallest number of awards, only 25, were earned from electrical systems and power transmission programs in the region.

The same programs are offered by technical and proprietary schools in the region. In the 2014-15 academic year, technical/proprietary college programs awarding associate degrees and certificates in the region were:

- Electrical (176 awards);
- Electronics and Electric Technology (65); and
- Electrical Systems and Power Transmission (27).

Installation, Maintenance & Repair

Overview

Occupations in the installation, maintenance and repair cluster conduct a wide range of activities. These jobs are typically characterized by the type of equipment they use.

Some workers specialize in aircraft repair and maintenance, while others focus on heavy and mobile equipment, or industrial machinery.

At the community college level, programs related to installation, maintenance and repair instruct students in the:

- Repair and maintenance of diesel engines;
- Construction, maintenance and operation of mechanical, hydraulic, pneumatic and electrical equipment and related systems; and
- Engineering principles and technical skills for the manufacturing of products and related industrial processes.

Job to Watch

In 2016, the region employed 16,865 workers in three occupations particularly relevant to the installation, repair and maintenance cluster.

These three occupations are:

- Industrial machinery mechanics,
- Aircraft mechanics and service technicians, and
- Mobile heavy equipment mechanics (except engines).

Across these three occupations, 3,200 job openings are projected over the next five years, with over 600 job openings per year. Approximately half of the job openings will be for industrial machinery mechanics. These three occupations pay \$26.50-\$29.90/hour.

Of the three occupations, industrial machinery mechanics typically requires a high school diploma, yet nearly half of the workforce has completed some community college training.

INSTALLATION, MAINTENANCE & REPAIR SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Industrial Machinery Mechanics	7,809	335	\$26.50
Aircraft Mechanics and Service Technicians	5,252	130	\$28.05
Mobile Heavy Equipment Mechanics, Except Engines	3,804	176	\$29.90

Supply

CC Programs	2015-16 Awards
Industrial Systems Technology and Maintenance	102
Aviation Powerplant Mechanics	90
Aviation Airframe Mechanics	84
Manufacturing and Industrial Technology	49
Aeronautical and Aviation Technology	43
Heavy Equipment Maintenance	8
TOTAL	376

Student Supply

There are six types of community college programs in the region that train for the three occupations. The most student completions in the 2015-16 academic year were in industrial systems technology and maintenance, 102 awards, followed by aviation powerplant mechanics, 90 awards. Aviation airframe mechanics conferred 84 awards.

Two programs related to the three occupations were offered by technical/proprietary colleges in the 2014-15 academic year in the region. Degrees and certificates were conferred by the following programs:

- Aeronautical and Aviation Technology (223 awards); and
- Aviation Powerplant Mechanics (2).



Production

Overview

Occupations related to production create new products either directly from raw materials or components.

Although these jobs are usually in a factory, plant or mill, they can also be in a home.

In the Los Angeles Basin, production occupations have a significant role in the biomedical industry, through establishments engaged in the production of medical equipment and supplies.

Workers who work in production may operate computercontrolled machines or robots. They may also inspect, test, sort, sample or weigh materials or processed, fabricated or assembled products.

Community colleges teach students about the fabrication, assembly and repair of parts and components or systems on machines.

They also train students to develop or manufacture systems or products used in various industries.

Job to Watch

The production cluster contains three occupations that particularly warrant attention in the region:

- Inspectors, testers, sorters, samplers and weighers;
- Welders, cutters, solderers and brazers; and
- Computer-controlled machine tool operators (metal and plastic).

In 2016, the region employed 38,605 workers in these three occupations, which are projected to have nearly 7,500 job openings over the next five years. This equates to approximately 1,500 job openings per year.

The highest average wage is earned by inspectors, testers, sorters, samplers and weighers, \$20.27/hour, which translates to about \$42,000 per year. This occupation is also expected to have the most annual openings of the three.

PRODUCTION SCORECARD

Demand

Occupation	2016 Jobs	Annual Openings	Avg. Hourly Wage
Inspectors, Testers, Sorters, Samplers and Weighers	22,383	768	\$20.27
Welders, Cutters, Solderers and Brazers	9,608	433	\$18.91
Computer-Controlled Machine Tool Operators, Metal and Plastic	6,614	298	\$17.87

Supply

CC Programs	2015-16 Awards
Machining and Machine Tools	243
Welding Technology	207
Manufacturing and industrial Technology	49
Biotechnology and Biomedical Technology	40
Laboratory Science Technology	22
TOTAL	561

Student Supply

There are five programs offered by community colleges in the region related to these three occupations.

By far, machining and machine tools programs conferred the most awards in the 2015-16 academic year, 243, followed by welding technology, 207.

In comparison, only two related programs are offered in the region by technical/proprietary colleges.

In the 2014-15 academic year, programs at technical/ proprietary colleges related to the three production occupations were:

- Biotechnology & Biomedical Technology (61 awards); and
- Machining and Machine Tools (3).

A1 Methodology

Industry Forecast

An economic forecast is created to project employment by industry over the next five years using statistical analysis of historical data paired with the most recent qualitative information impacting a set of 151 industries in the Los Angeles Basin. The industries configured for this forecast are defined through the North American Industry Classification System (NAICS) and comprised of industries that are categorized as 2-digit, 3-digit, and 4-digit industries through the NAICS hierarchical classification system. One of the key inputs to the regional forecast is the projected population growth in both Los Angeles and Orange Counties, provided by the California Department of Finance. State and national trends of production, production methods, consumer behavior, construction, and property values are a few of the inputs to the economic forecast model as they correspond to each industry.

Occupations

Occupations are commonly classified using the Standard Occupational Classification (SOC) system, developed by the Bureau of Labor Statistics. This system classifies all workers into one of 840 detailed occupations with similar job duties, skills, education and training. These detailed occupations are not generally industry-specific but are common to many industries. For example, retail salespersons are employed in a full spectrum of industries.

The economic forecast used for employment by industry is used to guide a projection of net new jobs for each occupation and are calculated by applying the industry occupational composition to the detailed industry employment forecast, and occupational forecasts are aggregated across industries.

The Census Bureau estimates replacement needs by industry and occupation through detailed surveys of employers and households. These take into account industry changes, the age of the current workforce within each industry and occupation, and the nature of the career path. These estimates are an important component of occupational job openings and workforce development needs, since the retirement and promotion of individuals leave openings for newer entrants and those moving up the career ladder to assume.

Total openings are the sum of projected five-year replacement needs and positive net new jobs forecast over the period.

Occupations selected for this report have a typical entry level of education that can be obtained at a California Community College - some college coursework, a postsecondary nondegree award, or an Associate degree. Also included were occupations with a typical entry level education of Bachelor's degree or less, but at least 33 percent of the current workers in the occupation had some college coursework or an Associate degree. Occupations with typical on-the-job training greater than 12 months or requiring an apprenticeship are also addressed in this report.

Supply

Community college and other two-year education institutions provide the education and training relevant to middle-skill occupations. A match of occupations to relevant training programs provide the information for the supply and demand analysis. The number of awards conferred by community colleges is reflective of the most recent year of data available, 2015-16 academic year. Award data for other two-year education institutions represents the 2014-2015 academic year. Due to data and timing limitations, training gap forecasts are an approximation of unmet labor maket demand and not an absolute over or undersupply of available talent. In addition, there is not a one-to-one relationship among education and training programs and occupations; that is some programs train to multiple occupations. Consequently, awards for some education and training programs are presented in multiple occupational groups.

Target Industries and Occupations

Target industries are selected using a variety of metrics including: middle-skill job share; the projected change in middle-skills jobs from 2016 to 2021 (number and rate); the five-year job replacement rate; the 2016 location quotient; the change in location quotient from 2011 to 2016; the 2016 annual average wage relative to all industries; and value added per worker.

Target occupations are selected in a two-step process; first, by isolating all occupations identified as middle-skill (those that generally require some significant education and training beyond high school but less than a bachelor's degree) from each target industry, and second, by using a variety of metrics to choose the target occupations including: 2016 employment; projected net job change; replacement rate; number of projected replacement jobs from 2016 to 2021; number of projected total job openings from 2016 to 2021; and annual median wages.

A2 Detailed Tables

EXHIBIT A-1 PROGRAM NAME

Program Name Awards (2015-2016) **Biotechnology and Biomedical Technology** 40 Associate Degree 7 Certificate 18 to < 30 semester units 15 Certificate 30 to < 60 semester units 16 Certificate 6 to < 18 semester units 2 1,193 Accounting 321 Associate Degree Certificate 12 to < 18 units 1 315 Certificate 18 to < 30 semester units Certificate 30 to < 60 semester units 140 Certificate 6 to < 18 semester units 283 Certificate 60+ semester units 0 Credit Award < 6 semester units 133 **Business Management** 995 Associate Degree 642 1 Certificate 12 to < 18 units 220 Certificate 18 to < 30 semester units 18 Certificate 30 to < 60 semester units 96 Certificate 6 to < 18 semester units Noncredit award from 192 to < 288 hours 18 **Logistics and Materials Transportation** 217 Associate Degree 103 Certificate 18 to < 30 semester units 20 Certificate 30 to < 60 semester units 4 Certificate 6 to < 18 semester units 90 **Radio and Television** 86 Associate Degree 32 23 Certificate 18 to < 30 semester units Certificate 30 to < 60 semester units 27 Certificate 6 to < 18 semester units 4 Credit Award < 6 semester units 0 Television (including combined TV/Film/Video) 208 Associate Degree 67 Associate for Transfer Degree 10 Certificate 18 to < 30 semester units 26 Certificate 30 to < 60 semester units 27 Certificate 6 to < 18 semester units 78 **Film Production** 174 Associate Degree 50 Certificate 18 to < 30 semester units 32 Certificate 30 to < 60 semester units 83 Certificate 6 to < 18 semester units 9 **Digital Media** 36 Associate Degree 13 Certificate 18 to < 30 semester units 12 Certificate 30 to < 60 semester units 3 Certificate 6 to < 18 semester units



EXHIBIT A-1 PROGRAM NAME (cont.)

Program Name	Awards (2015-2016)
Website Design and Development	37
Associate Degree	9
Certificate 12 to < 18 units	2
Certificate 18 to < 30 semester units	11
Certificate 30 to < 60 semester units	1
Certificate 6 to < 18 semester units	5
Noncredit award from 480 to < 960 hours	9
Computer Graphics and Digital Imagery	67
Associate Degree	21
Certificate 18 to < 30 semester units	25
Certificate 30 to < 60 semester units	20
Certificate 6 to < 18 semester units	1
Computer Information Systems	101
Associate Degree	68
Certificate 12 to < 18 units	0
Certificate 18 to < 30 semester units	12
Certificate 30 to < 60 semester units	21
Certificate 6 to < 18 semester units	0
Computer Infrastructure and Support	122
Associate Degree	76
Certificate 18 to < 30 semester units	39
Certificate 6 to < 18 semester units	7
Computer Networking	171
Associate Degree	38
Certificate 12 to < 18 units	28
Certificate 18 to < 30 semester units	20
Certificate 30 to < 60 semester units	30
Certificate 6 to < 18 semester units	55
Computer Support	36
Associate Degree	7
Certificate 12 to < 18 units	12
Certificate 18 to < 30 semester units	9
Certificate 30 to < 60 semester units	0
Certificate 6 to < 18 semester units	8
World Wide Web Administration	15
Associate Degree	5
Certificate 12 to < 18 units	6
Certificate 18 to < 50 semester units	2
Certificate 6 to < 10 competer units	2
Electronics and Electric Technology	761
Associate Degree	107
Cartificate 18 to < 30 somester units	55
Certificate 30 to < 60 semester units	59
Certificate 6 to < 18 semester units	42
Credit Award < 6 semester units	0
Noncredit award from 288 to < 480 hours	8
Noncredit award from 480 to < 960 hours	0
Electrical Systems and Power Transmission	25
Associate Degree	0
Certificate 18 to < 30 semester units	25
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EXHIBIT A-1 PROGRAM NAME (cont.)

Program Name	Awards (2015-2016)
Industrial Systems Technology and Maintenance	102
Associate Degree	5
Certificate 18 to < 30 semester units	97
Certificate 30 to < 60 semester units	0
Heavy Equipment Maintenance	8
Associate Degree	3
Certificate 18 to < 30 semester units	3
Certificate 30 to < 60 semester units	2
Certificate 6 to < 18 semester units	0
Aeronautical and Aviation Technology	43
Associate Degree	17
Certificate 30 to < 60 semester units	0
Certificate 60+ semester units	26
Aviation Airframe Mechanics	84
Associate Degree	1
Certificate 30 to < 60 semester units	83
Aviation Powerplant Mechanics	90
Associate Degree	2
Certificate 30 to < 60 semester units	88
Electrical	191
Associate Degree	34
Certificate 18 to < 30 semester units	7
Certificate 30 to < 60 semester units	129
Certificate 6 to < 18 semester units	5
Noncredit award from 192 to < 288 hours	16
Laboratory Science Technology	22
Associate Degree	8
Certificate 30 to < 60 semester units	14
Manufacturing and Industrial Technology	49
Associate Degree	24
Certificate 18 to < 30 semester units	12
Certificate 30 to < 60 semester units	5
Certificate 6 to < 18 semester units	8
Machining and Machine Tools	243
Associate Degree	53
Certificate 18 to < 30 semester units	70
Certificate 30 to < 60 semester units	118
Certificate 6 to < 18 semester units	2
Certificate 60+ semester units	0
Credit Award < 6 semester units	0
Welding Technology	207
Associate Degree	52
Certificate 12 to < 18 units	5
Certificate 18 to < 30 semester units	87
Certificate 30 to < 60 semester units	29
Certificate 6 to < 18 semester units	34
Certificate 60+ semester units	0
Industrial Quality Control	0
Certificate 18 to < 30 semester units	0
Commercial Art	70
Associate Degree	23
Certificate 18 to < 30 semester units	0
Certificate 30 to < 60 semester units	47



EXHIBIT A-1 PROGRAM NAME (cont.)

Program Name	Awards (2015-2016)
Graphic Art and Design	169
Associate Degree	83
Certificate 18 to < 30 semester units	27
Certificate 30 to < 60 semester units	31
Certificate 6 to < 18 semester units	28
Registered Nursing	1,943
Associate Degree	1,623
Certificate 30 to < 60 semester units	139
Certificate 60+ semester units	181
Credit Award < 6 semester units	0
Licensed Vocational Nursing	115
Associate Degree	28
Certificate 30 to < 60 semester units	87
Certified Nurse Assistant	16
Certificate 6 to < 18 semester units	0
Noncredit award from 48 to < 96 hours	16
Fashion	34
Associate Degree	12
Certificate 18 to < 30 semester units	10
Certificate 30 to < 60 semester units	12
Fashion Design	165
Associate Degree	59
Certificate 18 to < 30 semester units	17
Certificate 30 to < 60 semester units	87
Certificate 6 to < 18 semester units	2
Aviation and Airport Management and Services	15
Associate Degree	3
Certificate 18 to < 30 semester units	0
Certificate 30 to < 60 semester units	12
Aviation and Airport Management	31
Associate Degree	15
Certificate 18 to < 30 semester units	7
Certificate 30 to < 60 semester units	0
Certificate 6 to < 18 semester units	9

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