

Opportunities for Career Education to Fill Middle-Skill Job Gaps in San Diego County

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Introduction

In 2015, San Diego County's local Workforce Development Board conducted a study on the region's middle-skill jobs and identified that approximately 35 percent of "San Diegans ages 25 and older lack the post-secondary credentials to fill middle-skill job openings"¹ and more than 38 percent of households earn below the Sufficiency Standard for a single adult to meet basic living needs in San Diego County without public assistance.² Community colleges have the potential to close this "jobs gap" with Career Education programs. By providing training for the top middle-skill jobs, the community colleges can help workers move into living wage careers and provide employers with qualified employees as their businesses compete in a global economy.³

Public Career Education programs have already been proven to benefit students and workers. A recent report by the Brookings Institution analyzed labor market outcomes and debt incurred by students who completed Career Technical Education (CTE) or Career Education programs across the United States and found that "public sector students outperform for-profit students on nearly every measure, suggesting that the overwhelming majority of for-profit students would be better off attending a public institution."⁴

Beyond the national level, this study aims to understand where the middle-skill job opportunities are in San Diego County and explores job gaps (or supply gaps) that could potentially be filled with public Career Education programs.

About the Centers of Excellence

This study was funded by Strong Workforce Program funds and produced by the Centers of Excellence (COE) for Labor Market Research. The COE are funded in part by the California Community Colleges Chancellor's Office, Economic and Workforce Development (EWD) Program. One of the goals of EWD is to "support the regional alignment between the Career Technical Education programs of the community college system and the needs of California's Priority and Emerging Sectors."¹ The COE supports this goal by delivering regional workforce research and technical expertise to the California Community Colleges for program decision-making and resource development. More information about the Centers of Excellence is available at coecc.net.

1. Economic and Workforce Development Program. Annual Report. California Community Colleges Chancellor's Office. 2017

Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence, COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

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¹ San Diego Workforce Partnership. *San Diego County - Middle-Skill Jobs: Gaps and Opportunities*. November 2015. workforce.org/sites/default/files/pdfs/reports/industry/middle-skill_jobs_gaps_and_opportunities_2015.pdf

² The Self-Sufficiency Standard determines the hourly wages that a single adult needs to earn in order to meet basic needs and is based on real-world assumptions of the costs of food, health care, transportation, housing, etc. that vary over time and across geographic locations. selfsufficiencystandard.org

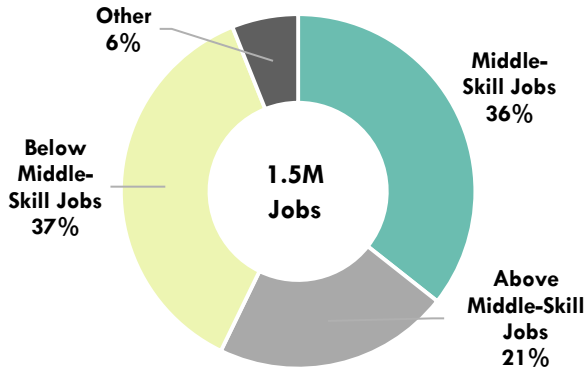
³ Economic and Workforce Development Program. Annual Report. California Community Colleges Chancellor's Office. 2017.

⁴ brookings.edu/blog/brown-center-chalkboard/2018/02/09/gainfully-employed-new-evidence-on-the-earnings-employment-and-debt-of-for-profit-certificate-students

Significance of Middle-Skill Jobs in San Diego County

Middle-skill jobs comprise a significant portion of the San Diego labor market. In 2017, 36 percent of the 1,583,115 jobs in San Diego County were middle-skill jobs and 21 percent were above middle-skill jobs (Figure 1).

Figure 1. Jobs Breakdown in San Diego County, 2017



Middle-skill jobs have median hourly earnings⁵ of \$22.10, which is higher than the self-sufficient hourly wage for a single adult to minimally meet basic living needs without public assistance (\$13.09),⁶ and higher than the average median hourly earnings of all jobs (\$19.30) in the region (Figure 2).⁷

Figure 2. Median Hourly Earnings vs. Self-Sufficiency Standard



San Diego County employers have difficulty filling middle-skill jobs. Between January and December 2017, employers posted 2.21 million online job postings for middle-skill jobs. Only 348,419 of these job postings were unique, which indicates that, on average, an employer posted a job six times in an effort to fill the position. Comparatively, employers posted 1.5 million online job postings for above middle-skill jobs, and only 280,586 were unique.⁸

Defining Middle-Skill Jobs

To define “middle-skill jobs,” the Centers of Excellence for Labor Market Research across the State of California examined 867 occupational codes from the Standard Occupational Classification (SOC)¹ system and classified 298 occupational codes as “middle-skill jobs” and 204 codes as “above middle-skill jobs.”

Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor’s degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs

Above middle-skill jobs include occupations that require an educational attainment of a bachelor’s degree or higher (excluding those in the middle-skill jobs category, as defined above).

For more information about the definition of middle-skill and above middle-skill jobs, see Appendix C.

1. “The 2018 Standard Occupational Classification (SOC) system is a federal statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data.” (bls.gov/soc)

⁵ Hourly earnings are the wages per hour, excluding benefits, of a worker in an occupation. Median hourly earnings are in the middle of the wage distribution for an occupation: half of the workers make more, half of them make less.

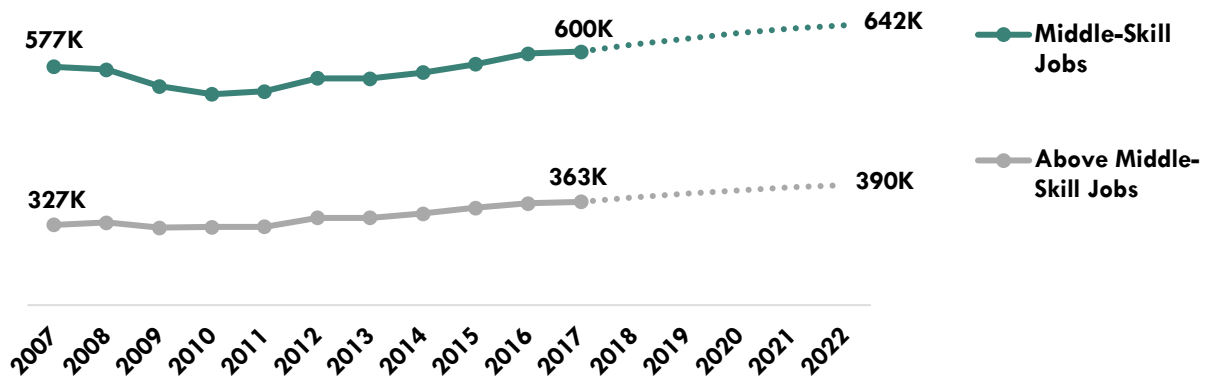
⁶ The Self-Sufficiency Standard determines the hourly wages that an individual needs to earn in order to meet basic needs and is based on real-world assumptions of the costs of food, health care, transportation, housing, etc. that vary over time and across geographic locations. selfsufficiencystandard.org

⁷ Economic Modeling Specialists, Int’l. (Emsi). San Diego County (6073). 2017.03 Class of Worker. QCEW + Non-QCEW+ Self-employed. 2007-2022.

⁸ Emsi. San Diego County (6073). 2017.03 Class of Worker. QCEW + Non-QCEW+ Self-employed. 2017-2022.

Not only do employers have difficulty filling existing middle-skill jobs, but they will also experience hiring challenges as these middle-skill jobs grow. Between 2017 and 2022, the number of middle-skill jobs in the region is projected to increase by 41,450 jobs or seven percent (Figure 3).⁹

Figure 3. Number of People Employed in Middle-Skill and Above-Middle-Skill Jobs in San Diego County



Top Middle-Skill Jobs

To better understand employers' needs, this study analyzes the top middle-skill jobs and their supply gaps and makes recommendations for program development. "Top jobs" are occupations that have the most labor market demand, stable employment growth, and entry-level wages at or above the Self-Sufficiency Standard. The top 100 middle-skill jobs have the following characteristics:

- Most number of annual openings between 2017 and 2022
- Entry-level hourly earnings (25th percentile) greater than or equal to \$13.09
- No employment decline between 2017 and 2022

Table 1 lists the top 100 middle-skill jobs that are analyzed in this study. (For specific details on each top middle-skill job, including wages, job growth and educational requirements, see Appendix D.) Occupational titles in Table 1 with an asterisk (*) have an oversupply of labor. The remaining occupations have supply gaps. A supply gap indicates that there is more labor market demand than labor market supply for an occupation. Conversely, a labor surplus (oversupply) indicates that there is more labor market supply than labor demand.

Labor Market Demand: Annual Openings

Annual (job) openings are used to determine labor market demand. This number estimates employment change and turnover for an occupation each year between 2017 and 2022. Annual openings include:

- **Job Growth:** An employer experiences increased demand for products and hires new employees to increase production. If job growth is zero or negative, then any and all openings are due to replacement needs.
- **Replacement Needs:** An employer hires replacement workers for employees who leave the workforce or change occupations. Replacement rates are derived from national 10-year, occupation-specific percentages published by the U.S. Bureau of Labor Statistics (BLS) Employment Projections program.

⁹ Emsi. San Diego County (6073). 2017.03 Class of Worker. QCEW + Non-QCEW+ Self-employed. 2007-2022.

Defining Top Middle-Skill Jobs

“Top jobs” are occupations that have the most labor market demand, stable employment growth, and entry-level wages at or above the Self-Sufficiency Standard. The most labor market demand is defined as the most number of annual job openings between 2017 and 2022. For more information about annual openings, see “Labor Market Demand: Annual Openings” below. Stable employment growth indicates that an occupation is projected to have no employment decline between 2017 and 2022. Entry-level wages are the hourly earnings, excluding benefits, that the 25th percentile of current workers within an occupation make. Only occupations with entry-level wages of \$13.09 per hour were included in this study because they allowed entry-level workers to earn a self-sufficient wage.

In addition to analyzing the top 100 middle-skill jobs, this study also examines the top 100 jobs (regardless of education or training) in the California Community Colleges’ Priority and Emerging Sectors. According to the California Community Colleges Chancellor’s Office, 10 industry sectors merit priority in terms of resources and program development due to their “labor market needs and opportunities to prepare students to compete in a global economy.”¹⁰ These Priority and Emerging Sectors include:

- Advanced Manufacturing
- Business & Entrepreneurship
- Energy, Construction & Utilities
- Health Care
- Life Sciences
- Global Trade
- Tourism
- Agricultural, Water & Environmental Technologies
- Information and Communication Technologies & Digital Media
- Advanced Transportation and Logistics

Table 1 illustrates labor market demand for the top 100 middle-skill jobs and their relationship to the Priority and Emerging Sectors. For more information about these industry sectors, see Appendix B.

Defining Top Priority Sector Jobs

To find the top jobs in Priority and Emerging Sectors, the Centers of Excellence (COE) first defined each sector by North American Industry Classification System (NAICS) codes. NAICS is the standard used by federal statistical agencies to collect, analyze and publish data related to the industry sectors. An “industry sector” is defined as a group of businesses that produce similar goods and services and share similar production processes for creating the goods and services they sell. After defining the industry sectors, the COE conducted a staffing patterns analysis to identify the top 100 jobs in each sector. According to the California Employment Development Department, “Staffing patterns are a list of the occupations employed within a particular industry, or a list of the industries that employ a particular occupation.” These staffing patterns were then cross-referenced with the top 100 middle-skill jobs in Table 1. For more information about sectors, see Appendix B.

¹⁰ Economic and Workforce Development Program. Annual Report. California Community Colleges Chancellor’s Office. 2017.

Table 1. Top 100 Middle-Skill Jobs by Labor Market Demand that are also Top 100 Priority & Emerging Sector Jobs

* = Oversupply

AM = Advanced Manufacturing

BE = Business & Entrepreneurship

ECU = Energy, Construction & Utilities

HC = Health Care

LS = Life Sciences

GT = Global Trade

T = Tourism

AWET = Agricultural, Water & Environmental Technologies

ICT = Information and Communication Technologies

ATL = Advanced Transportation and Logistics

SOC	Occupational Title	2017-22 Annual Openings	AM	BE	ECU	HC	LS	GT	T	AWET	ICT	ATL
43-4051	Customer Service Representatives	2,920			•	•	•	•	•	•		•
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	2,683	•		•	•	•	•	•	•		•
29-1141	Registered Nurses	1,810				•	•					
43-1011	First-Line Supervisors of Office and Administrative Support Workers	1,743	•		•	•	•	•	•	•		•
41-3099	Sales Representatives, Services, All Other	1,578			•	•			•			
41-1011	First-Line Supervisors of Retail Sales Workers	1,542							•			
13-1199	Business Operations Specialists, All Other	1,439	•	•	•	•	•	•	•	•	•	•
49-9071	Maintenance and Repair Workers, General	1,303	•		•	•	•	•	•	•		•
31-9092	Medical Assistants*	1,180				•						
47-2031	Carpenters	1,178	•		•			•				
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,132			•		•		•	•		•
43-6013	Medical Secretaries	1,058				•						
47-2111	Electricians	1,026	•		•			•		•		•
53-3032	Heavy and Tractor-Trailer Truck Drivers	988			•			•		•		•
39-9031	Fitness Trainers and Aerobics Instructors	835							•			
47-2152	Plumbers, Pipefitters, and Steamfitters	799	•		•			•		•		
43-6011	Executive Secretaries & Executive Admin Assistants	768				•	•					•
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	732			•					•		
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	650	•		•			•		•		•
29-2061	Licensed Practical and Licensed Vocational Nurses	645				•						
41-3021	Insurance Sales Agents	554										
15-1151	Computer User Support Specialists	548			•	•	•				•	•
31-9091	Dental Assistants	533				•						
43-5061	Production, Planning, and Expediting Clerks	505	•		•		•	•	•	•		•
51-1011	First-Line Supervisors of Production and Operating Workers	474	•				•	•		•		•
51-4041	Machinists	447					•	•		•		•
33-3051	Police and Sheriff's Patrol Officers	398										
23-2011	Paralegals and Legal Assistants	397					•					
51-4121	Welders, Cutters, Solderers, and Brazers	397	•		•			•		•		•
21-1093	Social and Human Service Assistants	391				•						
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	390	•	•	•		•	•	•	•		•
11-9021	Construction Managers	374		•	•					•		•
53-3022	Bus Drivers, School or Special Client	358										
51-2022	Electrical and Electronic Equipment Assemblers	357	•					•				•
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	348			•							
41-1012	First-Line Supervisors of Non-Retail Sales Workers	341						•	•	•		
13-1051	Cost Estimators*	341		•	•			•		•		•
11-3011	Administrative Services Managers*	339		•		•	•	•	•	•		•
15-1199	Computer Occupations, All Other*	326	•					•			•	•
11-9141	Property, Real Estate, and Community Association Managers	324		•	•							
29-2052	Pharmacy Technicians	304										
49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers	299	•		•			•	•	•		•
43-6012	Legal Secretaries	296										
47-2211	Sheet Metal Workers	295	•		•			•				
35-1011	Chefs and Head Cooks*	290							•			
39-1021	First-Line Supervisors of Personal Service Workers*	288				•			•			
13-1081	Logisticians	281	•	•			•	•		•		•
33-3012	Correctional Officers and Jailers	266										
13-2072	Loan Officers	264		•								
17-3023	Electrical and Electronics Engineering Technicians	260			•							•

Table 1. Top 100 Middle-Skill Jobs by Labor Market Demand that are also Top 100 Priority & Emerging Sector Jobs (Continued)

* = Oversupply

AM = Advanced Manufacturing

BE = Business & Entrepreneurship

ECU = Energy, Construction & Utilities

HC = Health Care

LS = Life Sciences

GT = Global Trade

T = Tourism

AWET = Agricultural, Water & Environmental Technologies

ICT = Information and Communication Technologies

ATL = Advanced Transportation and Logistics

SOC	Occupational Title	2017-22 Annual Openings	AM	BE	ECU	HC	LS	GT	T	AWET	ICT	ATL
31-9099	Healthcare Support Workers, All Other	259				•						
47-2073	Operating Engineers & Other Construction Equipment Operators	256			•					•		
13-1031	Claims Adjusters, Examiners, and Investigators	255										
13-1151	Training and Development Specialists	252	•	•		•	•	•	•			•
15-1142	Network and Computer Systems Administrators	251	•				•	•			•	•
15-1134	Web Developers	239					•	•			•	
33-2011	Firefighters*	237										
33-3021	Detectives and Criminal Investigators	228										
29-2012	Medical and Clinical Laboratory Technicians	228				•	•					
29-2099	Health Technologists and Technicians, All Other	227				•						
49-9041	Industrial Machinery Mechanics	227	•		•		•	•		•		•
27-4021	Photographers	219										
31-9097	Phlebotomists	211				•						
29-2021	Dental Hygienists	205				•						
43-3051	Payroll and Timekeeping Clerks*	201										
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	200								•		
43-4131	Loan Interviewers and Clerks	186										
43-4161	Human Resources Assistants, Except Payroll & Timekeeping	182										
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks	180							•			•
27-3091	Interpreters and Translators	179										
29-2071	Medical Records and Health Information Technicians	178				•						
49-3021	Automotive Body and Related Repairers	176										
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	171							•			
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	165	•				•	•		•	•	•
25-4031	Library Technicians	164										
47-4011	Construction and Building Inspectors	155			•							•
53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	153						•		•		
13-1022	Wholesale and Retail Buyers, Except Farm Products	152		•				•				
17-3029	Engineering Technicians, Except Drafters, All Other	150	•		•		•	•			•	•
17-3011	Architectural and Civil Drafters	146			•							•
15-1152	Computer Network Support Specialists	145									•	
11-3051	Industrial Production Managers	144	•	•			•	•		•		•
53-1021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	143						•		•		
51-2011	Aircraft Structure, Surfaces, Rigging & Systems Assemblers	142						•				•
13-2082	Tax Preparers*	141		•								
49-3011	Aircraft Mechanics and Service Technicians	137	•					•				•
29-2011	Medical and Clinical Laboratory Technologists	135				•	•					
29-2034	Radiologic Technologists	129				•						
19-4099	Life, Physical, and Social Science Technicians, All Other	126					•					
29-2056	Veterinary Technologists and Technicians*	125										
31-2021	Physical Therapist Assistants	122				•						
43-5011	Cargo and Freight Agents	120						•				
11-9081	Lodging Managers	113		•					•			
51-8031	Water and Wastewater Treatment Plant and System Operators	104										
47-2221	Structural Iron and Steel Workers	103			•							
17-3022	Civil Engineering Technicians	102			•							•
15-1143	Computer Network Architects	101	•				•				•	•
29-2055	Surgical Technologists	101				•						
47-2121	Glaziers	99			•							
11-3071	Transportation, Storage, and Distribution Managers*	99		•				•		•		

Program Supply for Top Middle-Skill Jobs

Labor market demand for the top middle-skill jobs amounts to 45,455 jobs openings each year between 2017 and 2022. To determine if there are enough qualified workers to meet this labor market demand, this study examines potential labor supply from the educational institutions in the region. Supply for an occupation can be estimated by analyzing the number of program completers or awards in a related Taxonomy or Programs (TOP) or Classification of Instructional Programs (CIP) code. There are 172 six-digit TOP codes (TOP6) related to the middle-skill jobs analyzed in this study; however, a TOP code or program may train for more than one occupation. Simply aggregating all supply from a related TOP code may overestimate supply for that occupation. For example, TOP092400 Engineering Technology trains for both Electrical and Electronics Engineering Technicians (17-3023) and Engineering Technicians, Except Drafters, All Other (17-3029). Table 2 lists the top middle-skill jobs and their related TOP6 codes; however, because a TOP code can be associated with more than one middle-skill job, duplicate TOP codes were removed in order to not over estimate program supply.

For complete details on each top middle-skill job's TOP codes, program titles and the colleges that provide training, see Appendix E.

Labor Market Supply: Program Awards

Program award data represents the supply of students that can potentially fill labor market demand. Supply can be estimated by analyzing Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP) codes. TOP is a system of numerical codes used at the state level to collect and report information on community college programs and courses throughout the state that have similar outcomes. TOP was designed to aggregate information about programs, but local program titles often differ substantially from college to college. For example, one college's program may be titled, "Mechanized Agriculture," another college's program may be titled, "Agriculture Engineering Technology," and a third college's program may be titled, "Agriculture Equipment Operations & Maintenance." Because they have similar outcomes, information on all three is collected and reported at the state level under TOP code 0116.00, which carries the standardized title "Agricultural Power Equipment Technology."

Other educational institutional programs were identified using CIP codes and then cross-walked to TOP codes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. CIP codes are used at the federal level and for non-community college programs. The CIP was originally developed by the National Center for Education Statistics (NCES) of the United States Department of Education. For more information about the differences between TOP and CIP codes, see Appendix C.

Disclaimer about Supply Gap Analysis

Subtracting program awards (labor supply) from annual openings (labor demand) is a basic analysis of supply gaps in labor market research. The data should be used to discuss the potential gaps or oversupply of workers for these occupations; however, it should not be the only basis for determining whether or not a program should be developed. The data is incomplete; it does not include workers who are currently in the labor force that could fill these positions or program supply from educational institutions that do not publicly disclose their completion or outcomes data.

Table 2. Labor Market Demand vs. Program Supply for the Top 100 Middle-Skill Jobs in San Diego County

“--” indicates that the TOP code(s) for that job was(were) omitted and accounted for elsewhere in the table (the full list of TOP codes is in Appendix E)

“0” indicates that a program for that TOP code exists in the region, but there was no supply

“N/A” indicates that no program exists for that TOP code in the region

SOC	Occupational Title	2017-22 Annual Openings	Supply Gap or Oversupply	2013-15 Average Awards	TOP6	TOP6 Program Title
43-4051	Customer Service Representatives	2,920	Supply Gap	5	050940	Sales and Salesmanship
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	2,683	Supply Gap	1,206	051400	Office Technology/ Office Computer Applications
29-1141	Registered Nurses	1,810	Supply Gap	553	120310	Registered Nursing
43-1011	First-Line Supervisors of Office and Administrative Support Workers	1,743	Supply Gap	9	050630 050970 051440	Management Development and Supervision E-Commerce (Business Emphasis) Office Management
41-3099	Sales Representatives, Services, All Other	1,578	Supply Gap	--	--	--
41-1011	First-Line Supervisors of Retail Sales Workers	1,542	Supply Gap	79	050960 050970 050650	Display E-Commerce (Business Emphasis) Retail Store Operations and Management
13-1199	Business Operations Specialists, All Other	1,439	Supply Gap	60	050640 050970	Small Business and Entrepreneurship E-Commerce (Business Emphasis)
49-9071	Maintenance and Repair Workers, General	1,303	Supply Gap	0	094500	Industrial Systems Technology and Maintenance
31-9092	Medical Assistants	1,180	Oversupply	1,396	120800 120810	Medical Assisting Clinical Medical Assisting
47-2031	Carpenters	1,178	Supply Gap	107	095200 095210 095250	Construction Crafts Technology Carpentry Mill and Cabinet Work
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,132	Supply Gap	87	130320 050800 050900	Fashion Merchandising International Business and Trade Marketing and Distribution
43-6013	Medical Secretaries	1,058	Supply Gap	405	051420 120820 122310	Medical Office Technology Administrative Medical Assisting Health Information Coding
47-2111	Electricians	1,026	Supply Gap	115	095220	Electrical
53-3032	Heavy and Tractor-Trailer Truck Drivers	988	Supply Gap	0	094750	Truck and Bus Driving
39-9031	Fitness Trainers and Aerobics Instructors	835	Supply Gap	125	083500 083510 083520 083550 083560 083580 083700 122800	Physical Education Physical Fitness and Body Movement Fitness Trainer Intercollegiate Athletics Coaching Adapted Physical Education Health Education Athletic Training and Sports Medicine
47-2152	Plumbers, Pipefitters, and Steamfitters	799	Supply Gap	221	095230	Plumbing, Pipefitting and Steamfitting
43-6011	Executive Secretaries and Executive Administrative Assistants	768	Supply Gap	--	--	--
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	732	Supply Gap	26	095240 095260 095270 095280 095290 210210	Glazing Masonry, Tile, Cement, Lath and Plaster Painting, Decorating, and Flooring Drywall and Insulation Roofing Public Works
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	650	Supply Gap	0	095500 095680	Laboratory Science Technology Industrial Quality Control
29-2061	Licensed Practical and Licensed Vocational Nurses	645	Supply Gap	378	123020	Licensed Vocational Nursing
41-3021	Insurance Sales Agents	554	Supply Gap	0	051200	Insurance
15-1151	Computer User Support Specialists	548	Supply Gap	39	070210 070800 070820	Software Applications Computer Infrastructure and Support Computer Support

SOC	Occupational Title	2017-22 Annual Openings	Supply Gap or Oversupply	2013-15 Average Awards	TOP6	TOP6 Program Title
31-9091	Dental Assistants	533	Supply Gap	410	124010	Dental Assistant
43-5061	Production, Planning, and Expediting Clerks	505	Supply Gap	3	051000	Logistics and Materials Transportation
51-1011	First-Line Supervisors of Production and Operating Workers	474	Supply Gap	0	094500	Industrial Systems Technology and Maintenance
51-4041	Machinists	447	Supply Gap	54	095630	Machining and Machine Tools
33-3051	Police and Sheriff's Patrol Officers	398	Supply Gap	81	210550	Police Academy
23-2011	Paralegals and Legal Assistants	397	Supply Gap	72	140200	Paralegal
51-4121	Welders, Cutters, Solderers, and Brazers	397	Supply Gap	343	095650	Welding Technology
21-1093	Social and Human Service Assistants	391	Supply Gap	222	126100 130100 130560 130570 130800 210400 210440 210450	Community Health Care Worker Family and Consumer Sciences, General Parenting and Family Education Foster and Kinship Care Family Studies Human Services Alcohol and Controlled Substances Disability Services
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	390	Supply Gap	0	050920 050960	Purchasing
11-9021	Construction Managers	374	Supply Gap	131	095700	Civil and Construction Management Technology
53-3022	Bus Drivers, School or Special Client	358	Supply Gap	0	094750	Truck and Bus Driving
51-2022	Electrical and Electronic Equipment Assemblers	357	Supply Gap	148	092400 093400	Engineering Technology, General Electronics and Electric Technology
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	348	Supply Gap	323	094600	Environmental Control Technology
41-1012	First-Line Supervisors of Non-Retail Sales Workers	341	Supply Gap	--	--	--
13-1051	Cost Estimators	341	Oversupply	438	050600	Business Management
11-3011	Administrative Services Managers	339	Oversupply	1,885	050500	Business Administration
15-1199	Computer Occupations, All Other	326	Oversupply	456	061420 070100 070200 070600 070910 079900 220610	Electronic Game Design Information Technology, General Computer Information Systems Computer Science (Transfer) E-Commerce (Technology Emphasis) Other Information Technology Geographic Information Systems
11-9141	Property, Real Estate, and Community Association Managers	324	Supply Gap	54	051100	Real Estate
29-2052	Pharmacy Technicians	304	Supply Gap	176	122100	Pharmacy Technology
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	299	Supply Gap	62	093440	Electrical Systems and Power Transmission
43-6012	Legal Secretaries	296	Supply Gap	10	051410	Legal Office Technology
47-2211	Sheet Metal Workers	295	Supply Gap	36	095640	Sheet Metal and Structural Metal
35-1011	Chefs and Head Cooks	290	Oversupply	1,052	130600 130630 130710	Nutrition, Foods, and Culinary Arts Culinary Arts Restaurant and Food Services and Management
39-1021	First-Line Supervisors of Personal Service Workers	288	Oversupply	1,303	300700	Cosmetology and Barbering
13-1081	Logisticians	281	Supply Gap	--	--	--
33-3012	Correctional Officers and Jailers	266	Supply Gap	51	210510	Corrections
13-2072	Loan Officers	264	Supply Gap	0	051110	Escrow
17-3023	Electrical and Electronics Engineering Technicians	260	Supply Gap	42	093410 093430 094300	Computer Electronics Telecommunications Technology Instrumentation Technology
31-9099	Healthcare Support Workers, All Other	259	Supply Gap	10	120830 122000	Health Facility Unit Coordinator Speech/Language Pathology and Audiology
47-2073	Operating Engineers and Other Construction Equipment Operators	256	Supply Gap	0	094730	Heavy Equipment Operation

SOC	Occupational Title	2017-22 Annual Openings	Supply Gap or Oversupply	2013-15 Average Awards	TOP6	TOP6 Program Title
13-1031	Claims Adjusters, Examiners, and Investigators	255	Supply Gap	0	051200	Insurance
13-1151	Training and Development Specialists	252	Supply Gap	0	086000	Educational Technology
15-1142	Network and Computer Systems Administrators	251	Oversupply	313	070810 093430	Computer Networking Telecommunications Technology
15-1134	Web Developers	239	Supply Gap	236	061430 070700 070710 070900 070910	Website Design and Development Computer Software Development** Computer Programming World Wide Web Administration E-Commerce (Technology Emphasis)
33-2011	Firefighters	237	Oversupply	292	213300 213310 213350	Fire Technology Wildland Fire Technology Fire Academy
33-3021	Detectives and Criminal Investigators	228	Supply Gap	79	210540	Forensics, Evidence, and Investigation
29-2012	Medical and Clinical Laboratory Technicians	228	Supply Gap	43	093470 095500 120500	Electron Microscopy Laboratory Science Technology Medical Laboratory Technology
29-2099	Health Technologists and Technicians, All Other	227	Supply Gap	27	121100 121200 121400	Polysomnography Electro-Neurodiagnostic Technology Orthopedic Assistant
49-9041	Industrial Machinery Mechanics	227	Supply Gap	9	095600	Manufacturing and Industrial Technology
27-4021	Photographers	219	Supply Gap	200	050910 061400 100100 100200 101100 101200	Advertising Digital Media Fine Arts, General Art (Painting, Drawing, and Sculpture) Photography Applied Photography
31-9097	Phlebotomists	211	Supply Gap	0	120510	Phlebotomy
29-2021	Dental Hygienists	205	Supply Gap	49	124020	Dental Hygienist
43-3051	Payroll and Timekeeping Clerks	201	Oversupply	557	050200	Accounting
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	200	Supply Gap	86	094700	Diesel Technology
43-4131	Loan Interviewers and Clerks	186	Supply Gap	18	050400	Banking and Finance
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	182	Supply Gap	N/A	N/A	N/A
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks	180	Supply Gap	15	300900	Travel Services and Tourism
27-3091	Interpreters and Translators	179	Supply Gap	28	060700 061000 085010 110100	Technical Communication Mass Communications Sign Language Interpreting Foreign Languages, General
29-2071	Medical Records and Health Information Technicians	178	Supply Gap	28	122300	Health Information Technology
49-3021	Automotive Body and Related Repairers	176	Supply Gap	48	094900	Automotive Collision Repair
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	171	Supply Gap	147	010900 010910 010930 010940 011510	Horticulture Landscape Design and Maintenance Nursery Technology Turfgrass Technology Parks and Outdoor Recreation
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	165	Supply Gap	--	--	--
25-4031	Library Technicians	164	Supply Gap	22	160200	Library Technician (Aide)
47-4011	Construction and Building Inspectors	155	Supply Gap	31	095720	Construction Inspection
53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	153	Supply Gap	2	094740	Railroad and Light Rail Operations
13-1022	Wholesale and Retail Buyers, Except Farm Products	152	Supply Gap	0	010400	Viticulture, Enology, and Wine Business Purchasing

SOC	Occupational Title	2017-22 Annual Openings	Supply Gap or Oversupply	2013-15 Average Awards	TOP6	TOP6 Program Title
17-3029	Engineering Technicians, Except Drafters, All Other	150	Supply Gap	40	093420 093460 093470 093480 094300 094610 095420 099900	Industrial Electronics Biomedical Instrumentation Electron Microscopy Laser and Optical Technology Instrumentation Technology Energy Systems Technology Plastics and Composites Other Engineering and Related Industrial Technologies
17-3011	Architectural and Civil Drafters	146	Supply Gap	142	020100 095300 095310 095320	Architecture and Architectural Technology Drafting Technology Architectural Drafting Civil Drafting
15-1152	Computer Network Support Specialists	145	Supply Gap	0	070730	Computer Systems Analysis
11-3051	Industrial Production Managers	144	Supply Gap	--	--	--
53-1021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	143	Supply Gap	--	--	--
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	142	Supply Gap	92	095000 095010 095020 095040 095050	Aeronautical and Aviation Technology Aviation Airframe Mechanics Aviation Powerplant Mechanics Aircraft Electronics (Avionics) Aircraft Fabrication
13-2082	Tax Preparers	141	Oversupply	570	050200 050210	Accounting Tax Studies
49-3011	Aircraft Mechanics and Service Technicians	137	Supply Gap	--	--	--
29-2011	Medical and Clinical Laboratory Technologists	135	Supply Gap	0	093470	Electron Microscopy
29-2034	Radiologic Technologists	129	Supply Gap	71	122500 122600	Radiologic Technology Radiation Therapy Technician
19-4099	Life, Physical, and Social Science Technicians, All Other	126	Supply Gap	62	010100 043000 192000	Agriculture Technology and Sciences, General Biotechnology and Biomedical Technology Ocean Technology
29-2056	Veterinary Technologists and Technicians	125	Oversupply	237	010210 010220	Veterinary Technician (Licensed) Artificial Inseminator (Licensed)
31-2021	Physical Therapist Assistants	122	Supply Gap	46	122200	Physical Therapist Assistant
43-5011	Cargo and Freight Agents	120	Supply Gap	--	--	--
11-9081	Lodging Managers	113	Supply Gap	39	130700 130720 130730	Hospitality Lodging Management Resort and Club Management
51-8031	Water and Wastewater Treatment Plant and System Operators	104	Supply Gap	92	095800	Water and Wastewater Technology
47-2221	Structural Iron and Steel Workers	103	Supply Gap	--	--	--
17-3022	Civil Engineering Technicians	102	Supply Gap	2	210210	Public Works
15-1143	Computer Network Architects	101	Supply Gap	--	--	--
29-2055	Surgical Technologists	101	Supply Gap	55	121700	Surgical Technician
47-2121	Glaziers	99	Supply Gap	0	095240	Glazing
11-3071	Transportation, Storage, and Distribution Managers	99	Oversupply	580	050100 210200 302000 302010	Business and Commerce, General Public Administration Aviation and Airport Management and Services Aviation and Airport Management
Total Demand		45,455		16,431	Total Supply	

Key Findings and Recommendations

The following findings resulted from analyzing the labor market demand, supply and gaps of the top middle-skill jobs in San Diego County:

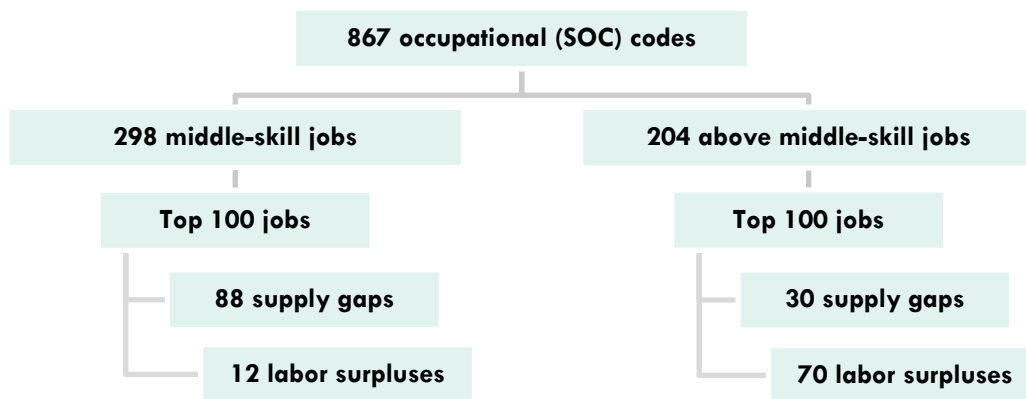
- Training for the top middle-skill jobs can provide job seekers with opportunities for income mobility. As previously mentioned, the average median hourly wage of all middle-skill jobs is \$22.10, the average median hourly wage of all jobs in the region is \$19.30, and the Self-Sufficiency Standard is \$13.09. The average median hourly wage of the top 100 middle-skill jobs analyzed in this study is \$26.70, which is higher than all three (Figure 4).

Figure 4. Median Hourly Earnings vs Self-Sufficiency Standard



- Of the top 100 middle-skill jobs identified in this study, 88 have supply gaps and 12 have labor surpluses. Comparatively, the top 100 above middle-skill jobs have only 30 supply gaps, suggesting that middle-skill jobs have more opportunities to develop programs than above middle-skill jobs (Figure 5).

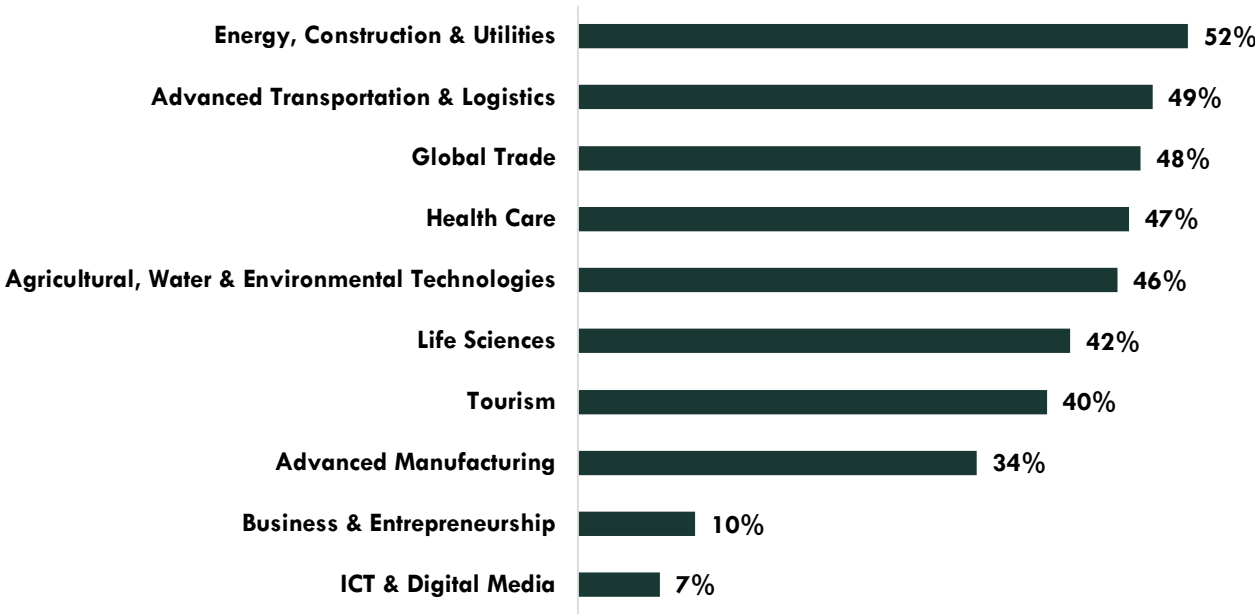
Figure 5. Analysis of Middle-Skill Job Gaps



- Labor market demand amounts to 45,455 annual job openings and program supply amounts to 16,431 awards for the top 100 middle-skill jobs. That is a difference of 29,024 awards that could be produced by the region to meet labor market demand. Across the top 100 middle-skill jobs, the median supply gap is 167 awards.

- Not all middle-skill jobs need to be filled with an associate degree. Of the 45,455 annual job openings (Table 1), 16 percent of labor market demand are related to supervisory or management roles, 17 percent are related to sales roles, and 17 percent are related to administrative or secretarial roles. The majority of these occupations require less than an associate degree as their typical entry-level education. This suggests that there are opportunities for short-term certificate programs that can fill these roles.
- A significant number of top middle-skill jobs are also top jobs in one or more of the Priority and Emerging Sectors. Figure 6 summarizes the labor market demand (annual openings) in Table 2, which indicates the overlap between top middle-skill jobs and top Priority and Emerging Sector jobs. The percentages add up to more than 100 percent because an occupation can be a top job in more than one of the Priority and Emerging Sectors.

Figure 6. Top 100 Middle-Skill Jobs – Labor Market Demand by Sector



Recommendations for Short-Term Certificate Programs

Comparing labor market demand with program supply suggests that there are 88 supply gaps for the top 100 middle-skill jobs. As previously mentioned, some of these supply gaps could be filled with short-term certificate programs due to their training and education requirements. Programs (TOP6 codes) with the following characteristics are recommended for short-term certificate programs:

- There is a supply gap of 100 or more for the occupation(s) that the program trains for; **and**
- The majority of middle-skill jobs that the program (TOP6) trains for require short- to moderate-term on-the-job training and/or a high school diploma; **and**
- The program trains for two or more top middle-skill jobs; **or**
- There are fewer than five colleges that offer the program in the region

The following tables list the recommended TOP6 codes for short-term certificate programs. The TOP codes associated with each sector were derived from CalPASS Plus’s “LaunchBoard Sector Explanation.”¹¹

¹¹ calpassplus.org/MediaLibrary/calpassplus/publicweb/Documents/sector-explanation.docx

Table 3. Programs Recommended for Short-Term Certificate Programs

Across Sectors

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
050630	Management Development and Supervision	43-1011 First-Line Supervisors of Office and Administrative Support Workers 51-1011 First-Line Supervisors of Production and Operating Workers 11-9021 Construction Managers 11-3011 Administrative Services Managers 49-1011 First-Line Supervisors of Mechanics, Installers, and Repairers 13-1081 Logisticians 11-3051 Industrial Production Managers
050940	Sales and Salesmanship	43-4051 Customer Service Representatives 41-3099 Sales Representatives, Services, All Other 41-4012 Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
051400	Office Technology/Office Computer Applications	43-5011 Cargo and Freight Agents 43-6011 Executive Secretaries and Executive Administrative Assistants 43-6014 Secretaries and Administrative Assistants, Except Legal, Medical, and Executive
051440	Office Management	43-1011 First-Line Supervisors of Office and Administrative Support Workers 11-3011 Administrative Services Managers

Tourism

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
050650	Retail Store Operations and Management	13-1022 Wholesale and Retail Buyers, Except Farm Products 41-1011 First-Line Supervisors of Retail Sales Workers
050900	Marketing and Distribution	41-4012 Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products 13-1023 Purchasing Agents, Except Wholesale, Retail, and Farm Products 13-1022 Wholesale and Retail Buyers, Except Farm Products 41-4012 Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products 13-1023 Purchasing Agents, Except Wholesale, Retail, and Farm Products 13-1022 Wholesale and Retail Buyers, Except Farm Products
130320	Fashion Merchandising	41-4012 Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products 13-1022 Wholesale and Retail Buyers, Except Farm Products

Advanced Transportation & Logistics

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
051000	Logistics and Materials Transportation	43-5061 Production, Planning, and Expediting Clerks 13-1081 Logisticians 53-1031 First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators 17-3029 Engineering Technicians, Except Drafters, All Other 11-3011 Industrial Production Managers 53-1021 First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand 43-5011 Cargo and Freight Agents
094700	Diesel Technology	47-2073 Operating Engineers and Other Construction Equipment Operators 49-3031 Bus and Truck Mechanics and Diesel Engine Specialists
094730	Heavy Equipment Operation	47-2073 Operating Engineers and Other Construction Equipment Operators
094740	Railroad and Light Rail Operations	53-1031 First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators
094750	Truck and Bus Driving	53-3032 Heavy and Tractor-Trailer Truck Drivers 53-3022 Bus Drivers, School or Special Client
094850	Recreational Vehicle Service	49-1011 First-Line Supervisors of Mechanics, Installers, and Repairers

Global Trade

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
050800	International Business and Trade	13-1199 Business Operations Specialists, All Other 41-4012 Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products 13-1022 Wholesale and Retail Buyers, Except Farm Products
050920	Purchasing	11-3011 Administrative Services Managers 13-1022 Wholesale and Retail Buyers, Except Farm Products 13-1023 Purchasing Agents, Except Wholesale, Retail, and Farm Products
050960	Display	41-1011 First-Line Supervisors of Retail Sales Workers 41-1012 First-Line Supervisors of Non-Retail Sales Workers 41-4012 Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products 13-1023 Purchasing Agents, Except Wholesale, Retail, and Farm Products

Business & Entrepreneurship

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
050970	E-Commerce (Business Emphasis)	43-1011 First-Line Supervisors of Office and Administrative Support Workers 41-1011 First-Line Supervisors of Retail Sales Workers 13-1199 Business Operations Specialists, All Other

ICT & Digital Media

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
070910	E-Commerce (Technology Emphasis)	41-1011 First-Line Supervisors of Retail Sales Workers 15-1151 Computer User Support Specialists 15-1199 Computer Occupations, All Other 15-1134 Web Developers
061420	Electronic Game Design	15-1199 Computer Occupations, All Other

Health Care

TOP6	TOP6 Program Title	Related Occupations
051420	Medical Office Technology	29-2071 Medical Records and Health Information Technicians 43-6013 Medical Secretaries

Life Sciences and Biotech

TOP6	TOP6 Program Title	Related Occupations
095680	Industrial Quality Control	51-9061 Inspectors, Testers, Sorters, Samplers, and Weighers

Recommended Programs for Increased Awards

The supply gap analysis indicates that there are several TOP codes with existing training programs already in the region but could be further developed to meet labor market demand. Programs with the following characteristics are recommended for increased awards:

- There is a supply gap of 100 or more for the occupation(s) that the program trains for; **and**
- The majority of the middle-skill jobs that the program trains for require long-term on-the-job training, a post-secondary college, associate degree, bachelor's degree or apprenticeship; **and**

- The program trains for at least one middle-skill job that is also a to job in one of the Priority and Emerging Sectors

The following tables list the recommended programs for increased awards. The TOP codes associated with each sector were derived from CalPASS Plus's "LaunchBoard Sector Explanation."¹²

Table 4. Programs Recommended for Increased Awards

ICT & Digital Media

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
070100	Information Technology, General	15-1142 Network and Computer Systems Administrators 15-1143 Computer Network Architects 15-1199 Computer Occupations, All Other 17-3023 Electrical and Electronics Engineering Technicians
070200	Computer Information Systems	15-1142 Network and Computer Systems Administrators 15-1143 Computer Network Architects 15-1151 Computer User Support Specialists 15-1199 Computer Occupations, All Other 17-3023 Electrical and Electronics Engineering Technicians
070210	Software Applications	15-1134 Web Developers 15-1151 Computer User Support Specialists
070600	Computer Science (Transfer)	15-1199 Computer Occupations, All Other 15-1134 Web Developers 15-1152 Computer Network Support Specialists
070700	Computer Software Development	15-1199 Computer Occupations, All Other 15-1134 Web Developers 15-1152 Computer Network Support Specialists
070800	Computer Infrastructure and Support	15-1142 Network and Computer Systems Administrators 15-1143 Computer Network Architects 15-1151 Computer User Support Specialists 15-1152 Computer Network Support Specialists 15-1199 Computer Occupations, All Other
070820	Computer Support	15-1151 Computer User Support Specialists 15-1199 Computer Occupations, All Other 15-1142 Network and Computer Systems Administrators 15-1152 Computer Network Support Specialists 15-1143 Computer Network Architects

Advanced Transportation & Logistics

TOP6	TOP6 Program Title	Related Middle-Skill Jobs
094900	Automotive Collision Repair	49-3021 Automotive Body and Related Repairers

Life Sciences and Biotech

TOP6	TOP6 Program Title	Related Occupations
010100	Agriculture Technology and Sciences, General	19-4099 Life, Physical, and Social Science Technicians, All Other
043000	Biotechnology and Biomedical Technology	19-4099 Life, Physical, and Social Science Technicians, All Other
093470	Electron Microscopy	17-3029 Engineering Technicians, Except Drafters, All Other 29-2011 Medical and Clinical Laboratory Technologists 29-2012 Medical and Clinical Laboratory Technicians
095500	Laboratory Science Technology	29-2012 Medical and Clinical Laboratory Technicians 51-9061 Inspectors, Testers, Sorters, Samplers, and Weighers

¹² calpassplus.org/MediaLibrary/calpassplus/publicweb/Documents/sector-explanation.docx

Advanced Manufacturing

TOP6	TOP6 Program Title	Related Middle-Skill Jobs	
092400	Engineering Technology, General	17-3022 17-3023 17-3029 51-2022	Civil Engineering Technicians Electrical and Electronics Engineering Technicians Engineering Technicians, Except Drafters, All Other Electrical and Electronic Equipment Assemblers
093400	Electronics and Electric Technology	51-2022 19-4099 17-3023	Electrical and Electronic Equipment Assemblers Life, Physical, and Social Science Technicians, All Other Electrical and Electronics Engineering Technicians
094500	Industrial Systems Technology and Maintenance	49-9071 51-1011 49-9041	Maintenance and Repair Workers, General First-Line Supervisors of Production and Operating Workers Industrial Machinery Mechanics
095000	Aeronautical and Aviation Technology	49-3011 51-2011	Aircraft Mechanics and Service Technicians Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
095010	Aviation Airframe Mechanics	49-3011 51-2011	Aircraft Mechanics and Service Technicians Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
095020	Aviation Powerplant Mechanics	49-3011 51-2011	Aircraft Mechanics and Service Technicians Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
095050	Aircraft Fabrication	49-3011 51-2011	Aircraft Mechanics and Service Technicians Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
095600	Manufacturing and Industrial Technology	17-3029 47-2221 49-9041 51-4011 51-4041 51-9061	Engineering Technicians, Except Drafters, All Other Structural Iron and Steel Workers Industrial Machinery Mechanics Computer-Controlled Machine Tool Operators, Metal and Plastic Machinists Machinists Inspectors, Testers, Sorters, Samplers, and Weighers
095630	Machining and Machine Tools	51-4011 51-4041	Computer-Controlled Machine Tool Operators, Metal and Plastic Machinists
095640	Sheet Metal and Structural Metal	47-2211	Sheet Metal Workers
093410	Computer Electronics	17-3023 17-3029	Electrical and Electronics Engineering Technicians Engineering Technicians, Except Drafters, All Other

Energy, Construction & Utilities

TOP6	TOP6 Program Title	Related Middle-Skill Jobs	
020100	Architecture and Architectural Technology	17-3011 17-3029	Architectural and Civil Drafters Engineering Technicians, Except Drafters, All Other
093440	Electrical Systems and Power Transmission	17-3023 49-1011	Electrical and Electronics Engineering Technicians First-Line Supervisors of Mechanics, Installers, and Repairers
095720	Construction Inspection	47-4011 47-1011	Construction and Building Inspectors First-Line Supervisors of Construction Trades and Extraction Workers
094600	Environmental Control Technology	17-3029 47-2211 49-9021	Engineering Technicians, Except Drafters, All Other Sheet Metal Workers Heating, Air Conditioning, and Refrigeration Mechanics and Installers
095200	Construction Crafts Technology	13-1051 17-3022 47-1011 47-2031	Cost Estimators Civil Engineering Technicians First-Line Supervisors of Construction Trades and Extraction Workers Carpenters
095220	Electrical	47-1011 47-2111	First-Line Supervisors of Construction Trades and Extraction Workers Electricians
095230	Plumbing, Pipefitting and Steamfitting	47-2152 47-1011 49-1011	Plumbers, Pipefitters, and Steamfitters First-Line Supervisors of Construction Trades and Extraction Workers First-Line Supervisors of Mechanics, Installers, and Repairers
095700	Civil and Construction Management Technology	47-1011 11-9021	First-Line Supervisors of Construction Trades and Extraction Workers Construction Managers
095210	Carpentry	47-2031 47-1011	Carpenters First-Line Supervisors of Construction Trades and Extraction Workers

Health Care

TOP6	TOP6 Program Title	Related Occupations	
120310	Registered Nursing	29-1141	Registered Nurses
120500	Medical Laboratory Technology	29-2012	Medical and Clinical Laboratory Technicians
121400	Orthopedic Assistant	29-2011 29-2099 31-2021	Medical and Clinical Laboratory Technologists Health Technologists and Technicians, All Other Physical Therapist Assistants
122100	Pharmacy Technology	29-2052	Pharmacy Technicians
122300	Health Information Technology	15-1151 29-2071	Computer User Support Specialists Medical Records and Health Information Technicians
122310	Health Information Coding	29-2071 43-6013	Medical Records and Health Information Technicians Medical Secretaries
123020	Licensed Vocational Nursing	29-2061	Licensed Practical and Licensed Vocational Nurses
124010	Dental Assistant	31-9091	Dental Assistants
124020	Dental Hygienist	29-2021	Dental Hygienists

Global Trade & Logistics

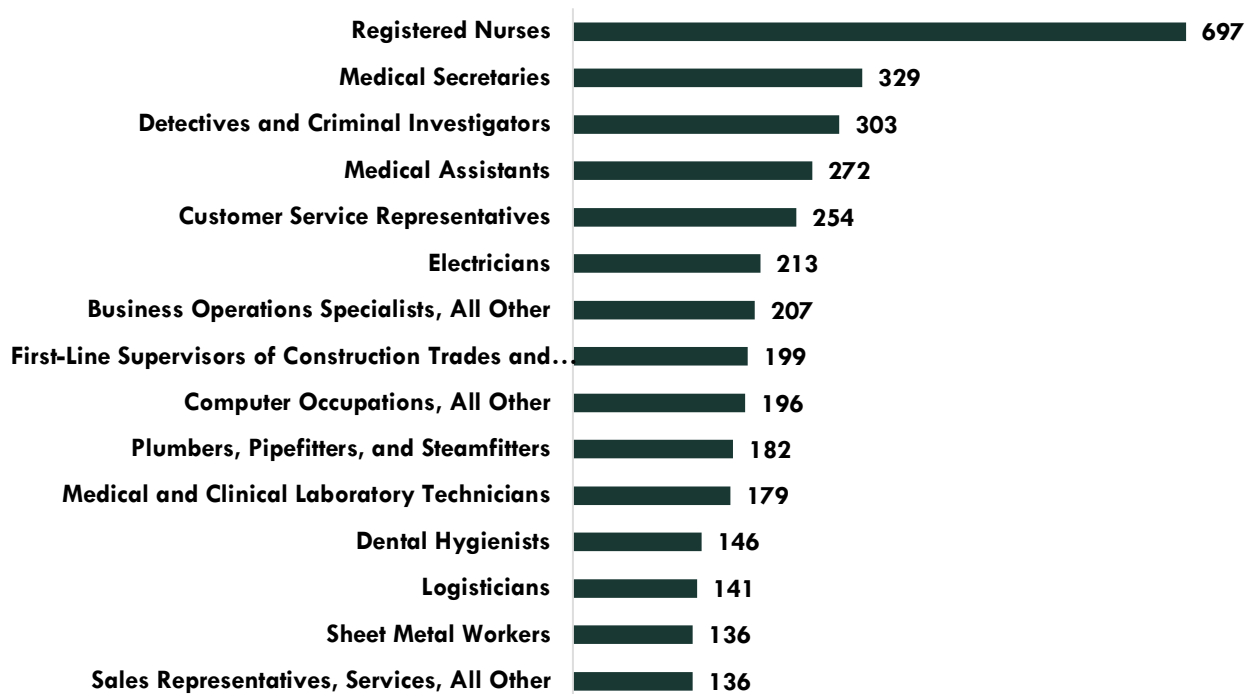
TOP6	TOP6 Program Title	Related Occupations	
050800	International Business and Trade	Business Operations Specialists, All Other Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products Wholesale and Retail Buyers, Except Farm Products	

Recommendations for Further Analysis

The following recommendations for further research could be coupled with this labor market analysis to help with decision-making in regards to programs and course offerings:

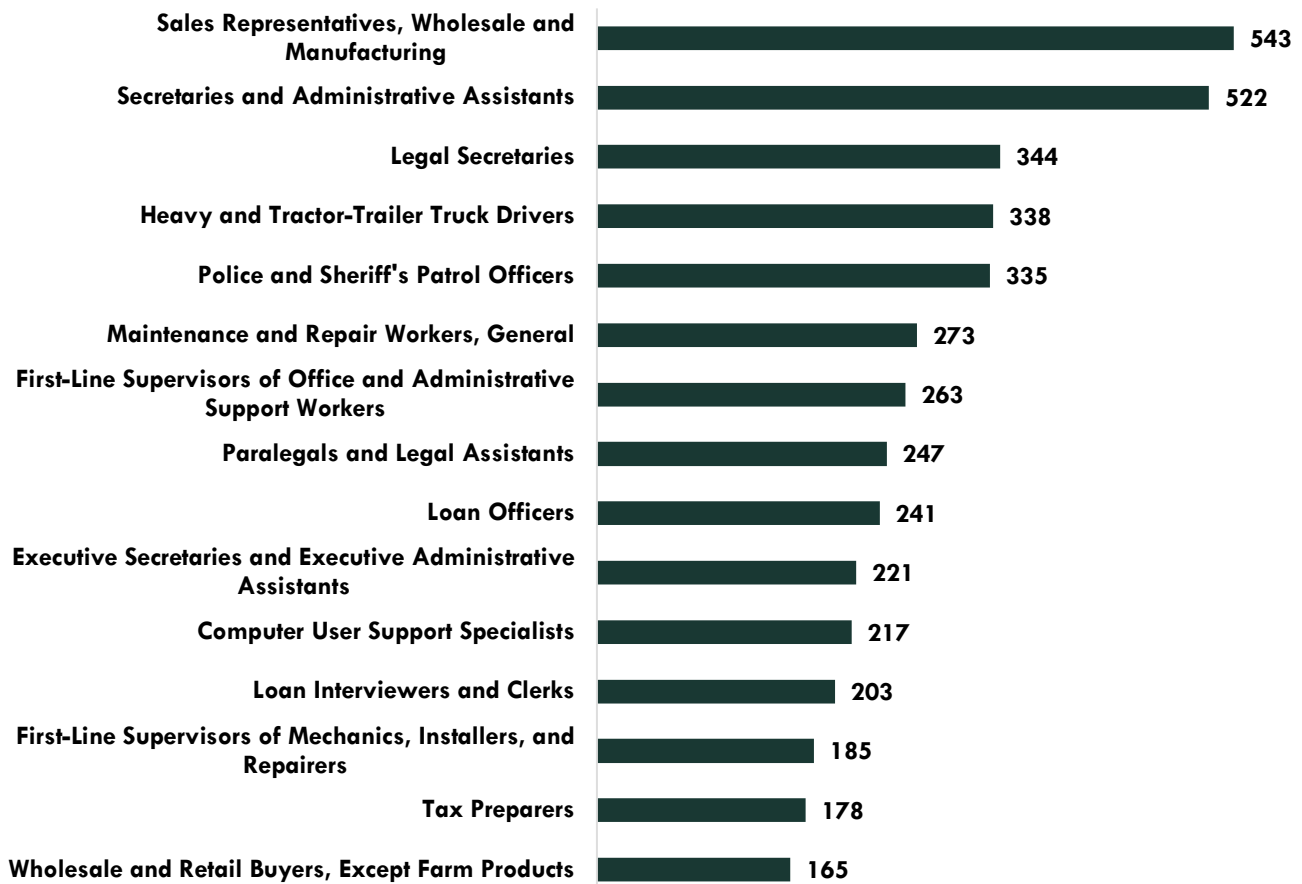
- **Validate whether the recommended TOP codes for short-term certificate programs currently train skills-builders:** Many of the TOP codes that this study recommends for short-term certificate programs may already train for skills-builders in the region. Skills-builders are students who take higher-level Career Education courses, but do not complete community college or transfer to a four-year institution.¹³ These skills-builders may take a college course to obtain new skills and/or to increase their earnings, but do not need an extensive, long-term program to achieve those goals. By understanding what programs train skills-builders, colleges in the region may want to consider which courses, rather than programs, to market to students and working professionals.
- **Examine how well existing programs currently meet labor market needs:** While this study makes recommendations for program development based on labor market information, it lacks information about the programs themselves. By conducting a program evaluation, the community colleges can gain insight as to why so many programs exist in the region for the top 100 middle-skill jobs, but supply from each program is significantly low. This analysis should be followed by recommendations on how the colleges could increase program supply for those recommended TOP codes.
- **Analyze other occupations that might be affected by policy or demographic changes:** This study examines the top 100 middle-skill jobs in the region, their supply gaps and their relation to the community colleges' Priority and Emerging Sectors. However, training and education providers in the region may also want to keep a pulse on occupations that will be affected by factors other than labor market demand. As the

Figure 7. Top 15 Middle-Skill Jobs Filled by Commuters into the Region



¹³ doingwhatmatters.cccco.edu/ForCollegeLeadership/SkillsBuilders.aspx

Figure 8. Top 15 Middle-Skill Jobs with Residents Commuting Out the Region



- **Conduct primary research to validate these recommendations with employers:** This study provides lists of recommended TOP codes for short-term certificate and associate degree programs. However, the recommendations have not been validated by industry or businesses. Collecting primary data directly from employers will help further confirm program recommendations.

Appendix A: Data Definitions

SOC code and occupational title: The Standard Occupational Classification System (SOC) is a statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 867 detailed occupational titles according to their occupational definition.

Annual (job) openings are the estimated employment change and turnover for an occupation each year between 2017 and 2022. This number is used to determine labor market demand. Annual openings combine two types of data sets:

- **Job Growth:** An employer experiences greater demand for its products and hires new employees to increase production. If job growth is zero or negative, then any and all openings are due to replacement needs.
- **Replacement Needs:** An employer hires replacement workers for employees who leave the workforce or change occupations. Replacement rates are derived from national 10-year, occupation-specific percentages published by the U.S. Bureau of Labor Statistics (BLS) Employment Projections program. Annual openings data include the new BLS “separations” methodology in its calculation of replacement needs job opportunities.

Number of jobs in 2017 indicate the total number of people employed in that occupation as of 2017.

2017-2022 % jobs change is the percentage change from 2017 to 2022, using number of jobs in 2017 as the baseline.

Entry-level hourly earnings are the hourly earnings that the 25th percentile of current workers within an occupation make. \$13.09 per hour is the self-sufficient wage for San Diego County. Only occupations that allow entry-level workers to earn the self-sufficient wage or higher were included in the top 100 jobs list.

Median hourly earnings are the wages per hour, excluding benefits, of a worker in an occupation. Median hourly earnings are in the middle of the wage distribution for an occupation: half of the workers make more, half make less.

Typical Entry-Level Education + On-the-Job Training (OJT) + Work Experience (Exp.) represent the educational attainment and training most often needed to enter the occupation. Typical entry-level education can be a high school diploma, associate degree, bachelor’s degree, etc. Work experience can range from less than five years to more than five years. On-the-job training needed to attain skills competency for an occupation has three different levels:

- **Long-term OJT:** More than 12 months
- **Moderate term OJT:** More than 1 month and up to 12 months
- **Short-term OJT:** One month or less

Top Priority and Emerging Sector Job indicates that the top middle-skill job is also one of the top 100 jobs in the listed Priority and Emerging Sector.

3-year average supply is the three-year average of awards for a specific TOP6 code between PY13-14 and PY15-16.

TOP6 and TOP6 program title illustrate which programs train for a specific occupational code (SOC). The TOP6 codes were selected based on the COE’s TOP-SOC crosswalk.

Other notes help explain how supply gaps and labor surpluses (oversupply) were calculated.

Appendix B: Priority and Emerging Sectors – Definitions

The term “industry sector” is defined as a group of businesses that produce similar goods and services and share similar production processes for creating the goods and services they sell. Industries are classified using the North American Industry Classification System (NAICS) codes. In order to analyze employment across industry sectors, the Center of Excellence for Labor Market Research (COE) examined codes from the North American Industry Classification System (NAICS), which is the standard used by federal statistical agencies to collect, analyze and publish data related to the industry sectors.¹⁴ Depending on which NAICS codes are selected to define a sector, the results can differ from report to report or from organization to organization. The NAICS codes selected for this report were determined after an extensive analysis of labor market reports produced throughout California in order to align sector definitions with regional and statewide partners. The following tables list the NAICS codes used to define each industry sector.

Advanced Manufacturing

All 160 six-digit NAICS codes for NAICS 31-33 were included in the analysis for this study. Three-digit NAICS codes are shown below as a reference.

NAICS	Description	NAICS	Description
311	Food Manufacturing	326	Plastics and Rubber Products Manufacturing
312	Beverage and Tobacco Product Manufacturing	327	Nonmetallic Mineral Product Manufacturing
313	Textile Mills	331	Primary Metal Manufacturing
314	Textile Product Mills	332	Fabricated Metal Product Manufacturing
315	Apparel Manufacturing	333	Machinery Manufacturing
316	Leather and Allied Product Manufacturing	334	Computer and Electronic Product Manufacturing
321	Wood Product Manufacturing	335	Electrical Equipment, Appliance, and Component Manufacturing
322	Paper Manufacturing	336	Transportation Equipment Manufacturing
323	Printing and Related Support Activities	337	Furniture and Related Product Manufacturing
324	Petroleum and Coal Products Manufacturing	339	Miscellaneous Manufacturing
325	Chemical Manufacturing		

Advanced Transportation & Logistics

NAICS	Description	NAICS	Description
334416	Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing	483211	Inland Water Freight Transportation
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	483212	Inland Water Passenger Transportation
336411	Aircraft Manufacturing	484110	General Freight Trucking, Local
336412	Aircraft Engine and Engine Parts Manufacturing	484121	General Freight Trucking, Long-Distance, Truckload
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	484122	General Freight Trucking, Long-Distance, Less Than Truckload
336414	Guided Missile and Space Vehicle Manufacturing	484210	Used Household and Office Goods Moving
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing	484220	Specialized Freight (except Used Goods) Trucking, Local
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	484230	Specialized Freight (except Used Goods) Trucking, Long-Distance
481111	Scheduled Passenger Air Transportation	485111	Mixed Mode Transit Systems
481112	Scheduled Freight Air Transportation	485112	Commuter Rail Systems
481211	Nonscheduled Chartered Passenger Air Transportation	491110	Postal Service
481212	Nonscheduled Chartered Freight Air Transportation	492110	Couriers and Express Delivery Services
481219	Other Nonscheduled Air Transportation	492210	Local Messengers and Local Delivery
482110	Rail transportation	493110	General Warehousing and Storage
483111	Deep Sea Freight Transportation	493120	Refrigerated Warehousing and Storage
483112	Deep Sea Passenger Transportation	493130	Farm Product Warehousing and Storage
483114	Coastal and Great Lakes Passenger Transportation	493190	Other Warehousing and Storage
		541330	Engineering Services

¹⁴ census.gov/eos/www/naics

Agriculture, Water & Environmental Technologies

NAICS	Description	NAICS	Description
111000	Crop Production	311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing
112000	Animal Production	311520	Ice Cream and Frozen Dessert Manufacturing
113110	Timber Tract Operations	311611	Animal (except Poultry) Slaughtering
113210	Forest Nurseries and Gathering of Forest Products	311612	Meat Processed from Carcasses
113310	Logging	311613	Rendering and Meat Byproduct Processing
114111	Finfish Fishing	311615	Poultry Processing
114112	Shellfish Fishing	311811	Retail Bakeries
114119	Other Marine Fishing	311812	Commercial Bakeries
114210	Hunting and Trapping	311813	Frozen Cakes, Pies, and Other Pastries Manufacturing
115111	Cotton Ginning	311821	Cookie and Cracker Manufacturing
115112	Soil Preparation, Planting, and Cultivating	311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour
115113	Crop Harvesting, Primarily by Machine	311830	Tortilla Manufacturing
115114	Postharvest Crop Activities (except Cotton Ginning)	311911	Roasted Nuts and Peanut Butter Manufacturing
115115	Farm Labor Contractors and Crew Leaders	311919	Other Snack Food Manufacturing
115116	Farm Management Services	311920	Coffee and Tea Manufacturing
115210	Support Activities for Animal Production	311930	Flavoring Syrup and Concentrate Manufacturing
115310	Support Activities for Forestry	311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing
221310	Water Supply and Irrigation Systems	311942	Spice and Extract Manufacturing
237110	Water and Sewer Line and Related Structures Construction	311991	Perishable Prepared Food Manufacturing
311111	Dog and Cat Food Manufacturing	311999	All Other Miscellaneous Food Manufacturing
311119	Other Animal Food Manufacturing	312111	Soft Drink Manufacturing
311211	Flour Milling	312112	Bottled Water Manufacturing
311212	Rice Milling	312113	Ice Manufacturing
311213	Malt Manufacturing	312120	Breweries
311221	Wet Corn Milling	312130	Wineries
311224	Soybean and Other Oilseed Processing	312140	Distilleries
311225	Fats and Oils Refining and Blending	312230	Tobacco Manufacturing
311230	Breakfast Cereal Manufacturing	325311	Nitrogenous Fertilizer Manufacturing
311313	Beet Sugar Manufacturing	325312	Phosphatic Fertilizer Manufacturing
311314	Cane Sugar Manufacturing	325314	Fertilizer (Mixing Only) Manufacturing
311340	Nonchocolate Confectionery Manufacturing	325320	Pesticide and Other Agricultural Chemical Manufacturing
311351	Chocolate and Confectionery Manufacturing from Cacao Beans	333111	Farm Machinery and Equipment Manufacturing
311352	Confectionery Manufacturing from Purchased Chocolate	333112	Lawn and Garden Tractor and Home Lawn and Garden Equipment Manufacturing
311411	Frozen Fruit, Juice, and Vegetable Manufacturing	333241	Food Product Machinery Manufacturing
311412	Frozen Specialty Food Manufacturing	423820	Farm and Garden Machinery and Equipment Merchant Wholesalers
311421	Fruit and Vegetable Canning	424510	Grain and Field Bean Merchant Wholesalers
311422	Specialty Canning	424520	Livestock Merchant Wholesalers
311423	Dried and Dehydrated Food Manufacturing	424590	Other Farm Product Raw Material Merchant Wholesalers
311511	Fluid Milk Manufacturing	424910	Farm Supplies Merchant Wholesalers
311512	Creamery Butter Manufacturing	483211	Inland Water Freight Transportation
311513	Cheese Manufacturing	483212	Inland Water Passenger Transportation

Energy, Construction & Utilities

NAICS	Description	NAICS	Description
221111	Hydroelectric Power Generation	238150	Glass and Glazing Contractors
221112	Fossil Fuel Electric Power Generation	238160	Roofing Contractors
221113	Nuclear Electric Power Generation	238170	Siding Contractors
221114	Solar Electric Power Generation	238190	Other Foundation, Structure, and Building Exterior Contractors
221115	Wind Electric Power Generation	238210	Electrical Contractors and Other Wiring Installation Contractors
221116	Geothermal Electric Power Generation	238220	Plumbing, Heating, and Air-Conditioning Contractors

221117	Biomass Electric Power Generation	238290	Other Building Equipment Contractors
221118	Other Electric Power Generation	238310	Drywall and Insulation Contractors
221121	Electric Bulk Power Transmission and Control	238990	All Other Specialty Trade Contractors
221122	Electric Power Distribution	423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers
221210	Natural Gas Distribution	423730	Warm Air Heating and Air-Conditioning Equipment and Supplies Merchant Wholesalers
221310	Water Supply and Irrigation Systems	444190	Other Building Material Dealers
221320	Sewage Treatment Facilities	531311	Residential Property Managers
221330	Steam and Air-Conditioning Supply	531312	Nonresidential Property Managers
236115	New Single-Family Housing Construction (except For-Sale Builders)	541310	Architectural Services
236117	New Housing For-Sale Builders	541320	Landscape Architectural Services
236118	Residential Remodelers	541330	Engineering Services
236210	Industrial Building Construction	541370	Surveying and Mapping (except Geophysical) Services
236220	Commercial and Institutional Building Construction	541410	Interior Design Services
237130	Power and Communication Line and Related Structures Construction	541420	Industrial Design Services
237210	Land Subdivision	541614	Process, Physical Distribution, and Logistics Consulting Services
237990	Other Heavy and Civil Engineering Construction	541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services		

Health Care

NAICS	Description	NAICS	Description
621111	Offices of Physicians (except Mental Health Specialists)	621511	Medical Laboratories
621112	Offices of Physicians, Mental Health Specialists	621512	Diagnostic Imaging Centers
621210	Offices of Dentists	621610	Home Health Care Services
621310	Offices of Chiropractors	621910	Ambulance Services
621320	Offices of Optometrists	621991	Blood and Organ Banks
621330	Offices of Mental Health Practitioners (except Physicians)	621999	All Other Miscellaneous Ambulatory Health Care Services
621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists	622110	General Medical and Surgical Hospitals
621391	Offices of Podiatrists	622210	Psychiatric and Substance Abuse Hospitals
621399	Offices of All Other Miscellaneous Health Practitioners	622310	Specialty (except Psychiatric and Substance Abuse) Hospitals
621410	Family Planning Centers	623110	Nursing Care Facilities (Skilled Nursing Facilities)
621420	Outpatient Mental Health and Substance Abuse Centers	623210	Residential Intellectual and Developmental Disability Facilities
621491	HMO Medical Centers	623220	Residential Mental Health and Substance Abuse Facilities
621492	Kidney Dialysis Centers	623311	Continuing Care Retirement Communities
621493	Freestanding Ambulatory Surgical and Emergency Centers	623312	Assisted Living Facilities for the Elderly
621498	All Other Outpatient Care Centers	623990	Other Residential Care Facilities

Life Sciences/Biotech

NAICS	Description	NAICS	Description
311221	Wet Corn Milling	334516	Analytical Laboratory Instrument Manufacturing
311224	Soybean and Other Oilseed Processing	334517	Irradiation Apparatus Manufacturing
325193	Ethyl Alcohol Manufacturing	339112	Surgical and Medical Instrument Manufacturing
325220	Artificial and Synthetic Fibers and Filaments Manufacturing	339113	Surgical Appliance and Supplies Manufacturing
325311	Nitrogenous Fertilizer Manufacturing	339114	Dental Equipment and Supplies Manufacturing
325312	Phosphatic Fertilizer Manufacturing	339115	Ophthalmic Goods Manufacturing
325314	Fertilizer (Mixing Only) Manufacturing	339116	Dental Laboratories
325320	Pesticide and Other Agricultural Chemical Manufacturing	423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers
325411	Medicinal and Botanical Manufacturing	424210	Drugs and Druggists' Sundries Merchant Wholesalers

325412	Pharmaceutical Preparation Manufacturing	424910	Farm Supplies Merchant Wholesalers
325413	In-Vitro Diagnostic Substance Manufacturing	541380	Testing Laboratories
325414	Biological Product (except Diagnostic) Manufacturing	541713	Research and Development in Nanotechnology
333314	Optical Instrument and Lens Manufacturing	541714	Research and Development in Biotechnology (except Nanobiotechnology)
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)

Tourism (Leisure & Hospitality)

NAICS	Description	NAICS	Description
711110	Theater Companies and Dinner Theaters	713920	Skiing Facilities
711120	Dance Companies	713930	Marinas
711130	Musical Groups and Artists	713940	Fitness and Recreational Sports Centers
711190	Other Performing Arts Companies	713950	Bowling Centers
711211	Sports Teams and Clubs	713990	All Other Amusement and Recreation Industries
711212	Racetracks	721110	Hotels (except Casino Hotels) and Motels
711219	Other Spectator Sports	721120	Casino Hotels
711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities	721191	Bed-and-Breakfast Inns
711320	Promoters of Performing Arts, Sports, and Similar Events without Facilities	721199	All Other Traveler Accommodation
711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures	721211	RV (Recreational Vehicle) Parks and Campgrounds
711510	Independent Artists, Writers, and Performers	721214	Recreational and Vacation Camps (except Campgrounds)
712110	Museums	721310	Rooming and Boarding Houses, Dormitories, and Workers' Camps
712120	Historical Sites	722310	Food Service Contractors
712130	Zoos and Botanical Gardens	722320	Caterers
712190	Nature Parks and Other Similar Institutions	722330	Mobile Food Services
713110	Amusement and Theme Parks	722410	Drinking Places (Alcoholic Beverages)
713120	Amusement Arcades	722511	Full-Service Restaurants
713210	Casinos (except Casino Hotels)	722513	Limited-Service Restaurants
713290	Other Gambling Industries	722514	Cafeterias, Grill Buffets, and Buffets
713910	Golf Courses and Country Clubs	722515	Snack and Nonalcoholic Beverage Bars

Defining Business & Entrepreneurship, ICT & Digital Media, and Global Trade

Business & Entrepreneurship

Business occupations are employed across all sectors and cannot be defined by industries alone. Therefore, this study analyzes occupational codes from the Standard Occupational Classification (SOC) system instead of NAICS codes for Business & Entrepreneurship. SOC codes in this sector include:

SOC	Description	SOC	Description
11-1011	Chief Executives	11-9199	Managers, All Other
11-1021	General and Operations Managers	13-1011	Agents and Business Managers of Artists, Performers, and Athletes
11-1031	Legislators	13-1021	Buyers and Purchasing Agents, Farm Products
11-2011	Advertising and Promotions Managers	13-1022	Wholesale and Retail Buyers, Except Farm Products
11-2021	Marketing Managers	13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products
11-2022	Sales Managers	13-1031	Claims Adjusters, Examiners, and Investigators
11-2031	Public Relations and Fundraising Managers	13-1032	Insurance Appraisers, Auto Damage
11-3011	Administrative Services Managers	13-1041	Compliance Officers
11-3021	Computer and Information Systems Managers	13-1051	Cost Estimators
11-3031	Financial Managers	13-1071	Human Resources Specialists
11-3051	Industrial Production Managers	13-1074	Farm Labor Contractors
11-3061	Purchasing Managers	13-1075	Labor Relations Specialists
11-3071	Transportation, Storage, and Distribution Managers	13-1081	Logisticians
11-3111	Compensation and Benefits Managers	13-1111	Management Analysts

11-3121	Human Resources Managers	13-1121	Meeting, Convention, and Event Planners
11-3131	Training and Development Managers	13-1131	Fundraisers
11-9013	Farmers, Ranchers, and Other Agricultural Managers	13-1141	Compensation, Benefits, and Job Analysis Specialists
11-9021	Construction Managers	13-1151	Training and Development Specialists
11-9031	Education Administrators, Preschool and Childcare Center/Program	13-1161	Market Research Analysts and Marketing Specialists
11-9032	Education Administrators, Elementary and Secondary School	13-1199	Business Operations Specialists, All Other
11-9033	Education Administrators, Postsecondary	13-2011	Accountants and Auditors
11-9039	Education Administrators, All Other	13-2021	Appraisers and Assessors of Real Estate
11-9041	Architectural and Engineering Managers	13-2031	Budget Analysts
11-9051	Food Service Managers	13-2041	Credit Analysts
11-9061	Funeral Service Managers	13-2051	Financial Analysts
11-9071	Gaming Managers	13-2052	Personal Financial Advisors
11-9081	Lodging Managers	13-2053	Insurance Underwriters
11-9111	Medical and Health Services Managers	13-2061	Financial Examiners
11-9121	Natural Sciences Managers	13-2071	Credit Counselors
11-9131	Postmasters and Mail Superintendents	13-2072	Loan Officers
11-9141	Property, Real Estate, and Community Association Managers	13-2081	Tax Examiners and Collectors, and Revenue Agents
11-9151	Social and Community Service Managers	13-2082	Tax Preparers
11-9161	Emergency Management Directors	13-2099	Financial Specialists, All Other

Information and Communication Technologies (ICT) & Digital Media

ICT is an umbrella term, used widely outside the U.S. and by the United Nations, to encompass all rapidly emerging, evolving and converging computer, software, networking, telecommunications, Internet, programming and information technologies. ICT professions are employed across all sectors and cannot be defined by industries alone. Therefore, this study analyzes occupational codes instead of NAICS codes for ICT & Digital Media. SOC codes in this sector include:

SOC	Description	SOC	Description
11-3021	Computer and Information Systems Managers	17-2061	Computer Hardware Engineers
13-1111	Management Analysts	17-2072	Electronics Engineers, Except Computer
13-1161	Market Research Analysts and Marketing Specialists	17-3029	Engineering Technicians, Except Drafters, All Other
13-1199	Business Operations Specialists, All Other	17-3031	Surveying and Mapping Technicians
15-1111	Computer and Information Research Scientists	19-4061	Social Science Research Assistants
15-1121	Computer Systems Analysts	25-9011	Audio-Visual and Multimedia Collections Specialists
15-1122	Information Security Analysts	27-1014	Multimedia Artists and Animators
15-1131	Computer Programmers	27-1024	Graphic Designers
15-1132	Software Developers, Applications	27-4011	Audio and Video Equipment Technicians
15-1133	Software Developers, Systems Software	27-4014	Sound Engineering Technicians
15-1134	Web Developers	43-9011	Computer Operators
15-1141	Database Administrators	43-9021	Data Entry Keyers
15-1142	Network and Computer Systems Administrators	43-9022	Word Processors and Typists
15-1143	Computer Network Architects	43-9031	Desktop Publishers
15-1151	Computer User Support Specialists	43-9111	Statistical Assistants
15-1152	Computer Network Support Specialists	49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers
15-1199	Computer Occupations, All Other	51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic
15-2031	Operations Research Analysts	51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic
15-2041	Statisticians		

Global Trade

To define Global Trade, the COE analyzed export data from the U.S. Department of Commerce International Trade Administration (ITA).¹⁵ The ITA provides the top five exporting industries (by three-digit NAICS codes) from the 50 largest metropolitan area exporters in the United States. The top export industries for San Diego between 2012 and 2016 are provided below:

NAICS Code	Description
334	Computer and Electronic Product Manufacturing
333	Machinery Manufacturing
325	Chemical Manufacturing
335	Electrical Equipment, Appliance, and Component Manufacturing
336	Transportation Equipment Manufacturing
339	Miscellaneous Manufacturing

In addition to the NAICS codes that define the sector, Global Trade professions are employed across sectors and cannot be defined by industries alone. Therefore, this study also analyzes occupational (SOC) codes for Global Trade. SOC codes in this sector include:

SOC	Description	SOC	Description
11-2021	Marketing Managers	15-2041	Statisticians
11-3021	Computer and Information Systems Managers	17-2061	Computer Hardware Engineers
13-1111	Management Analysts	17-2072	Electronics Engineers, Except Computer
13-1161	Market Research Analysts and Marketing Specialists	17-3029	Engineering Technicians, Except Drafters, All Other
13-1199	Business Operations Specialists, All Other	17-3031	Surveying and Mapping Technicians
15-1111	Computer and Information Research Scientists	19-4061	Social Science Research Assistants
15-1121	Computer Systems Analysts	25-9011	Audio-Visual and Multimedia Collections Specialists
15-1122	Information Security Analysts	27-1014	Multimedia Artists and Animators
15-1131	Computer Programmers	27-1024	Graphic Designers
15-1132	Software Developers, Applications	27-4011	Audio and Video Equipment Technicians
15-1133	Software Developers, Systems Software	27-4014	Sound Engineering Technicians
15-1134	Web Developers	43-9011	Computer Operators
15-1141	Database Administrators	43-9021	Data Entry Keyers
15-1142	Network and Computer Systems Administrators	43-9022	Word Processors and Typists
15-1143	Computer Network Architects	43-9031	Desktop Publishers
15-1151	Computer User Support Specialists	43-9111	Statistical Assistants
15-1152	Computer Network Support Specialists	49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers
15-1199	Computer Occupations, All Other	51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic
15-2031	Operations Research Analysts	51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic

¹⁵ tse.export.gov/metro/SelectReports.aspx?DATA=Metro

Appendix C: Demand, Supply and Gaps – Definitions and Methodology

Middle-Skill and Above Middle-Skill Jobs

In order to analyze employment trends, the Centers of Excellence for Labor Market Research (COE)¹⁶ across the State of California examined 867 occupational codes from the Standard Occupational Classification (SOC)¹⁷ system and classified 298 occupations as “middle-skill jobs” and 204 occupations as “above middle-skill jobs.” According to the COE, middle-skill jobs have the following training and education requirements:

- Some college coursework, a postsecondary certificate, and/or an associate degree; or
- HS diploma or equivalent with on-the-job training greater than 12 months; or
- Apprenticeship; or
- Bachelor’s degree if at least 33 percent of workers in the occupation, age 25 or higher, have completed, as their highest level of education, some college coursework or an associate degree.

Of the 298 middle-skill jobs, the top 100 jobs were defined by the following parameters:

- Most number of annual openings between 2017 and 2022
- Entry-level hourly earnings (25th percentile) greater than or equal to \$13.09
- No employment decline between 2017 and 2022

Similarly, the top 100 above middle-skill jobs were defined by the following parameters:

- Educational attainment of a bachelor’s degree or higher (excluding those in the middle-skill jobs list above)
- Most number of annual openings between 2017 and 2022
- Entry-level hourly earnings (25th percentile) greater than or equal to \$13.09
- No employment decline between 2017 and 2022

The tables in the following pages list the top 100 middle-skill and above middle-skill jobs based on the aforementioned parameters, sorted in alphabetical order. Occupational titles with an asterisk (*) have an oversupply of labor. The remaining occupations have supply gaps.

Defining Top Priority Sector Jobs

To find the top jobs in Priority and Emerging Sectors, the COE first defined each sector by NAICS codes. The NAICS used to define each sector are listed in Appendix B. After defining the industry sectors, the COE conducted a staffing patterns analysis. According to the California Employment Development Department, “Staffing patterns are a list of the occupations employed within a particular industry, or a list of the industries that employ a particular occupation.” Because they are different than traditionally defined industry sectors, ICT & Digital Media, Business & Entrepreneurship, and Global Trade cannot be defined by NAICS alone. These professions are employed across multiple sectors; therefore, SOC codes are also used to define these three sectors. In addition to being a top job in the staffing patterns analysis, if a top middle-skill job also overlapped with an SOC code that defines one of these three sectors, then that middle-skill job was also considered a “top priority sector job” in ICT & Digital Media, Business & Entrepreneurship, and/or Global Trade.

¹⁶ coeccc.net

¹⁷ bls.gov/soc

Top 100 Middle-Skill Jobs List

SOC	Occupational Title	SOC	Occupational Title
11-3011	Administrative Services Managers*	11-3051	Industrial Production Managers
49-3011	Aircraft Mechanics and Service Technicians	51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	41-3021	Insurance Sales Agents
17-3011	Architectural and Civil Drafters	27-3091	Interpreters and Translators
49-3021	Automotive Body and Related Repairers	43-6012	Legal Secretaries
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	25-4031	Library Technicians
53-3022	Bus Drivers, School or Special Client	29-2061	Licensed Practical and Licensed Vocational Nurses
13-1199	Business Operations Specialists, All Other	19-4099	Life, Physical, and Social Science Technicians, All Other
43-5011	Cargo and Freight Agents	43-4131	Loan Interviewers and Clerks
47-2031	Carpenters	13-2072	Loan Officers
35-1011	Chefs and Head Cooks	11-9081	Lodging Managers
17-3022	Civil Engineering Technicians	13-1081	Logisticians
13-1031	Claims Adjusters, Examiners, and Investigators	51-4041	Machinists
15-1143	Computer Network Architects*	49-9071	Maintenance and Repair Workers, General
15-1152	Computer Network Support Specialists*	29-2012	Medical and Clinical Laboratory Technicians
15-1199	Computer Occupations, All Other*	29-2011	Medical and Clinical Laboratory Technologists
15-1151	Computer User Support Specialists	31-9092	Medical Assistants*
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	29-2071	Medical Records and Health Information Technicians*
47-4011	Construction and Building Inspectors	43-6013	Medical Secretaries
11-9021	Construction Managers	15-1142	Network and Computer Systems Administrators
33-3012	Correctional Officers and Jailers	47-2073	Operating Engineers and Other Construction Equipment Operators
13-1051	Cost Estimators*	23-2011	Paralegals and Legal Assistants*
43-4051	Customer Service Representatives	43-3051	Payroll and Timekeeping Clerks
31-9091	Dental Assistants	29-2052	Pharmacy Technicians
29-2021	Dental Hygienists	31-9097	Phlebotomists
33-3021	Detectives and Criminal Investigators*	27-4021	Photographers
51-2022	Electrical and Electronic Equipment Assemblers	31-2021	Physical Therapist Assistants
17-3023	Electrical and Electronics Engineering Technicians	47-2152	Plumbers, Pipefitters, and Steamfitters
47-2111	Electricians	33-3051	Police and Sheriff's Patrol Officers
17-3029	Engineering Technicians, Except Drafters, All Other	43-5061	Production, Planning, and Expediting Clerks
43-6011	Executive Secretaries and Executive Administrative Assistants	11-9141	Property, Real Estate, and Community Association Managers
33-2011	Firefighters	13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	29-2034	Radiologic Technologists
53-1021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	29-1141	Registered Nurses
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	43-4181	Reservation and Transportation Ticket Agents and Travel Clerks
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	41-3099	Sales Representatives, Services, All Other
41-1012	First-Line Supervisors of Non-Retail Sales Workers	41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
43-1011	First-Line Supervisors of Office and Administrative Support Workers	43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive
39-1021	First-Line Supervisors of Personal Service Workers*	47-2211	Sheet Metal Workers
51-1011	First-Line Supervisors of Production and Operating Workers	21-1093	Social and Human Service Assistants
41-1011	First-Line Supervisors of Retail Sales Workers	47-2221	Structural Iron and Steel Workers
53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	29-2055	Surgical Technologists
39-9031	Fitness Trainers and Aerobics Instructors	13-2082	Tax Preparers*
47-2121	Glaziers	13-1151	Training and Development Specialists
29-2099	Health Technologists and Technicians, All Other	11-3071	Transportation, Storage, and Distribution Managers
31-9099	Healthcare Support Workers, All Other	29-2056	Veterinary Technologists and Technicians*
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	51-8031	Water and Wastewater Treatment Plant and System Operators
53-3032	Heavy and Tractor-Trailer Truck Drivers	15-1134	Web Developers
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	51-4121	Welders, Cutters, Solderers, and Brazers
49-9041	Industrial Machinery Mechanics	13-1022	Wholesale and Retail Buyers, Except Farm Products

Top 100 Above Middle-Skill Jobs List

SOC	Occupational Title
13-2011	Accountants and Auditors
25-3011	Adult Basic and Secondary Education and Literacy Teachers and Instructors*
17-2011	Aerospace Engineers
17-1011	Architects, Except Landscape and Naval
11-9041	Architectural and Engineering Managers*
27-1011	Art Directors*
19-1021	Biochemists and Biophysicists*
19-1029	Biological Scientists, All Other*
19-4021	Biological Technicians
17-2031	Biomedical Engineers*
13-2031	Budget Analysts*
19-2031	Chemists*
11-1011	Chief Executives*
21-1021	Child, Family, and School Social Workers*
17-2051	Civil Engineers
19-3031	Clinical, Counseling, and School Psychologists*
27-2022	Coaches and Scouts*
21-1099	Community and Social Service Specialists, All Other*
13-1041	Compliance Officers
15-1111	Computer and Information Research Scientists*
11-3021	Computer and Information Systems Managers*
17-2061	Computer Hardware Engineers*
15-1121	Computer Systems Analysts
13-2041	Credit Analysts*
15-1141	Database Administrators*
29-1021	Dentists, General*
29-1031	Dietitians and Nutritionists*
21-2021	Directors, Religious Activities and Education
11-9032	Education Administrators, Elementary and Secondary School*
11-9033	Education Administrators, Postsecondary*
11-9031	Education Administrators, Preschool and Childcare Center/Program*
25-9099	Education, Training, and Library Workers, All Other
21-1012	Educational, Guidance, School, and Vocational Counselors*
17-2071	Electrical Engineers*
17-2072	Electronics Engineers, Except Computer*
25-2021	Elementary School Teachers, Except Special Education*
17-2199	Engineers, All Other*
17-2081	Environmental Engineers*
19-2041	Environmental Scientists and Specialists, Including Health*
29-1062	Family and General Practitioners*
13-2051	Financial Analysts*
11-3031	Financial Managers
13-2099	Financial Specialists, All Other*
13-1131	Fundraisers
11-1021	General and Operations Managers*
21-1091	Health Educators*
21-1022	Healthcare Social Workers
11-3121	Human Resources Managers*
13-1071	Human Resources Specialists
17-2112	Industrial Engineers

SOC	Occupational Title
25-9031	Instructional Coordinators
25-2012	Kindergarten Teachers, Except Special Education
23-1011	Lawyers*
25-4021	Librarians
13-1111	Management Analysts*
11-9199	Managers, All Other*
13-1161	Market Research Analysts and Marketing Specialists
11-2021	Marketing Managers*
21-1013	Marriage and Family Therapists
17-2141	Mechanical Engineers*
11-9111	Medical and Health Services Managers*
19-1042	Medical Scientists, Except Epidemiologists*
13-1121	Meeting, Convention, and Event Planners
21-1023	Mental Health and Substance Abuse Social Workers
21-1014	Mental Health Counselors*
19-1022	Microbiologists
25-2022	Middle School Teachers, Except Special and Career/Technical Education*
27-2041	Music Directors and Composers
11-9121	Natural Sciences Managers*
29-1171	Nurse Practitioners
29-1122	Occupational Therapists*
15-2031	Operations Research Analysts*
13-2052	Personal Financial Advisors*
29-1051	Pharmacists*
29-1123	Physical Therapists*
29-1071	Physician Assistants*
29-1069	Physicians and Surgeons, All Other*
25-1099	Postsecondary Teachers*
21-1092	Probation Officers and Correctional Treatment Specialists*
27-3031	Public Relations Specialists*
11-3061	Purchasing Managers
41-9031	Sales Engineers
11-2022	Sales Managers*
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products
25-2031	Secondary School Teachers, Except Special and Career/Technical Education*
41-3031	Securities, Commodities, and Financial Services Sales Agents
11-9151	Social and Community Service Managers*
15-1132	Software Developers, Applications*
15-1133	Software Developers, Systems Software*
25-2052	Special Education Teachers, Kindergarten and Elementary School*
25-2053	Special Education Teachers, Middle School*
25-2054	Special Education Teachers, Secondary School*
29-1127	Speech-Language Pathologists*
21-1011	Substance Abuse and Behavioral Disorder Counselors*
25-3098	Substitute Teachers
25-3099	Teachers and Instructors, All Other
27-3042	Technical Writers
19-3051	Urban and Regional Planners
29-1131	Veterinarians*
27-3043	Writers and Authors*

Defining Supply Gaps

To determine if an occupation has a supply gap, simply subtract the labor supply from labor demand. For the purpose of this study, labor supply is defined as the number of completions or awards that the region produces for an occupation, and labor demand is defined as the number of annual openings for an occupation.

There are two sources of supply data that the COE analyzed for this study: California Community Colleges Chancellor’s Office Management Information System (MIS) Data Mart and Economic Modeling Specialists, Int’l (Emsi). Supply data in Emsi originates from Integrated Postsecondary Education Data System (IPEDS), which uses Classification of Instructional Program (CIP) codes. Conversely, supply data in the CCCC’s MIS Data Mart uses Taxonomy of Programs (TOP) codes. Different coding systems result in differences in supply numbers and, ultimately, supply gaps. For example, according to Emsi, there is an oversupply of workers for Registered Nurses. However, according to Data Mart, there is a supply gap:

SOC Code	Occupational Title	2017-2022 Annual Openings	2017 Regional Completions (Emsi)	Supply Gap or Oversupply (Emsi)	PY2013-15 3-Yr Average Supply (Data Mart)	Supply Gap or Oversupply (Data Mart)
29-1141	Registered Nurses	1,810	1,829	-19	560	1,250

In this study, the COE determined that only occupations with an oversupply of workers in both Emsi and Data Mart would be considered occupations that had an oversupply of workers. Because Data Mart is more up-to-date (see Differences Between Data Mart and IPEDS section below), if the occupation had an oversupply in Emsi and a supply gap in Data Mart, then that occupation would be considered to have a supply gap.

Data Mart Limitations:

- Data is provided as yearly snapshots, rather than following a cohort of students over time
- Data on local low-unit certificate programs may be missing, because districts are not required to report such data to the Chancellor’s Office
- Program award data is based on the number of awards given, rather than the number of students who received awards, which impacts estimates of the supply of qualified workers
- All information is based on a single TOP code, which may not align directly with colleges or their programs

Emsi or IPEDS Limitations:

- Program completion data is not complete, likely related to reporting errors and compliance issues
- Education programs that do not participate in federal student aid programs are not included in the database
- Program completion data are reported by CIP codes, not the TOP codes used by California community colleges

Differences Between Data Mart and IPEDS:

- Academic years for which the number of awards is reported in IPEDS and CCCC Data Mart differ due to the longer time lag for IPEDS data. The COE supply tables use the latest available datasets; therefore, the data for the most recent academic year (e.g., 2015-2016) may be representative of community college awards only because IPEDS data for the same academic year might not be available yet.
- The COE supply tables are organized by TOP code program. To provide the number of awards for postsecondary institutions other than community colleges, TOP codes were cross-referenced with relevant CIP codes. This match is imperfect, with gaps and overlaps between the two coding systems.
- There is inconsistency in the classification of awards below an associate degree between the two data sources. IPEDS classifies certificate-level awards by program duration (e.g., award 1 < 2 academic year, award < 1 academic year, etc.), while CCCC Data Mart classifies data by type of certificate in semester units (e.g., certificate 30 to < 60 semester units, certificate 6 to < 18 semester units). Because of these differences in certificate-level award classification, it is difficult to compare certificate completion between community colleges and other postsecondary education providers.