

LABOR MARKET DEMAND AND SUPPLY ANALYSIS

Priority and Emerging Sectors in San Diego County

Draft updated August 29, 2018

The community colleges in San Diego County met and reviewed labor market demand and program supply for middle-skill jobs in six Priority and Emerging Sectors: Life Sciences and Biotechnology, Information and Communication Technologies (ICT) and Digital Media, Advanced Manufacturing, Health Care, Advanced Transportation and Logistics, and Global Trade. The objectives of the meetings were to identify labor market supply gaps in middle-skill jobs; understand where programs exist or don't exist to fill in the supply gaps; and discuss how the region's community colleges could close the supply gaps. The information reviewed in those meetings are included in the "Demand and Supply Analysis" section of this study. The tables in the following pages summarize the topics, challenges, and recommendations discussed at those meetings.

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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. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), 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.



SUMMARY: FINDINGS AND RECOMMENDATIONS BY SECTOR

SECTOR & COLLEGES	ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>Life Sciences & Biotech</p> <ul style="list-style-type: none"> MiraCosta Miramar 	<p>Large demand, small supply: Biotechnology and Biomedical Technology (TOP 043000) provides only 51 awards, but trains for four top middle-skill jobs that have an aggregated labor market demand of 1,198 annual job openings. That’s a supply gap of 1,142 awards.</p> <p>Enrollment numbers are low for existing programs: While there is high labor market demand, few students enroll in existing Biotechnology and Biomedical Technology (043000) programs; students are not familiar with the careers in this sector; millennials want more flexible employment—not the typical 9-to-5 job; etc.</p> <p>Employers are filling the gap with candidates who have bachelor’s degrees or higher: This leads to high employee turnover once an overqualified individual gets his/her “foot through the door” and move on to higher positions.</p> <p>Developing programs south of Interstate 8 (I-8) was not successful: Southwestern College developed a biotechnology program in the past, but had to discontinue it. Students did not want to commute north of the I-8 and were unfamiliar with jobs in the sector. LS & Biotech jobs and employers are primarily clustered around State Route 52 (SR 52) and SR 78.</p>	<p>As a region, we should:</p> <ul style="list-style-type: none"> Conduct a marketing campaign that educates students about the career opportunities in LS & Biotech Encourage students across the region to enroll in MiraCosta and Miramar’s programs if they are interested in the sector Invest money to market community college programs to employers as a solution to the cost of turnover: The colleges need to work with employers to change their hiring culture; more middle-skill jobs need to be advertised as jobs that require associate degrees (e.g., “no bachelor’s degree” listed on the online job posting) <p>MiraCosta and Miramar should:</p> <ul style="list-style-type: none"> Prioritize 043000 and set a goal to reach specific enrollment numbers Dedicate more funding to market their biotechnology programs to job seekers and high school students across the region Work with the LS & Biotech DSN to set a goal and increase the number of internship and work-based learning opportunities with employers Align curricula between colleges: Biomufacturing associate degree programs across the state can funnel into MiraCosta’s biomufacturing bachelor’s degree program. However, for that to happen, the curricula have to align to meet the bachelor’s program’s prerequisites
	<p>There is no program in the region for Chemical Technology (095400): 095400 can train for three LS & Biotech middle-skill jobs. The aggregate labor market demand for these three occupations is 123 annual job openings between 2017 and 2022.</p>	<p>As a region, we should:</p> <ul style="list-style-type: none"> Wait to create a new program until after Biotechnology and Biomedical Technology (043000) programs reach enrollment capacity Assist MiraCosta and Miramar in developing programs, should they decide to create a Chemical Technology (095400) program for these occupations
	<p>Outcomes from Medical Laboratory Technology (120500) are not linked to the LS & Biotech sector: 120500 is a Health Care TOP code at the state level, but Miramar’s program is more closely related to the Life Sciences & Biotech sector.</p>	<p>As a region, we should understand that 120500 at Miramar is different than the 120500 at Southwestern, despite the coding system at the state level. One focuses Life Sciences & Biotech while the other focuses on Health Care.</p>

SECTOR & COLLEGES	ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>ICT & Digital Media</p> <ul style="list-style-type: none"> • SD Continuing Ed • Palomar • Mesa • Southwestern • City • MiraCosta • Grossmont • Cuyamaca • Miramar <p>(Colleges are listed in order of enrollment numbers from largest to smallest on the LaunchBoard for the ICT & Digital Media sector.)</p>	<p>There is no shortage of ICT & Digital Media programs in the region: Virtually every educational institution in the county has an ICT & DM program.</p> <p>It is difficult to understand which programs lead to which jobs: The career pathways in this sector are convoluted. The COE had difficulty matching course offerings with jobs in ICT & DM.</p> <p>Enrollment numbers are high, but completion and retention numbers are low: Students enroll in ICT& DM programs, but tend to drop out because they do not realize the rigorous training requirements for the occupation (e.g., cybersecurity) until they start training; they take a one or two courses to upskill (skills-builders); etc.</p> <p>The program approval process is too slow for this sector: Program approval can take one to two years. Locally issued, short-term certificate programs are a better fit for employers' needs, which is why Continuing Education has the most offerings for ICT & DM.</p> <p>Many ICT & DM faculty are industry experts, but do not have formal pedagogical training: The colleges need faculty who are subject matter experts and know how to teach. This issue may also affect retention.</p> <p>Third-party certificates are valued in this sector, but we do not know exactly which programs train for industry-recognized certificates (e.g., Security+, A+, Network+) and how many students actually obtain them: We do not know if the curriculum (training offered at the colleges) match the skills that employers need for these positions. Examination fees are costly and are typically not paid by the college, but by the student, which may be a barrier to employment.</p> <p>Bachelor's degree programs generate a significant number of awards (labor supply) for ICT & DM occupations: Employers fill supply gaps with graduates from four-year institutions.</p> <p>No program/supply exists in the region for Database Design and Administration (TOP 070720) or for Data Modeling/Warehousing and Database Administration (CIP 11.0802).</p>	<p>As a region, we should:</p> <ul style="list-style-type: none"> • Emphasize Guided Pathways for ICT & DM programs: If researchers have difficulty navigating through ICT & DM programs, then students will have difficulty as well. • Refine existing and/or develop new career pathway diagrams to help guide students and counselors across all the programs offered in the region; these tools must be marketed extensively or they will never be used • Validate that the noncredit and not for credit short-term training programs are training for what employers need: Not all courses need a full semester and can be accelerated to 8 weeks or less to meet rapid industry changes • Provide “train-the-trainer” or “how to teach” professional development • Create an inventory of the third-party credentials and skills taught at each college across credit, noncredit and not-for-credit (fee-based) programs, and validate with employers which skills and credentials... <ul style="list-style-type: none"> ○ Could be combined for short-term certificates (less than 8 weeks) ○ They would pay to send current/incumbent workers for upskilling (contracted education/continuing education) • Explore partnerships with employers or apprenticeship programs that can pay for industry certification examination fees: Exams can cost up to \$500 and prevent a student from obtaining the industry certifications that employers prefer • Confirm with employers if a bachelor's degree is truly required for these occupations or if an associate degree is sufficient

SECTOR & COLLEGES	ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>Health Care</p> <ul style="list-style-type: none"> • Mesa • Palomar • Miramar • Southwestern • MiraCosta • SD Continuing Ed • City • Grossmont <p>(Colleges are listed in order of enrollment numbers from largest to smallest on the LaunchBoard for the Health Care sector.)</p>	<p>Students who complete Health Care programs are not licensed to practice until they pass the industry (third-party) licensing exam: For example, students who complete the Certified Nurse Assistant (123030) program are not Certified Nursing Assistants until they actually pass the state certification exam.</p> <p>The labor market data does not separate those who are officially certified from those who only complete the program. Colleges vary in their reporting practices for Certificates of Proficiency outcomes data: Some colleges report to the state licensing board, but not to the Chancellor's Office; some colleges report awards with less than four units, but they are introductory programs and do not make a student qualified to practice in that field.</p> <p>Program growth is limited to lack of equipment, space and instructors: Additional funding can help with equipment and space issues, however, finding instructors is challenging due to external accreditation requirements. Regulatory agencies require individuals to meet strenuous minimum qualifications to become instructors, and programs have to meet specific teacher to student ratios. For example, the teacher to student ratio is 1:6 for Dental Assisting, making the program expensive to implement.</p> <p>Lack of clinical placement opportunities is not the only challenge for increasing the region's supply of Registered Nurses: Health institutions have limited space for new grad hires and job openings are typically for experienced nurses. As a result, employers hire from outside San Diego County (e.g., traveling nurses) to fill the demand for Registered Nurses with 3-5 years of experience.</p> <p>Mesa, Miramar, MiraCosta, Continuing Ed, and Palomar are developing—or considering to develop—a variety of new Health Care programs: Pharmacy Technology (122100), Psychiatric Technicians (123900), Medical Secretary or Medical Office Technology (051420), Dental Assistant (124010) and Paramedic (122100).</p> <p>The data shows that Medical Assistants have a labor surplus; however, private training providers produce the majority of those awards and they do not provide clinical training.</p> <p>Retention is high for this sector because students need to complete the certificate or degree in order to get the licensure.</p>	<p>The region should:</p> <ul style="list-style-type: none"> • Develop a tracking mechanism to disaggregate supply data, identifying the number of completers who are actually licensed • Allocate local Strong Workforce Program funds to procure resources such as space and equipment to expand programs at colleges • Explore non-traditional training models when programs are at capacity: For example, simulation centers are used in various parts of the country to help students earn training or clinical hours. However, the region should keep in mind that simulation centers can be used for nursing programs, but not others; external accrediting agencies place limitations on what percent of training could be simulated • Host an allied health clinical placement solutions summit, which the region is currently planning. The summit increases communication and awareness between industry and education. The colleges have challenges with clinical placements; however, employers also have challenges in finding instructors for their own staff's continuing education • Market the quality of community college training programs compared to private training institutions that do not provide students with clinical placements or hands-on training (e.g., medical assisting)

SECTOR & COLLEGES	ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>Advanced Manufacturing</p> <ul style="list-style-type: none"> • Palomar • SD Continuing Ed • City • Miramar • Cuyamaca • Mesa • Southwestern <p>(Colleges are listed in order of enrollment numbers from largest to smallest on the LaunchBoard for the Advanced Manufacturing.)</p>	<p>Eighteen top middle-skill jobs in Advanced Manufacturing have an aggregate labor market demand of 5,061 annual job openings and program supply of 688 awards. That is a supply gap of 4,373 awards. Top middle-skill jobs are occupations that have the greatest labor market demand, stable employment growth between 2017 and 2022, and entry-level wages at or above the Self-Sufficiency Standard.</p> <p>Public perception of the sector limits the talent pipeline: Parents and youth’s perception of manufacturing has not caught up with the technological advancements in the sector.</p> <p>Employers hire students from programs before they complete training: Outcomes data may be skewed due to students dropping out after they get hired. Students tend to work overtime or after office hours (when not-for-credit programs are offered).</p> <p>Long-term training programs at the colleges may be shortened to suit small company needs: This is related to the fact that employers hire students before they complete a program. Once students get foundational skills, the firms can hire and train them in-house. Small manufacturers need skills specific to their business and have developed in-house training to meet those specialized needs.</p> <p>Program growth are limited because the colleges need more faculty, space and equipment: Most programs are at capacity and are impacted, even with the majority of programs held in the evening. Only a few facilities have enough space for machines.</p> <p>Third-party certificates are valued in this sector, but we do not know exactly which programs train for industry-recognized certificates and how many students actually obtain them: There is no standardized system that tracks data for third-party certifications.</p> <p>Apprenticeship programs and not-for credit (fee-based) programs do not report outcomes data to the Chancellor’s Office; therefore, the data was not included in the demand and supply analysis.</p>	<p>As a region, we should:</p> <ul style="list-style-type: none"> • Invest local Strong Workforce Program funds in equipment and space to increase capacity for Advanced Manufacturing programs • Create a list of related apprenticeship programs, nonprofit programs, etc. in the county to better understand the labor market supply for the sector • Create an inventory of the third-party credentials and skills taught at each college across credit, noncredit and not-for-credit (fee-based) programs, and validate with employers which skills and credentials... <ul style="list-style-type: none"> ○ Could be combined for short-term certificates (less than 8 weeks) ○ They would pay to send current/incumbent workers for upskilling (contracted education/continuing education) • Market the job opportunities in Advanced Manufacturing to parents and students, focusing especially on the highly technical and well-paid careers. This shift in perspective will help expand the pipeline of skilled workers willing and eager to enter the sector

SECTOR & COLLEGES	ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>Advanced Transportation</p> <ul style="list-style-type: none"> • Miramar • Palomar • MiraCosta • Cuyamaca • SD Continuing Ed • Southwestern <p>(Colleges are listed in order of enrollment numbers from largest to smallest on the LaunchBoard for the Advanced Transportation sector.)</p>	<p>Opportunities exist in electric and hybrid vehicles: Employers are currently filling the demand for EV and hybrid technology skills in-house. Workers must become master technicians before they can train on electric and hybrid vehicles. This bottleneck will lead to increased demand for EV and hybrid technicians. However, faculty are reluctant to work on hybrid vehicles.</p> <p>Opportunities exist in supply chain and logistics programs: Logistics and Materials Transportation (051000) trains for occupations with a total labor market demand of 2,123 annual job openings, yet the region only produces 4 awards in this TOP code.</p> <p>There is a small labor market demand of 65 annual job openings for Airline Pilots, Copilots and Flight Engineers (53-2011) and Commercial Pilots (53-2012) in San Diego County; however, the demand is much higher across the nation: Workers in these occupations travel all over the world; therefore, analyzing job openings in San Diego County alone does not capture the whole picture. The county's community colleges supply 29 awards for these occupations, and are on track to meet regional demand. However, across the State of California, the labor market demand is 1,659 annual job openings with only 107 completions (supply).</p> <p>While there is a large labor market demand of 1,005 annual job openings for Heavy and Tractor-Trailer Truck Drivers and no community college program exists for the occupation, the community colleges do not need to create a new program: This occupation is not recession proof or disruption proof; it is at risk of automation, especially with the increased use of autonomous vehicles. Developing a program would also be costly due to the cost of insurance, vehicles, equipment and space. Private training providers produce a significant number of awards to fill the supply gap, but do not report their numbers to IPEDS and are not included in the demand and supply gap analysis.</p> <p>Retention is an issue when students with no prior industry experience first enroll into an Automotive Technology (094800) program: Students who are directed into the program without a proper assessment soon find out that it isn't a good fit for them and drop out.</p> <p>The region's Diesel Technology (094700) programs are currently meeting the needs of employers in the region.</p>	<p>The region should engage with employers and have them work with faculty to create hybrid and EV programs: This will address employer's growing needs as people retire from the automotive industry and address faculty's misconceptions about the dangers of working on hybrid or electric vehicles.</p> <p>Colleges interested in expanding or upgrading Automotive Technology (094800) and Piloting (302020) programs for new technologies should use local Strong Workforce Program funds to procure the necessary vehicles and equipment in preparation for future labor market demand.</p> <p>As a region, we should develop more supply chain and logistics programs and coordinate them across colleges: Supply chain and logistics certificates are applicable across all industries and include a variety of fields such as project management, warehousing, mega warehousing, purchasing, and regulatory compliance. There is enough demand that each college could offer a program that addresses each niche.</p> <p>Miramar and Palomar are increasing their Diesel Technology program capacity with an apprenticeship program and/or Strong Workforce Program funds. No additional recommendations for Diesel Technology (094700).</p>

SECTOR & COLLEGES	ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>Global Trade</p> <ul style="list-style-type: none"> • Southwestern • Grossmont • MiraCosta • Palomar <p>(Colleges are listed in order of enrollment numbers from largest to smallest on the LaunchBoard for the Global Trade sector. However, the occupations analyzed in this study are also in the Business and Entrepreneurship sector, which every college has a program for.)</p>	<p>Middle-skill jobs in Global Trade overlap with the Advanced Transportation & Logistics and Business and Entrepreneurship sectors: Labor market supply can be found in Business and Entrepreneurship programs such as Business and Commerce, General (050100), Business Administration (050500), and Business Management (050600). Because these programs train for a variety of occupations, the awards supplied by these TOP codes were removed from the demand and supply analysis for this sector. Therefore, the labor market gaps for the top middle-skill jobs in Global Trade may be smaller than what the data depicts.</p> <p>Employers fill the labor market gap for Sales Representatives with in-house training: Sales positions are specific to their industry; employers offer internal, on-the-job training to supplement sales skills with knowledge of a company’s products and/or services. For highly technical industries, employers require Sales Representatives to have a bachelor’s degree or prior experience in the industry.</p> <p>Marketing and Distribution (050900) trains for sales positions, which have an aggregate labor market demand of 2,775 annual job openings, but only supplies 18 awards: Students in these programs tend to transfer to four-year institutions. It is unclear if an associate degree instead of a bachelor’s degree in marketing would meet employers’ demand.</p> <p>Opportunities exist in supply chain management: While Purchasing Agents and Whole and Retail Buyers have an aggregate labor market demand of 546 annual job openings, the region does not need to develop a specific program for Purchasing (050920). 050920 is an outdated TOP code and procurement skills are embedded in supply chain management programs.</p> <p>There is only one TOP code in this sector: At the state level, International Business and Trade (050800) is the only TOP code for Global Trade.</p> <p>Due to increasing demand for entrepreneurship skills, colleges are developing more Small Business and Entrepreneurship (050640) programs.</p>	<p>As a region, we should:</p> <ul style="list-style-type: none"> • Convene employers and ask if they would be interested in a sales certificate offered by the community colleges. The program would focus on general sales skills while employers’ internal programs can focus on product-specific knowledge • Confirm with employers if a bachelor’s degree is truly required for these occupations or if an associate degree is sufficient • Engage employers to change hiring behaviors, especially if positions could be filled with associate degrees; market the cost benefit of changing job descriptions to require associate degrees before we can increase capacity in these programs • Develop more supply chain management programs

SUMMARY: FINDINGS AND RECOMMENDATIONS ACROSS ALL SECTORS

ISSUES AND TOPICS DISCUSSED	SUGGESTED RECOMMENDATIONS
<p>Virtually all top middle-skill jobs across the Priority & Emerging Sectors have supply gaps in San Diego County.</p>	<ul style="list-style-type: none"> • Increase program supply using the sector strategies identified in this demand and supply analysis
<p>There are issues in the data reporting for certificates and degrees (awards). The Center of Excellence marked the names of colleges that have program awards reported in MIS Data Mart (as of Feb 2018) but not in LaunchBoard, and vice versa in the demand and supply tables for each sector.</p>	<ul style="list-style-type: none"> • Prioritize data quality and Code Alignment for our programs: If programs are coded incorrectly, then the demand and supply analysis does not show an accurate picture of labor gaps • Review the markings in the demand and supply tables and check for accuracy with internal reports
<p>Several programs do not report their outcomes (supply) data to the Chancellor's Office, so their awards are not included in the demand and supply analysis:</p> <ul style="list-style-type: none"> • Not-for-credit (fee-based) programs • Some noncredit programs • Adult Education • Apprenticeship programs • External/nonprofit training providers 	<ul style="list-style-type: none"> • Develop a standardized way to track not-for-credit program outcomes at each college: If the colleges do not have a standardize method of tracking not-for-credit programs, then they will continue to not be included in the gap analysis. • Create a list of fee-based, not-for-credit programs, adult education programs, apprenticeships, and not-for-profit programs: If we do not have outcomes data for these programs, then we should, at minimum, include a list of these programs in our analyses to illustrate how many programs are available.
<p>Low retention is an issue for nearly all P&E sectors.</p>	<ul style="list-style-type: none"> • Designed programs to meet the needs of underrepresented students: Instructors, counselors and staff should be required to train for cultural competency. • Provide "train-the-trainer" or "how to teach" professional development: Faculty may be industry experts but not have teaching experience, or faculty may need a refresher on how to best teach CTE-specific subjects.
<p>Career counselors at each college do not know of or promote programs from other colleges to their students.</p>	<ul style="list-style-type: none"> • Create a one-page infographic for each audience (students, counselors, parents) about career pathways: The career pathways can be simple diagrams that indicate what level of training (courses, certificates, or degrees) is required for specific occupations. • Develop a script for career center counselors to help them guide students: Career counselors can benefit from training and information about programs across colleges.
<p>Recommendations and plans to increase supply for each sector should be validated by employers</p>	<ul style="list-style-type: none"> • Have the Deputy Sector Navigators (DSNs) use this information to convene regional advisory groups: DSNs can work with the COE and use the labor market information to inform program curriculum and validate employers' needs.
<p>It is unclear if programs are training exactly for what employers are looking for: We do not know who sits on the CTE advisory groups; we do not know the makeup of employers and/or industries on the advisory groups.</p>	<ul style="list-style-type: none"> • Create an inventory of the skills and third-party credentials taught at each college across credit, noncredit and not-for-credit (fee-based) programs • Create an inventory of CTE programs and their advisory groups to confirm that a representative sample of employers across the region are providing feedback on curriculum

DEMAND AND SUPPLY ANALYSIS

The following sections analyze labor market demand and supply for selected middle-skill jobs in the region’s Priority and Emerging (P&E) Sectors. Labor market demand is determined by the number of annual job openings employers expect to fill due to job growth and employee turnover between 2017 and 2022. An indicator of whether the region is providing enough labor market supply to meet labor market demand is the number of related awards (e.g., certificates, degrees) generated by the region. The following charts and figures illustrate how program supply from the community colleges and other educational institutions (e.g., universities, private providers) compare with labor market demand.

Methodology and Data Definitions

The San Diego-Imperial Center of Excellence for Labor Market Research (COE) prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Emsi, a software program that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Programmatic data is drawn from two sources using Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP) codes.

The COE examined more than 850 occupational codes from the Standard Occupational Classification (SOC) system and classified approximately 300 occupational codes as “middle-skill jobs.” SOC is a federal statistical standard used by EDD, BLS and other federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. 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.

The COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The following figure illustrates this process:



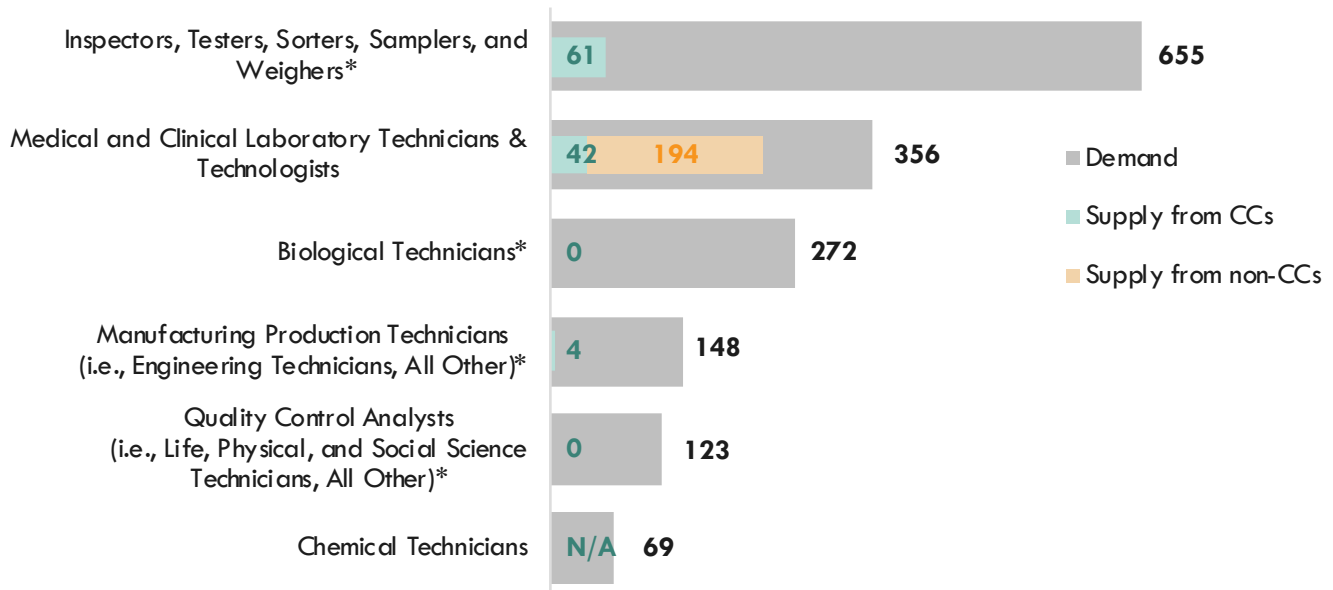
TOP data comes from the California Community Colleges Chancellor’s Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data). TOP is a system of numerical codes used at the state level to collect and report information on community college programs and courses throughout the state that have similar outcomes. 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.

Because a TOP/CIP code may train for more than one occupation, simply aggregating all supply from all related codes may overestimate supply for that occupation. Therefore, the COE de-duplicated TOP codes that trained for more than one occupation to avoid counting the program supply more than once. This information can be seen in the demand and supply tables for each P&E section of this study.

LIFE SCIENCES & BIOTECHNOLOGY

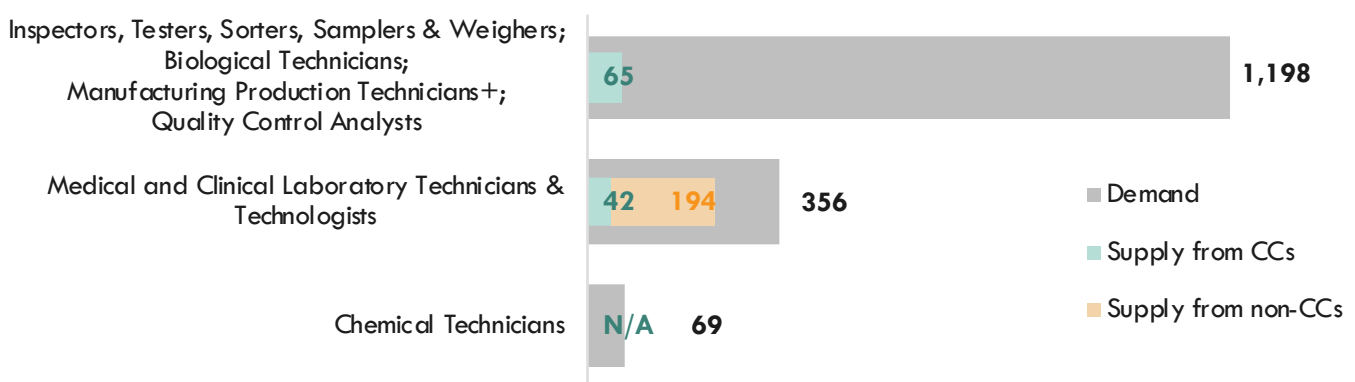
Figure 1a compares labor market demand for the top middle-skill jobs¹ in Life Sciences and Biotechnology with program supply from the community colleges and non-community college providers in San Diego County. The top middle-skill jobs in this sector all have a supply gap (Figure 1a).

Figure 1a. Life Sciences Top Middle-Skill Jobs: Labor Market Demand vs. Program Supply San Diego County



The asterisk (*) indicates that four top middle-skill jobs (Quality Control Analysts; Manufacturing Production Technicians; Biological Technicians; and Inspectors, Testers, Sorters, Samplers and Weighers) have the same program supply: Biotechnology and Biomedical Technology (TOP 043000). Biotechnology and Biomedical Technology supplies only 61 awards, but trains for four different occupations with a total labor market demand of 1,198 annual openings. Another way to look at the supply and demand analysis of the top middle-skill jobs is shown below, with the four occupations combined (Figure 1b). Figure 1b has the same data as Figure 1a.

Figure 1b. Life Sciences Top Middle-Skill Jobs: Labor Market Demand vs. Program Supply San Diego County



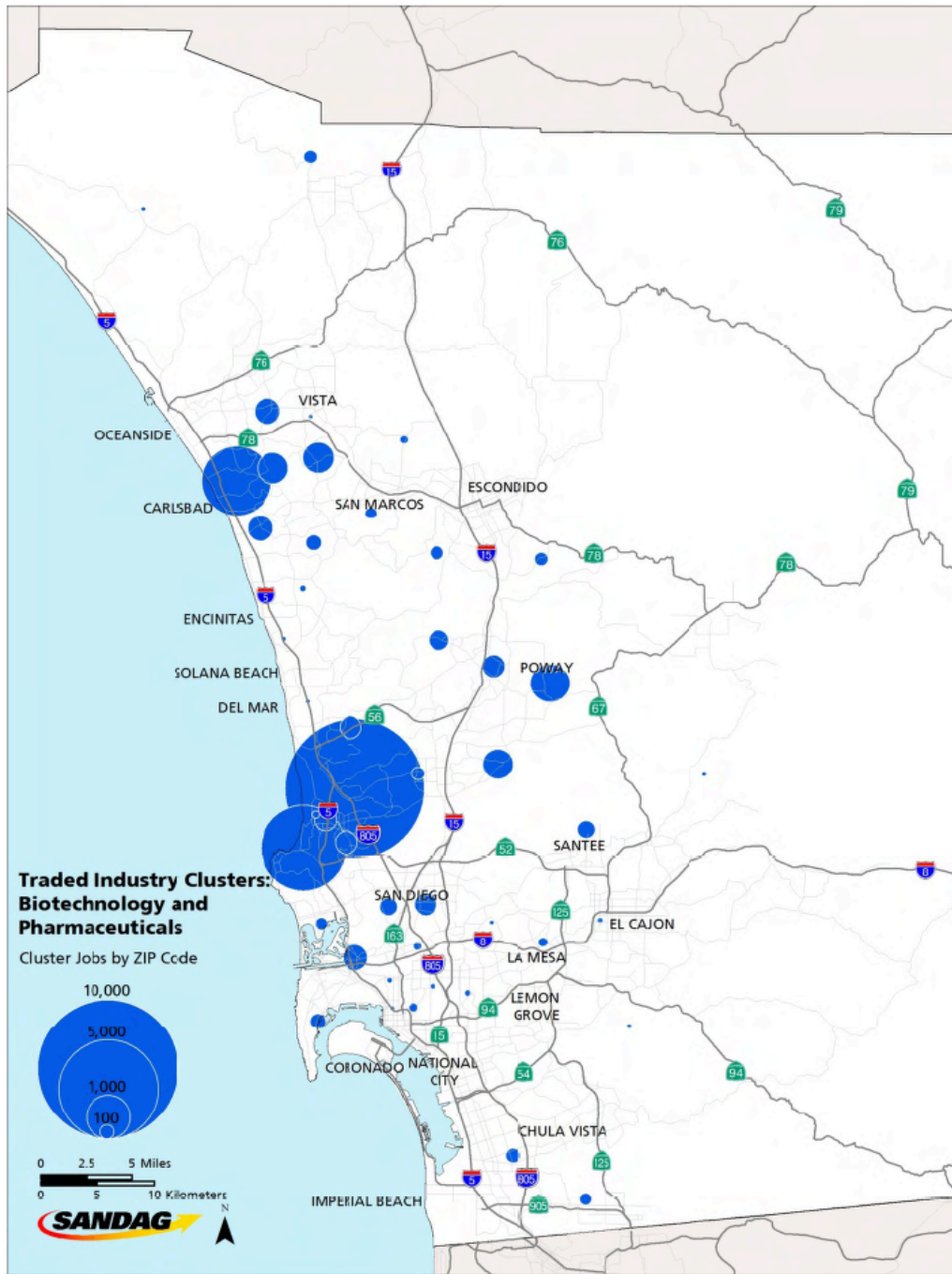
+Other Engineering and Related Industrial Technologies (TOP 099900) also trains for Manufacturing Production Technicians and provides 4 awards in the region; this number was added to the 61 awards from Biotechnology and Biomedical Technology, which results in a total of 65 awards.

¹Top middle-skill jobs have the most labor market demand, stable employment growth, and entry-level wages at or above the Self-Sufficiency Standard. The Self-Sufficiency Standard is the hourly wage that a single adult needs to earn to meet basic needs in San Diego County. selfsufficiency.org.

A Note About Medical and Clinical Laboratory Technicians and Technologists

Medical and Clinical Laboratory Technicians (SOC 29-2012) and Medical and Clinical Laboratory Technologists (29-2011) are top middle-skill jobs for both the Life Sciences and Health Care sectors. According to the California Community Colleges Chancellor's Office, the program that trains for these two occupations, Medical Laboratory Technology, is a Health Care program; however, due to their importance in the Life Sciences sector, they are included in this brief for discussion.

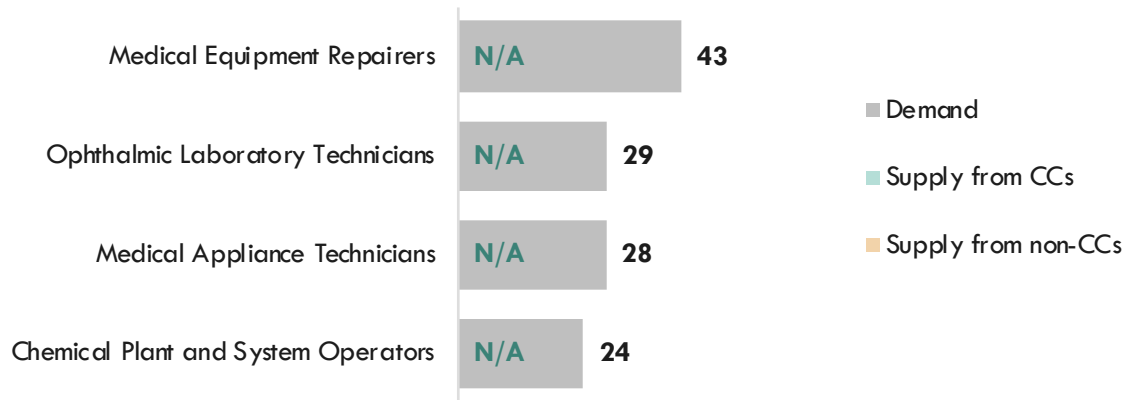
Two community colleges in San Diego County have programs for Biotechnology and Biomedical Technology: Miramar College and MiraCosta College. These colleges are located in proximity to Life Sciences and Biotechnology employers as shown below.²



² The image was taken from SANDAG's study, "Traded Industry Clusters in the San Diego Region." December 2012.

Other middle-skill jobs in the Life Sciences and Biotechnology sector include Chemical Technicians, Medical Equipment Repairers, Chemical Equipment Operators and Tenders, Ophthalmic Laboratory Technicians and Medical Appliance Technicians. These occupations do not have as much labor market demand as the top middle-skill jobs but there are no community colleges programs that train for them in the San Diego-Imperial region (Figure 2).

Figure 2. Other Life Sciences Middle-Skill Jobs: Labor Market Demand vs. Program Supply San Diego County



While Chemical Plant and System Operators do not have as much labor market demand as the other occupations, it may be important to note that Chemical Technology (095400) can train for this occupation and with two other middle-skill jobs: Chemical Technicians and Chemical Equipment Operators and Tenders. The aggregate labor market demand for these three occupations is 123 annual job openings per year. However, there is currently no program in the region for Chemical Technology (095400).

SOC	OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	ENTRY-LEVEL WAGE (25 TH PERCENTILE)	MEDIAN WAGE
19-4031	Chemical Technicians	69	\$15.71	\$23.32
51-9011	Chemical Equipment Operators and Tenders	30	\$10.73	\$11.80
51-8091	Chemical Plant and System Operators	24	\$19.32	\$22.02
TOTAL JOB OPENINGS PER YEAR		123		

DEMAND AND SUPPLY DATA FOR TOP MIDDLE-SKILL JOBS: LIFE SCIENCES

+The COE Supply Table indicates that this college has a program for this TOP code, but this college is not listed in the LaunchBoard

*LaunchBoard indicates that this college has a program for this TOP code, but this college is not listed in COE Supply Table

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Inspectors, Testers, Sorters, Samplers, and Weighers	655	Supply Gap	61	Industrial Quality Control	095680	San Diego City*	0
				Biotechnology and Biomedical Technology	043000	MiraCosta	31
						San Diego City	5
						San Diego Mesa+	0
						San Diego Miramar	11
						Southwestern	14
Biological Technicians	272	Supply Gap	0	Laboratory Science Technology	095500	San Diego Mesa*	0
				Biotechnology and Biomedical Technology	043000	Already accounted for	0
Medical and Clinical Laboratory Technicians	226	Supply Gap	42	Medical Laboratory Technology	120500	San Diego Miramar	29
Medical and Clinical Laboratory Technologists	130					Southwestern	13
Engineering Technicians, Except Drafters, All Other	148	Supply Gap	4	Other Engineering and Related Industrial Technologies	099900	San Diego Miramar*	0
				Biotechnology and Biomedical Technology	043000	San Diego City	4
						Already accounted for	0
Life, Physical, and Social Science Technicians, All Other	123	Supply Gap	0	Biotechnology and Biomedical Technology	043000	Already accounted for	0
Chemical Technicians	69	Supply Gap	N/A	Chemical Technology	095400	N/A	N/A

DEMAND AND SUPPLY DATA FOR OTHER MIDDLE-SKILL JOBS: LIFE SCIENCES

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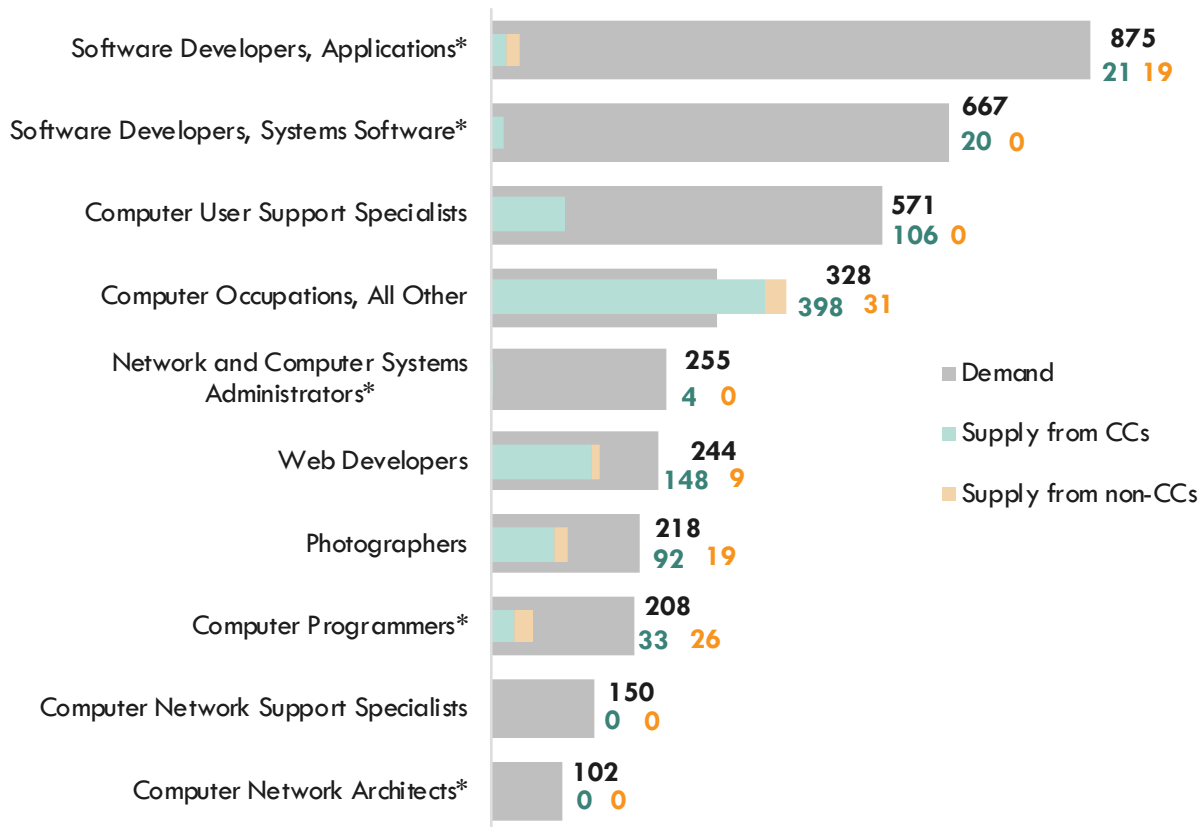
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OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Chemical Equipment Operators and Tenders	30	Supply Gap	N/A	Chemical Technology	95400	N/A	N/A
Medical Equipment Repairers	43	Supply Gap	N/A	Biomedical Instrumentation	093460	N/A	N/A
Ophthalmic Laboratory Technicians	29	Supply Gap	N/A	Optics	096100	N/A	N/A
Medical Appliance Technicians	28	Supply Gap	N/A	N/A	N/A	N/A	N/A
Chemical Plant and System Operators	24	Supply Gap	N/A	Chemical Technology	095400	N/A	N/A

ICT & DIGITAL MEDIA

The top ICT and Digital Media middle-skill jobs have a supply gap except Computer Occupations, All Other (Figure 3). However, Computer Occupations, All Other is a generic SOC code that aggregates labor market demand from a variety of new and emerging occupations. As a result, labor market data is unclear for the variety of occupations captured under this code. This SOC code should be used for discussion purposes only.

**Figure 3. ICT and Digital Media Top Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



*Indicates that these occupations have a typical entry-level educational requirement of a bachelor's degree

The asterisk (*) indicates that employers normally require job candidates to have an educational attainment of a bachelor's degree or higher; however, more than one-third of the existing workforce employed in these occupations have an education level of an associate degree or less. This suggests that community colleges graduates may also qualify for these occupations.

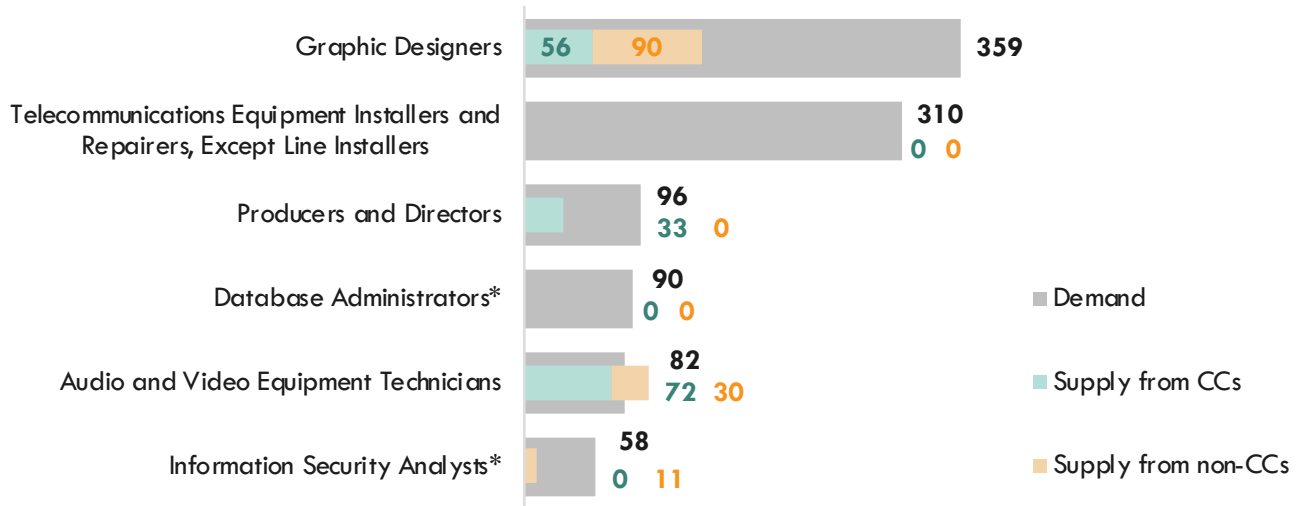
Computer Occupations, All Other (15-1199)

According to the U.S. Bureau of Labor Statistics, workers who perform activities not described in the current Standard Occupational Classification system are grouped in a broad category, with the words "All Other" at the end of the title. The SOC codes for "All Other" occupations end in "9," as seen in Computer Occupations, All Other (15-1199). This code includes new and emerging occupations that may not have enough labor market data on their own such as Business Intelligence Analysts, Information Technology Project Managers, Video Game Designers, and Geographic Information Systems Technicians.

Source: bls.gov/soc/2018/soc_2018_class_prin_cod_guide.pdf

Figure 4 illustrates labor market demand and supply for other middle-skill jobs in the ICT and Digital Media sector. Other middle-skill jobs do not have as much labor market demand as the top middle-skill jobs and/or they are projected decline in total employment between 2017 and 2022. Of these other middle-skill jobs, the Audio Video Equipment Technicians occupation has an oversupply of labor (Figure 4).

**Figure 4. Other ICT and Digital Media Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



*indicates that these occupations have a typical entry-level educational requirement of a bachelor's degree

While Graphic Designers and Telecommunications Equipment Installers and Repairers, Except Line Installers have a significant number of annual openings (labor market demand), these two occupations are not “top middle-skill jobs” because employment trends indicate that they are expected to decline in total employment between 2017 and 2022.

Occupational Table for Graphic Designers and Telecommunications Equipment Installers in San Diego County

SOC	OCCUPATIONAL TITLE	ANNUAL OPENINGS	2017 JOBS	2022 JOBS	2017-2022 EMPLOYMENT CHANGE	2017-2022 % EMPLOYMENT CHANGE
27-1024	Graphic Designers	359	3,853	3,823	-30	-1%
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	310	2,999	2,933	-66	-2%

DEMAND AND SUPPLY DATA FOR TOP MIDDLE-SKILL JOBS: ICT & DIGITAL MEDIA

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OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Software Developers, Applications	875	Supply Gap	40	Electronic Game Design	061420	Already accounted for	0
				Computer Software Development	070700	Already accounted for	0
				Software Applications	070210	Grossmont+	2
						MiraCosta	10
						San Diego Continuing Ed+	6
						San Diego City+	0
						San Diego Miramar	2
						Southwestern	1
Palomar*	0						
Computer Software and Media Applications, Other	CIP 11.0899	Non-community college provider	19				
Computer Programming	070710	Already accounted for	0				
Software Developers, Systems Software	667	Supply Gap	20	Computer Software Development	070700	Palomar	20
						San Diego Mesa*	0
						Southwestern*	0
						San Diego City*	0
				MiraCosta*	0		
Computer Programming	070710	Already accounted for	0				
Computer User Support Specialists	571	Supply Gap	146	Software Applications	070210	Already accounted for	0
				Computer Software and Media Applications, Other	CIP 11.0899	Already accounted for	0
				Computer Infrastructure and Support	070800	San Diego Continuing Ed	9
						San Diego City	12
						Palomar*	0
						MiraCosta*	0
				Computer Support	070820	Palomar	0
						San Diego Continuing Ed	28
						Southwestern	5
				Computer Information Systems	070200	San Diego City*	0
						MiraCosta	0
						Palomar+	15
						San Diego City+	5
San Diego Mesa+	18						
San Diego Miramar+	11						
Southwestern	3						

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Computer Occupations, All Other	328	Oversupply	493	Electronic Game Design	061420	Palomar	1
						Southwestern	4
				Information Technology, General	070100	Southwestern	7
						Grossmont*	0
						San Diego Mesa*	0
						San Diego City*	0
						Cuyamaca*	0
						Palomar*	0
						MiraCosta*	0
						San Diego Miramar*	0
				Computer and Information Sciences, General	CIP 11.0101	Non-community college provider	31
				Computer Science (Transfer)	070600	MiraCosta+	14
						Southwestern+	9
						Palomar*	0
San Diego Mesa*	0						
San Diego City*	0						
E-Commerce (Technology Emphasis)	070910	MiraCosta	1				
Other Information Technology	079900	San Diego Continuing Ed	334				
		San Diego Mesa*	0				
		San Diego City*	0				
		Palomar*	0				
Geographic Information Systems	220610	Palomar	18				
		San Diego Mesa+	8				
		Southwestern	2				
Computer and Information Systems Security	CIP 11.1003	Already accounted for	0				
Network and Computer Systems Administrators	255	Supply Gap	4	Computer Networking	070810	Already accounted for	0
				Computer Systems Analysis	070730	San Diego City+	0
						Southwestern	0
						Palomar	0
Telecommunications Technology	093430	San Diego City+	4				
Web Developers	244	Supply Gap	157	Website Design and Development	061430	Cuyamaca+	8
						MiraCosta	2
						Palomar	1
						San Diego Continuing Ed	69
						San Diego Mesa	20
				Southwestern	7		
				Web Page, Digital/Multimedia and Information Resources Design	CIP 11.0801	Non-community college provider	9
				Computer Software Development	070700	Already accounted for	0
				Computer Programming	070710	Already accounted for	0
				Computer Programming/Programmer, General	CIP 11.0201	Already accounted for	0
World Wide Web Administration	070900	Grossmont+	5				
		Palomar	7				
		Southwestern*	0				
		San Diego Continuing Ed	29				

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Photographers	218	Supply Gap	111	Advertising	050910	Palomar	7
				Photography	101100	Grossmont*	0
						MiraCosta*	0
						San Diego City*	0
						Palomar*	0
						San Diego Mesa*	0
				Applied Photography	101200	Southwestern*	0
						MiraCosta	13
						Palomar	20
				Photographic and Film/Video Technology/Technician and Assistant	CIP 10.0201	San Diego City	7
						Southwestern	8
Commercial Photography	CIP 50.0406	Non-community college provider	12				
Digital Media	061400	Commercial Photography	7				
		MiraCosta	15				
		Palomar	14				
		Southwestern*	0				
		San Diego Mesa*	0				
Computer Programmers	208	Supply Gap	59	San Diego City	8		
				Electronic Game Design	061420	Already accounted for	0
				Information Technology, General	070100	Already accounted for	0
				Computer Software Development	070700	Already accounted for	0
				Computer Programming/Programmer, General	CIP 11.0201	Non-community college provider	26
				Computer Programming	070710	Grossmont+	8
						MiraCosta	3
						Palomar	3
						San Diego City	18
						San Diego Mesa	1
San Diego Miramar	0						
Computer Network Support Specialists	150	Supply Gap	0	Computer Networking	070810	Cuyamaca	12
				Grossmont+	4		
				MiraCosta	14		
				Palomar	36		
				San Diego City+	19		
				Southwestern	3		
				Computer Systems Analysis	070730	Already accounted for	0
Computer Support	070820	Already accounted for	0				
Computer Network Architects	102	Supply Gap	0	Computer Networking	070810	Already accounted for	0

DEMAND AND SUPPLY DATA FOR OTHER MIDDLE-SKILL JOBS: ICT & DIGITAL MEDIA

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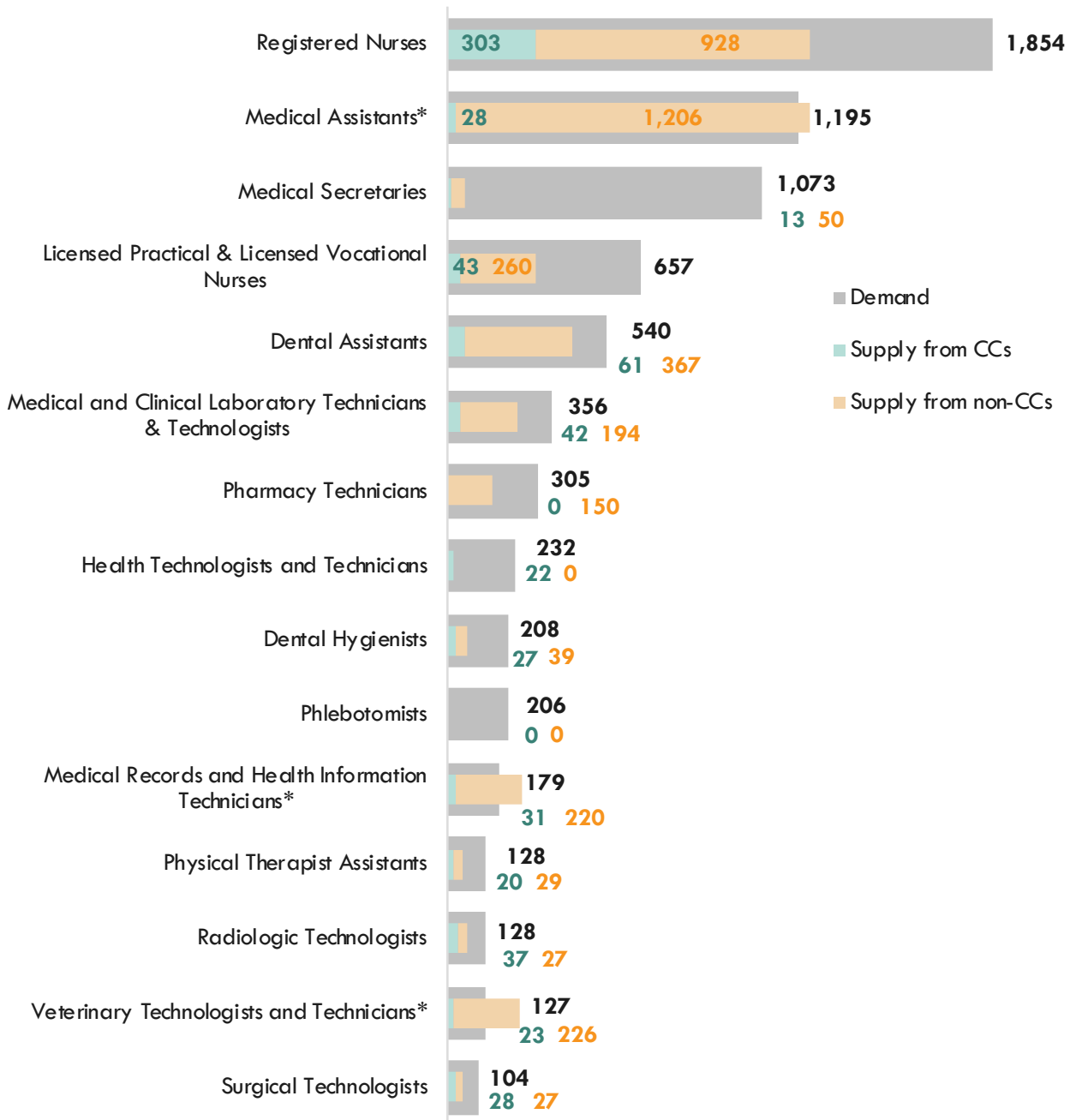
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OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Graphic Designers	359	Supply Gap	146	Graphic Art and Design	103000	Cuyamaca	13
						Palomar	9
						San Diego Continuing Ed	5
						San Diego City	19
						MiraCosta*	0
						San Diego Miramar*	0
				Southwestern	10		
Graphic Design	CIP 50.0409	Non-community college provider	90				
Telecommunications Equipment Installers and Repairers, Except Line Installers	310	Supply Gap	0	Telecommunications Technology	093430	Already accounted for	0
Producers and Directors	96	Supply Gap	18	Film Production	061220	San Diego City	18
						Palomar*	0
						San Diego Miramar*	0
Database Administrators	90	Supply Gap	0	Information Technology, General	070100	Already accounted for	0
				Database Design and Administration	070720	N/A	N/A
				Computer Infrastructure and Support	070800	Already accounted for	0
				Computer Networking	070810	Already accounted for	0
Audio and Video Equipment Technicians	82	Oversupply	102	Computer Networking	061400	Already accounted for	0
				Multimedia	061410	Grossmont+	1
						MiraCosta	19
						Palomar	6
						San Diego City*	0
						San Diego Mesa+	14
				Commercial Music	100500	MiraCosta	20
						San Diego City	8
						San Diego Miramar	1
						Palomar*	0
Southwestern	3						
Recording Arts Technology/Technician	CIP 10.0203	Non-community college provider	30				
Information Security Analysts	58	Supply Gap	11	Computer Infrastructure and Support	070800	Already accounted for	0
				Computer Networking	070810	Already accounted for	0
				Computer Support	070820	Already accounted for	0
				World Wide Web Administration	070900	Already accounted for	0
				Computer and Information Systems Security/Information Assurance	CIP 11.1003	Non-community college provider	11

HEALTH CARE

The following graph compares labor market demand for the top middle-skill jobs in Health Care with program supply from the community colleges and non-community college providers in San Diego County (Figure 5). The top middle-skill jobs in Health Care have a supply gap except Medical Assistants, Medical Records and Health Information Technicians, and Veterinary Technologists and Technicians. In addition to community college offerings, many students are completing Health Care programs at other postsecondary education providers.

Figure 5. Health Care Top Middle-Skill Jobs: Labor Market Demand vs. Program Supply San Diego County



*These occupations have an oversupply of labor.

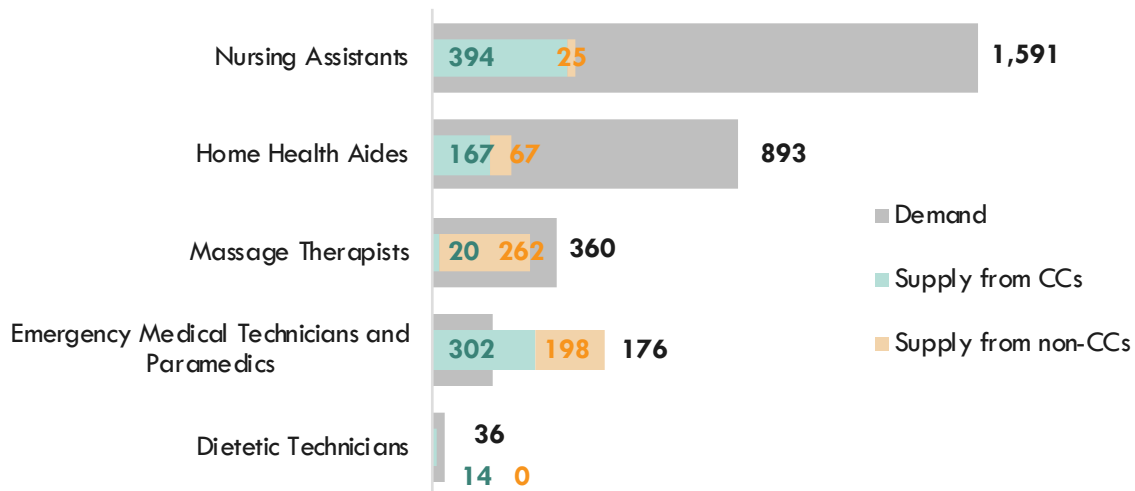
Challenges in Expanding Health Care Programs

While there is a supply gap for the top middle-skill jobs, it should be noted that increasing program supply will require increasing clinical placements for students. However, securing clinical placements is difficult because they are limited. The region does not have the capacity to meet those needs. Similarly, other programs may be at capacity due to limitations in space and resources and cannot expand.

San Diego County has community college programs for middle-skill jobs that have entry-level earnings below the Self-Sufficiency Standard (living wage): Nursing Assistants, Home Health Aides, Massage Therapists, Emergency Medical Technicians and Paramedics, and Dietetic Technicians. These occupations have a supply gap except Emergency Medical Technicians and Paramedics (Figure 6).

It is important to note that the Standard Occupational Classification system combines “Emergency Medical Technicians” and “Paramedics” into one code; however, EMTs generally earn less than Paramedics and combining the two professions may not accurately reflect their wages. While not currently, the SOC coding system will split this occupation into two separate and distinct codes. By 2020, employment and wage data collected will separate out EMTs from Paramedics. Additionally, the oversupply of labor for this occupation may be misleading because students who aim to become firefighters also complete paramedic programs.

Figure 6. Health Care Middle-Skill Jobs with Entry-Level Wages Below Self-Sufficiency: Labor Market Demand vs. Program Supply San Diego County

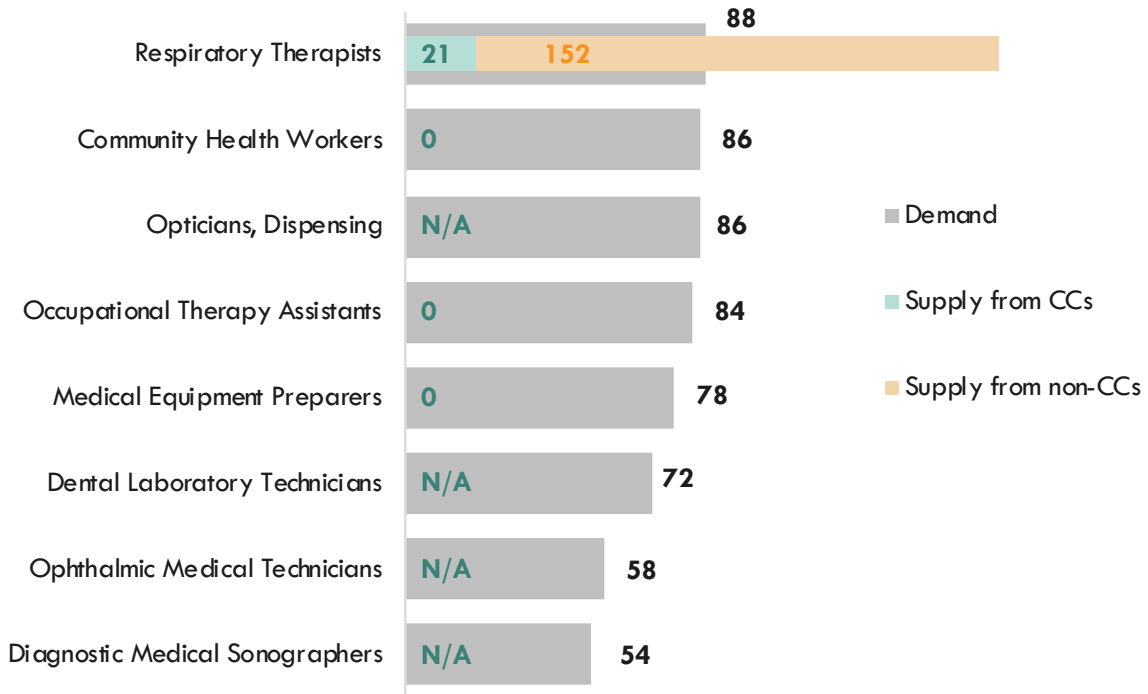


Occupational Table for Health Care Middle-Skill Jobs with Entry-Level Wages Below Self-Sufficiency in San Diego County

SOC	OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	ENTRY-LEVEL WAGE (25 TH PERCENTILE)	MEDIAN WAGE
31-1014	Nursing Assistants	1,591	\$12.47	\$14.42
31-1011	Home Health Aides	893	\$10.93	\$12.00
31-9011	Massage Therapists	360	\$11.05	\$14.14
29-2041	Emergency Medical Technicians and Paramedics	176	\$11.14	\$13.87
29-2051	Dietetic Technicians	36	\$12.56	\$16.56

Other middle-skill jobs that pay entry-level living wages in the Health Care sector are shown in the graph below. These occupations do not have as much labor market demand as the top middle-skill jobs. Programs exist at the community colleges for Respiratory Therapists, Community Health Workers, and Occupational Therapy Assistants. There are no programs for Opticians (Dispensing), Dental Laboratory Technicians, Ophthalmic Medical Technicians and Diagnostic Medical Sonographers. While there is currently no program for Diagnostic Medical Sonographers, San Diego Mesa College will start a program in 2019.

**Figure 7. Other Health Care Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



N/A indicates there is no community college program available.

DEMAND AND SUPPLY DATA FOR TOP MIDDLE-SKILL JOBS: HEALTH CARE

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**Adult Ed has a program for this TOP code, but the COE does not have data on program supply

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Registered Nurses	1854	Supply Gap	1231	Registered Nursing	CIP 51.3901	Non-community college providers	928
					123010	Grossmont	83
						MiraCosta	44
						Palomar	55
						San Diego City	57
						Southwestern	64
Medical Assistants	1195	Oversupply	1234	Medical Assisting	CIP 51.0801	Non-community college providers	1206
					120800	San Diego Mesa	23
						Southwestern*	0
				Clinical Medical Assisting	120810	Palomar+	0
						Southwestern	5
					Medical Secretaries	1073	Supply Gap
Southwestern*	0						
Medical Admin/Executive Assistant and Medical Secretary	51.0716	Grossmont*	0				
		MiraCosta*	0				
Licensed Practical and Licensed Vocational Nurses	657	Supply Gap	322	Licensed Vocational Nursing	CIP 51.3901	Non-community college providers	260
					123020	MiraCosta	16
						San Diego City+	0
						Southwestern	27
Dental Assistants	540	Supply Gap	428	Dental Assistant	CIP 51.0601	Non-community college providers	367
					124010	Palomar	32
						San Diego Mesa	29
						Health Occupations Center (Adult Ed)**	0

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Medical and Clinical Laboratory Technicians	226	Supply Gap	42	Medical Laboratory Technology	120500	San Diego Miramar	29
Medical and Clinical Laboratory Technologists	130					Southwestern	13
Pharmacy Technicians	305	Supply Gap	150	Pharmacy Technology	CIP 51.0805	Non-community college providers	150
					122100	MiraCosta*	0
Health Technologists and Technicians, All Other	232	Supply Gap	22	Electro-Neurodiagnostic Technology	121200	N/A	N/A
				Orthopedic Assistant	121400	Grossmont	22
				Polysomnography	121100	N/A	N/A
Dental Hygienists	208	Supply Gap	59	Dental Hygiene/Hygienist	CIP 51.0602	Non-community college providers	39
				Dental Hygienist	124020	Southwestern	27
						Health Occupations Center (Adult Ed)**	0
Phlebotomists	206	Supply Gap	N/A	Phlebotomy	120510	San Diego Mesa*	0
Medical Records and Health Information Technicians	179	Oversupply	251	Health Information/Medical Records Technology/Technician	CIP 51.0707	Non-community college providers	97
				Health Information Technology	122300	San Diego Mesa	28
				Health Information Coding	CIP 51.0713	Non-community college providers	123
					122310	Southwestern	3
Radiologic Technologists	128	Supply Gap	64	Radiologic Technology	CIP 51.0911	Non-community college providers	27
					122500	San Diego Mesa	37
Physical Therapist Assistants	128	Supply Gap	49	Physical Therapist Assistant	CIP 51.0806	Non-community college providers	29
					122200	San Diego Mesa	20
Veterinary Technologists and Technicians	127	Oversupply	249	Veterinary Technician (Licensed)	CIP 51.0808	Non-community college providers	226
					010210	San Diego Mesa	23
Surgical Technologists	104	Supply Gap	55	Surgical Technician	CIP 51.0909	Non-community college providers	27
					121700	MiraCosta	13
						Southwestern	15

DEMAND AND SUPPLY DATA FOR MIDDLE-SKILL JOBS WITH ENTRY-LEVEL WAGES BELOW SELF-SUFFICIENCY: HEALTH

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OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Nursing Assistants	1591	Supply Gap	419	Certified Nurse Assistant	CIP 51.3902	Non-community college providers	25
					123030	MiraCosta	53
						San Diego Continuing Ed	320
						Southwestern	21
						Health Occupations Center (Adult Ed)**	0
Home Health Aides	893	Supply Gap	167	Home Health Aide	123080	MiraCosta	0
						San Diego Continuing Ed	167
						Health Occupations Center (Adult Ed)**	0
					CIP 51.2602	Non-community college providers	67
Massage Therapists	360	Supply Gap	238	Massage Therapy	CIP 51.3501	Non-community college providers	218
					126200	MiraCosta	20
Emergency Medical Technicians and Paramedics	176	Oversupply	302	Emergency Medical Services	125000	San Diego Miramar*	0
						Palomar*	0
						Southwestern*	0
						Health Occupations Center (Adult Ed)**	0
				Paramedic	125010	Southwestern	24
						Palomar	278
Emergency Medical Technology/Technician (EMT Paramedic)	51.0904	Non-community college providers	198				
Dietetic Technicians	36	Supply Gap	14	Dietetic Services and Management	130620	San Diego Mesa	14

DEMAND AND SUPPLY DATA FOR OTHER MIDDLE-SKILL JOBS: HEALTH CARE

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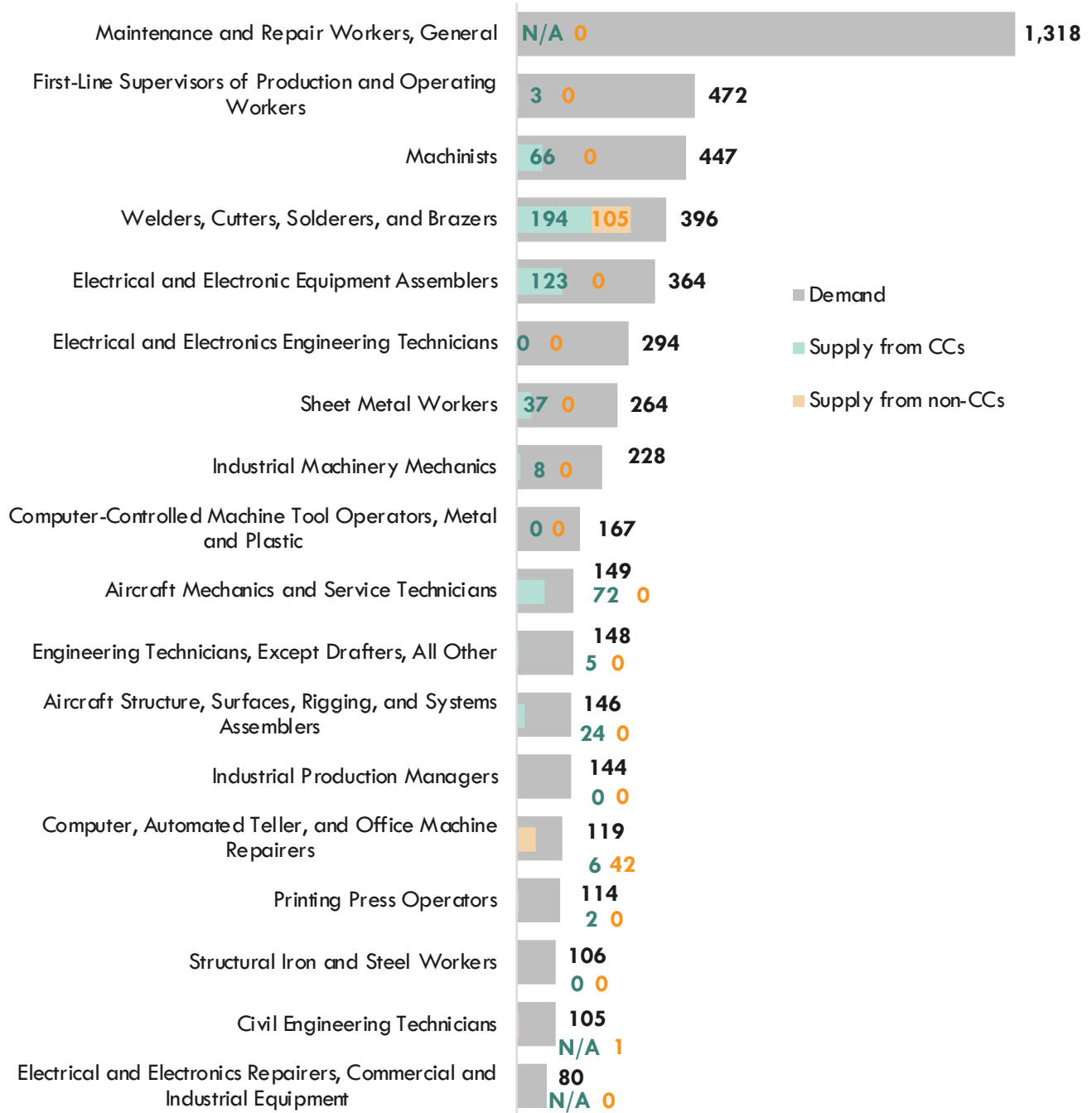
**Adult Ed has a program for this TOP code, but the COE does not have data on program supply

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Respiratory Therapists	88	Oversupply	173	Respiratory Care/Therapy	CIP 51.0908	Non-community college providers	152
					121000	Grossmont	21
Opticians, Dispensing	86	Supply Gap	N/A	N/A	N/A	N/A	N/A
Community Health Workers	86	Supply Gap	24	Community Health Care Worker	CIP 51.2208	Non-community college providers	24
					126100	San Diego City*	0
Occupational Therapy Assistants	84	Supply Gap	0	Occupational Therapy Technology	121800	Grossmont*	0
Medical Equipment Preparers	78	Supply Gap	0	Hospital Central Service Technician	120900	Southwestern*	0
Dental Laboratory Technicians	72	Supply Gap	N/A	Dental Laboratory Technician	124030	N/A	N/A
Ophthalmic Medical Technicians	58	Supply Gap	N/A	Optical Technology	121900	N/A	N/A
Diagnostic Medical Sonographers	54	Supply Gap	N/A	Diagnostic Medical Sonography	122700	N/A	N/A

ADVANCED MANUFACTURING

Advanced Manufacturing has the greatest number of top middle-skill jobs analyzed in this study. Eighteen top middle-skill jobs have an aggregate labor market demand of 5,061 annual job openings and program supply of 688 awards (Figure 8). That is a supply gap of 4,373 awards.

**Figure 8. Advanced Manufacturing Top Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



N/A indicates there is no community college program available

DEMAND AND SUPPLY DATA FOR TOP MIDDLE-SKILL JOBS: ADVANCED MANUFACTURING

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N/A indicates there is no community college program available

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Maintenance and Repair Workers, General	1,318	Supply Gap	0	Industrial Systems Technology and Maintenance	094500	N/A	0
First-Line Supervisors of Production and Operating Workers	472	Supply Gap	3	Management Development and Supervision	050630	Southwestern	3
				Industrial Systems Technology and Maintenance	094500	Palomar*	0
Machinists	447	Supply Gap	66	Machining and Machine Tools	095630	San Diego City	66
				Manufacturing and Industrial Technology	095600	Already accounted for	0
Welders, Cutters, Solderers, and Brazers	396	Supply Gap	299	Welding Technology/Welder	48.0508	Non-community college providers	105
				Welding Technology	095650	Palomar	47
						San Diego Continuing Ed+	147
Electrical and Electronic Equipment Assemblers	364	Supply Gap	123	Electronics and Electric Technology	093400	Cuyamaca*	0
						San Diego Continuing Ed	120
						Southwestern*	0
Electrical and Electronics Engineering Technicians	294					San Diego City	3
Sheet Metal Workers	264	Supply Gap	37	Sheet Metal and Structural Metal	095640	Palomar	16
						San Diego Continuing Ed	8
						San Diego City	13
Industrial Machinery Mechanics	228	Supply Gap	8	Manufacturing and Industrial Technology	095600	San Diego Continuing Ed+	0
Computer-Controlled Machine Tool Operators, Metal and Plastic	167	Supply Gap				San Diego City	8
Aircraft Mechanics and Service Technicians	149	Supply Gap	72	Aircraft Fabrication	095050	N/A	0
				Aeronautical and Aviation Technology	095000	San Diego Miramar	46
				Aviation Powerplant Mechanics	095020	San Diego Miramar	26
				Aviation Airframe Mechanics	095010	Already accounted for	0

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Engineering Technicians, Except Drafters, All Other	148	Supply Gap	5	Other Engineering and Related Industrial Technologies	099900	San Diego City+	4
						San Diego Mesa*	0
				Plastics and Composites	095420	N/A	0
				Engineering Technology, General	092400	N/A	0
				Engineering Technology, General	15.0000	Non-community college providers	1
				Industrial Electronics	093420	N/A	0
				Manufacturing and Industrial Technology	095600	Already accounted for	0
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	146	Supply Gap	24	Aviation Airframe Mechanics	095010	San Diego Miramar	24
				Aviation Powerplant Mechanics	095020	Already accounted for	0
				Aircraft Electronics (Avionics)	095040	N/A	0
				Aeronautical and Aviation Technology	095000	Already accounted for	0
Industrial Production Managers	144	Supply Gap	0	Management Development and Supervision	050630	Already accounted for	0
Computer, Automated Teller, and Office Machine Repairers	119	Supply Gap	48	Computer Installation and Repair Technology/Technician	47.0104	Non-community college providers	42
				Computer Electronics	093410	San Diego City+	5
						Southwestern+	1
Printing Press Operators	114	Supply Gap	2	Printing and Lithography	093600	Palomar	2
Structural Iron and Steel Workers	106	Supply Gap	0	Manufacturing and Industrial Technology	095600	Already accounted for	0
Civil Engineering Technicians	105	Supply Gap	1	Engineering Technology, General	15.0000	Non-community college providers	1
				Engineering Technology, General	092400	N/A	0
Electrical and Electronics Repairers, Commercial and Industrial Equipment	80	Supply Gap	0	Industrial Electronics	093420	N/A	0
				Electronics and Electric Technology	093400	N/A	0
				Computer Electronics	093410	Already accounted for	0

+The COE Supply Table indicates that this college has a program for this TOP code, but this college is not listed in the LaunchBoard

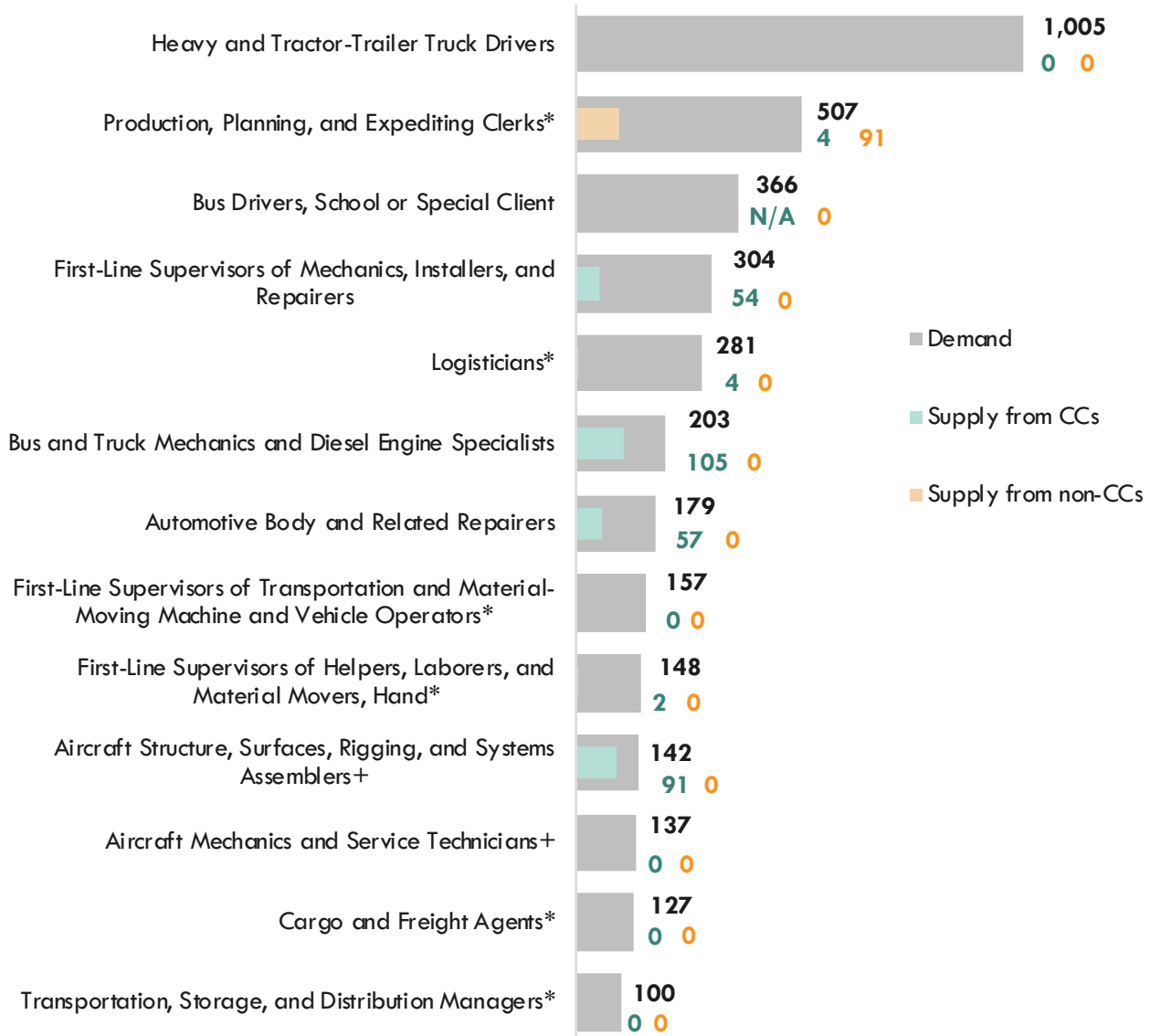
*LaunchBoard indicates that this college has a program for this TOP code, but this college is not listed in COE Supply Table

N/A indicates there is no community college program available

ADVANCED TRANSPORTATION & LOGISTICS

Figure 9 compares labor market demand for the top middle-skill jobs³ in Advanced Transportation and Logistics with program supply from the community colleges and non-community college providers in San Diego County.

**Figure 9. Advanced Transportation and Logistics Top Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



*indicates that these occupations overlap with the Global Trade sector

+indicates that these occupations overlap with the Advanced Manufacturing sector

³ Top middle-skill jobs have the most labor market demand, stable employment growth, and entry-level wages at or above the Self-Sufficiency Standard. The Self-Sufficiency Standard is the hourly wage that a single adult needs to earn to meet basic needs in San Diego County. selfsufficiency.org.

Program Supply for Cargo and Freight Agents

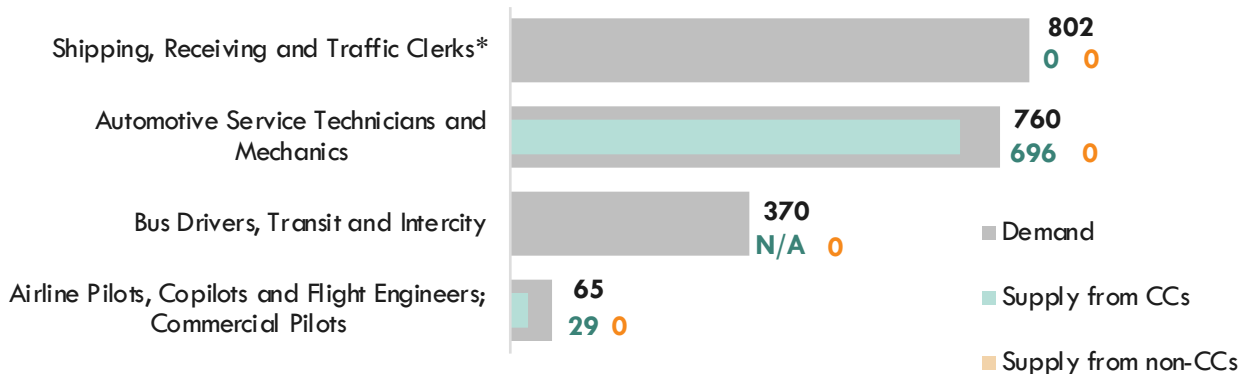
It is important to note that there are limitations in determining supply numbers for a particular occupation. Programs coded under a particular six-digit Taxonomy of Programs (TOP6) code may not necessarily train for the occupation that the TOP6 code is associated with. For example, Cargo and Freight Agents (SOC 43-5011) have two TOP6 codes associated with it:

SOC Code and Occupational Title	TOP6 Code	TOP6 Program Title
43-5011 Cargo and Freight Agents	051400	Office Technology/Office Computer Applications
	051000	Logistics and Materials Transportation

The awards supplied by Office Technology/Office Computer Applications programs in the region are not directly related to Cargo and Freight Agents and were removed from the demand and supply analysis.

Figure 10 and the following table illustrate other middle-skill jobs that have labor market demand in San Diego County. Shipping, Receiving and Traffic Clerks; Automotive Service Technicians and Mechanics; and Bus Drivers, Transit and Intercity have significant annual job openings but have entry-level earnings below the Self-Sufficiency Standard (living wage). Automotive Service Technicians and Mechanics include Automotive Master Mechanics (49-3023.01) and Automotive Specialty Technicians (493032.02). Automotive Specialty Technicians such as Lube Technicians earn minimum wages that lower the overall entry-level wages for the occupation. Pilots, Copilots and Flight Engineers and Commercial Pilots have 29 and 36 annual job openings, respectively, for an aggregate labor market demand of 65 annual openings. The region supplies 29 awards for these positions.

**Figure 10. Other Advanced Transportation Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



*Indicates that this occupation overlaps with the Global Trade sector

Occupational Table for Other Advanced Transportation Middle-Skill Jobs in San Diego County

SOC	OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	ENTRY-LEVEL WAGE (25 TH PERCENTILE)	MEDIAN WAGE
43-5071	Shipping, Receiving, and Traffic Clerks	802	\$12.51	\$15.63
49-3023	Automotive Service Technicians and Mechanics	760	\$11.76	\$17.29
53-3021	Bus Drivers, Transit and Intercity	370	\$12.50	\$14.89
53-2011	Airline Pilots, Copilots, and Flight Engineers	29	\$43.84	\$66.31
53-2012	Commercial Pilots	36	\$15.64	\$30.61

DEMAND AND SUPPLY DATA FOR TOP MIDDLE-SKILL JOBS: ADVANCED TRANSPORTATION & LOGISTICS

+The COE Supply Table indicates that this college supplies awards for this TOP code, but this college is not listed in the LaunchBoard

*LaunchBoard indicates that this college supplies awards for this TOP code, but this college is not listed in COE Supply Table

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Heavy and Tractor-Trailer Truck Drivers	1005	Supply Gap	0	Truck and Bus Driving	094750	N/A	0
Production, Planning, and Expediting Clerks	507	Supply Gap	95	Logistics, Materials, and Supply Chain Management	52.0203	Non-community college providers	91
				Logistics and Materials Transportation	051000	Southwestern	4
Bus Drivers, School or Special Client	366	Supply Gap	0	Truck and Bus Driving	094750	Already accounted for	0
First-Line Supervisors of Mechanics, Installers, and Repairers	304	Supply Gap	54	Electrical Systems and Power Transmission	093440	San Diego City	54
Logisticians	281	Supply Gap	0	Logistics and Materials Transportation	051000	Already accounted for	4
Bus and Truck Mechanics and Diesel Engine Specialists	203	Supply Gap	105	Diesel Technology	094700	Palomar	24
						San Diego Miramar	81
Automotive Body and Related Repairers	179	Supply Gap	57	Automotive Collision Repair	094900	Palomar	6
						San Diego Continuing Ed	51
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	157	Supply Gap	0	Logistics and Materials Transportation	051000	Already accounted for	0
First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	148	Supply Gap	2	Logistics and Materials Transportation	051000	Already accounted for	0
				Railroad and Light Rail Operations	094740	San Diego City+	2
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	142	Supply Gap	92	Aeronautical and Aviation Technology	095000	San Diego Miramar	42
Aircraft Mechanics and Service Technicians	132			Aviation Airframe Mechanics	095010	San Diego Miramar	24
				Aviation Powerplant Mechanics	095020	San Diego Miramar	26
Cargo and Freight Agents	127	Supply Gap	0	Logistics and Materials Transportation	051000	Already accounted for	0
Transportation, Storage, and Distribution Managers	100	Supply Gap	0	Logistics and Materials Transportation	051000	Already accounted for	0

DEMAND AND SUPPLY DATA FOR OTHER MIDDLE-SKILL JOBS: ADVANCED TRANSPORTATION & LOGISTICS

+The COE Supply Table indicates that this college supplies awards for this TOP code, but this college is not listed in the LaunchBoard

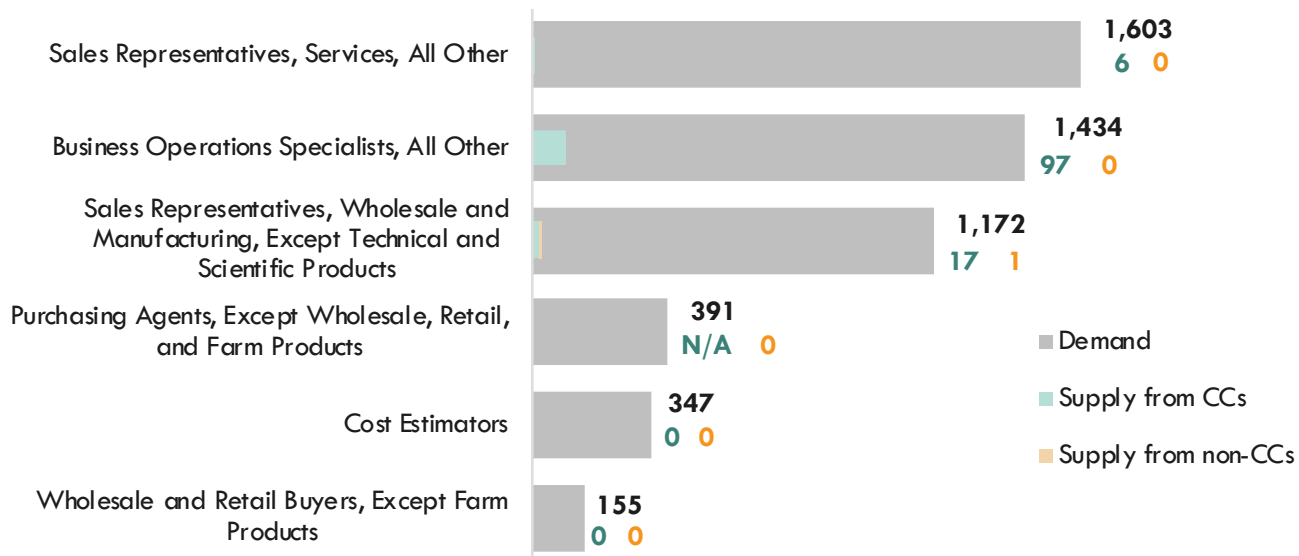
*LaunchBoard indicates that this college supplies awards for this TOP code, but this college is not listed in COE Supply Table

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Shipping, Receiving, and Traffic Clerks	802	Supply Gap	0	Logistics and Materials Transportation	051000	Already accounted for	0
Automotive Service Technicians and Mechanics	760	Supply Gap	696	Automotive Technology	094800	Cuyamaca	26
						MiraCosta	63
						Palomar	30
						San Diego Continuing Ed	393
						San Diego Miramar	149
				Southwestern	35		
				Alternative Fuels and Advanced Transportation Technology	094840	N/A	N/A
Bus Drivers, Transit and Intercity	370	Supply Gap	0	Truck and Bus Driving	094750	Already accounted for	0
Airline Pilots, Copilots, and Flight Engineers	29	Supply Gap	29	Piloting	302020	Palomar	4
Commercial Pilots	36	Supply Gap				Miramar	25

GLOBAL TRADE

Figure 11 compares labor market demand and supply for six top middle-skill jobs in the Global Trade sector. These occupations overlap with the Business and Entrepreneurship sector.

**Figure 11. Global Trade Top Middle-Skill Jobs:
Labor Market Demand vs. Program Supply
San Diego County**



N/A indicates there is no community college program available for the TOP6 code associated with that occupation.

Program Supply for Cost Estimators

It is important to note that there are limitations in determining supply numbers for a particular occupation. Programs coded under a particular six-digit Taxonomy of Programs (TOP6) code may not necessarily train for the occupation that the TOP6 code is associated with. For example, Cost Estimators (SOC 13-1051) have four TOP6 codes associated with the occupation:

SOC Code and Occupational Title	TOP6 Code	TOP6 Program Title
13-1051 Cost Estimators	050100	Business and Commerce, General
	050500	Business Administration
	050600	Business Management
	095200	Construction Crafts Technology

These four TOP6 codes train for a variety of occupations. The awards supplied by these TOP6 codes may not be directly related to Cost Estimators and were removed from the demand and supply analysis.

Similarly, a TOP6 code may be associated with more than one occupation. For example, International Business and Trade (TOP6 050800) trains for at least three different occupations:

TOP6 Code and Program Title	SOC Code	SOC Title
050800 International Business and Trade	13-1199	Business Operations Specialists, All Other
	13-1022	Wholesale and Retail Buyers, Except Farm Products
	41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products

Because a TOP6 code may train for more than one occupation, the program supply may be distributed among various occupations. However, for the purpose of this brief, each TOP6 code was accounted for only one occupation in order to not duplicate supply numbers.

DEMAND AND SUPPLY DATA FOR TOP MIDDLE-SKILL JOBS: GLOBAL TRADE

+The COE Supply Table indicates that this college supplies awards for this TOP code, but this college is not listed in the LaunchBoard

*LaunchBoard indicates that this college supplies awards for this TOP code, but this college is not listed in COE Supply Table

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Sales Representatives, Services, All Other	1,603	Supply Gap	6	Sales and Salesmanship	050940	Southwestern*	0
						MiraCosta*	0
						Palomar	1
						San Diego City	5
Business Operations Specialists, All Other	1,434	Supply Gap	97	Small Business and Entrepreneurship	050640	Cuyamaca	4
						MiraCosta	15
						Palomar*	0
						San Diego Continuing Ed	61
						San Diego City+	10
						Southwestern	1
				International Business and Trade	050800	Grossmont	3
						MiraCosta*	0
						Palomar	2
						Southwestern	1
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,172	Supply Gap	18	Sales and Salesmanship	050940	Already accounted for	0
				International Business and Trade	050800	Already accounted for	0
				Marketing and Distribution	050900	Grossmont	7
						MiraCosta	5
						San Diego City*	0
						San Diego Miramar*	0
						San Diego Continuing Ed*	0
						San Diego Mesa	4
				Southwestern	1		
Marketing/Marketing Management, General	CIP 52.1401	Non-community college provider	1				
Purchasing Agents, Except Wholesale, Retail, and Farm Products	391	Supply Gap	N/A	Purchasing	050920	N/A	N/A

OCCUPATIONAL TITLE	AVERAGE ANNUAL OPENINGS (2017-22)	SUPPLY GAP/ OVERSUPPLY	AVERAGE ANNUAL AWARDS (2015-17)	TOP6 TITLE	TOP6 OR CIP	COLLEGE	COLLEGE SUPPLY (3-YR AVG)
Cost Estimators	347	Supply Gap	622	Business Management	050600	Program does not necessarily train for Cost Estimators and was therefore omitted from the analysis	0
				Business and Commerce, General	050100	Program does not necessarily train for Cost Estimators and was therefore omitted from the analysis	0
				Business Administration	050500	Program does not necessarily train for Cost Estimators and was therefore omitted from the analysis	0
				Construction Crafts Technology	095200	Program does not necessarily train for Cost Estimators and was therefore omitted from the analysis	0
Wholesale and Retail Buyers, Except Farm Products	155	Supply Gap	0	Purchasing	050920	N/A	N/A
				International Business and Trade	050800	Already accounted for	0