

Drafting Technology

Inland Empire/Desert Region (Riverside-San Bernardino-Ontario Metropolitan Statistical Area) and Los Angeles County

Summary

- Employment for the drafting technology occupational group is expected to **decrease by 2% between 2017 and 2022** in the Inland Empire/Desert Region and Los Angeles County combined. Despite this projected decrease, nearly **3,600 job openings** will be available over the five-year timeframe.
- The entry-level wage for each occupation in the drafting technology occupational group is **above the MIT Living Wage estimate of \$12.30 per hour** for a single adult living in the Inland Empire/Desert Region.
- There appears to be an opportunity for program growth based on the average annual number of program completions for the selected community college programs (**52 average annual community college credentials**), and the annual openings for drafting technology occupations in the local region (**712 annual job openings**).

Introduction

This report details occupations relevant to the drafting technology program. This program prepares students for drafting occupations through the instruction of planning, preparation, and interpretation of various engineering sketches for design and drafting duties, for circuits, machines, structures, weldments, or architectural plans. In addition, the program strengthens students' applicable skills through the instruction of how to use computer software (Computer Assisted Drafting and Design) to create graphic representations and simulations. The occupations included in the drafting technology occupational group are:

- Architectural and Civil Drafters
- Electrical and Electronics Drafters
- Mechanical Drafters
- Drafters, All Other

Job Opportunities

In 2017, there were nearly 8,400 drafting technology jobs in the Inland Empire/Desert Region and Los Angeles County. This occupational group is projecting to decrease employment by 2% in the Inland Empire/Desert Region and Los Angeles County by 2022. Despite this projected decrease in new job creation, employers in the combined region will still need to hire nearly 3,600 workers over the next five years to backfill jobs that workers are permanently vacating (includes retirements). Appendix A, Tables 1 – 3 show the projected job growth, wages, education, training, and work experience required for each of the occupations in this group.

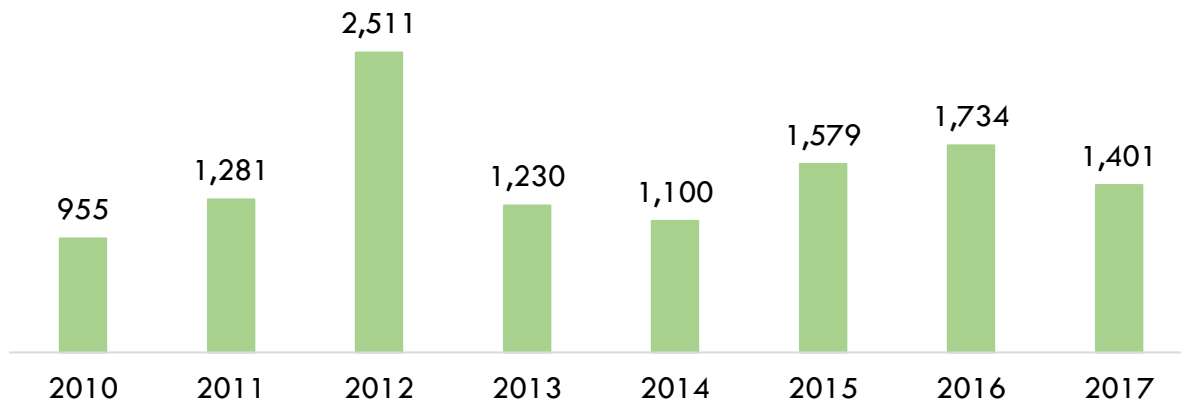
Exhibit 1: Five-year projections for the drafting technology occupational group in the Inland Empire/Desert Region and Los Angeles

Region	2017 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Inland Empire/Desert	2,039	3%	933	187	25%
Los Angeles	6,346	(4%)	2,624	525	26%
Combined	8,386	(2%)	3,558	712	26%

Source: EMSI 2018.2

Over the last 12 months (June 2017 to May 2018), there were 1,393 advertisements (ads) for jobs in the drafting technology occupational group in the Inland Empire/Desert Region. From 2010 to 2017, there was an annual average of 1,474 job ads per year (Exhibit 2).

Exhibit 2: Number of online job postings for the drafting technology occupational group in the Inland Empire/Desert Region and Los Angeles County, 2010 to 2017



Source: Burning Glass – Labor Insights

On average, local employers fill online job posting for the drafting technology occupational group within 46 days. This regional average is within two days of the national average, indicating that it is neither relatively easy nor difficult for local employers to find qualified candidates. Exhibit 3 shows the number of job ads posted during the last 12 months along with the regional and national average time to fill.

Exhibit 3: Job ads by each of the drafting technology occupations in the Inland Empire/Desert Region and Los Angeles County and time to fill, June 2017 – May 2018

Occupation	Job Ads	Regional Average Time to Fill (Days)	National Average Time to Fill (Days)
Drafters, All Other	645	51	42
Mechanical Drafters	351	44	39
Architectural and Civil Drafters	200	38	44
Electrical and Electronics Drafters	197	48	47
TOTAL	1,393	-	-

Source: Burning Glass – Labor Insights

Earnings

The entry-level wage for each of the occupations in the drafting technology occupational group is above the MIT Living Wage estimate of \$12.30 per hour for a single adult living in the Inland Empire/Desert Region. Median wages for these occupations are sufficient for an adult living in a household with one other working adult and one child (\$14.50 per hour, per adult or \$30,160 annually for each adult). Exhibit 4 displays wage information for this occupational group in the Inland Empire/Desert Region and Los Angeles County.

Exhibit 4: Earnings for the drafting technology occupational group in the Inland Empire/Desert Region and Los Angeles County

Occupation	Area	Entry to Experienced Hourly Earnings Range*	Median Wage*	Avg. Annual Earnings
Electrical and Electronics Drafters	IE/Desert	\$24.60 to \$36.19	\$30.15	\$62,800
	Los Angeles	\$25.59 to \$38.09	\$31.76	\$67,200
Drafters, All Other	IE/Desert	\$22.41 to \$29.26	\$26.51	\$54,600
	Los Angeles	\$23.11 to \$35.72	\$27.36	\$62,100

Occupation	Area	Entry to Experienced Hourly Earnings Range*	Median Wage*	Avg. Annual Earnings
Architectural and Civil Drafters	IE/Desert	\$18.20 to \$29.60	\$24.15	\$51,500
	Los Angeles	\$23.19 to \$35.61	\$27.99	\$61,100
Mechanical Drafters	IE/Desert	\$18.12 to \$28.71	\$22.67	\$50,000
	Los Angeles	\$22.02 to \$33.14	\$26.57	\$58,800

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.

Employers, Skills, and Education

Exhibit 5 displays the top employers posting job ads for each occupation during the last 12 months.

Exhibit 5: The top employers for the drafting technology occupational group in the Inland Empire/Desert Region and Los Angeles County during the last 12 months, June 2017 – May 2018

Occupation	Top Employers
Drafters, All Other (n=369)	<ul style="list-style-type: none"> Edison International SpaceX Parsons Brinckerhoff
Mechanical Drafters (n=161)	<ul style="list-style-type: none"> Parsons Brinckerhoff Husmann Corporation PEAK Technical Staffing
Architectural and Civil Drafters (n=139)	<ul style="list-style-type: none"> AMPAM Parks Mechanical Parsons Brinckerhoff Psomas
Electrical and Electronics Drafters (n=129)	<ul style="list-style-type: none"> Jacobs Engineering Group Incorporated Northrop Grumman The Aerospace Corporation

Source: Burning Glass – Labor Insights

Exhibit 6 lists a sample of in-demand specialized and soft skills that employers are seeking when looking for workers to fill drafting technology positions.

Exhibit 6: Sample of in-demand skills from employer job ads for drafting technology occupations in the Inland Empire/Desert Region and Los Angeles County, June 2017 – May 2018

Occupation	Specialized skills	Soft skills	Software and Programming skills
Drafters, All Other (n=548)	<ul style="list-style-type: none"> AutoCAD Computer Aided Drafting/Design (CAD) Engineering Design 	<ul style="list-style-type: none"> Communication Skills Detail-Oriented Organizational Skills 	<ul style="list-style-type: none"> Microsoft Office SolidWorks Revit
Mechanical Drafters (n=275)	<ul style="list-style-type: none"> AutoCAD 3D Modeling/Design Project Management 	<ul style="list-style-type: none"> Communication Skills Organizational Skills Creativity 	<ul style="list-style-type: none"> Revit SolidWorks Microsoft Office
Architectural and Civil Drafters (n=164)	<ul style="list-style-type: none"> AutoCAD Plumbing Project Management 	<ul style="list-style-type: none"> Communication Skills Organization Skills Research 	<ul style="list-style-type: none"> Revit Adobe Photoshop Microsoft Office
Electrical and Electronics Drafters (n=187)	<ul style="list-style-type: none"> Electrical Design Calculation Wiring 	<ul style="list-style-type: none"> Communication Skills Troubleshooting Planning 	<ul style="list-style-type: none"> AutoCAD Microsoft Office Revit

Source: Burning Glass – Labor Insights

Exhibit 7 displays the entry-level education level education typically required to enter each occupation according to the Bureau of Labor Statistics, educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census, and the minimum advertised education requirement requested by employers in online job ads.

Exhibit 7: Educational attainment and online job ads with minimum advertised education requirements for the drafting technology occupational group in the Inland Empire/Desert Region and Los Angeles County, June 2017 – May 2018

Occupation	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
			Number of Job Postings (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Drafters, All Other	Associate degree	61%	343	19%	41%	40%
Mechanical Drafters	Associate degree	61%	160	24%	28%	48%
Architectural and Civil Drafters	Associate degree	61%	106	20%	32%	48%
Electrical and Electronics Drafters	Associate degree	61%	125	13%	26%	61%

Source: EMSI 2018.2, Burning Glass – Labor Insights

*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

Student Completions

Exhibit 8 shows the annual average regional community college credentials (associate degrees and certificates) conferred during the three academic years between 2014 and 2017, with the relevant TOP code as well as the program title used at each college, sourced from the Chancellor’s Office Curriculum Inventory (COCI). Please note, a credential is not equivalent to a single person in search of a job opening since a student may earn more than one credential, such as an associate degree in addition to a certificate. Community College student outcome information was obtained from the CTE LaunchBoard based on the selected TOP code(s) and region.

Exhibit 8: Annual average community college student completions for drafting technology programs in the Inland Empire/Desert Region

0953.00 Drafting Technology	Annual Community College Headcount (2016-17)	Community College Annual Average Credentials (2014-17)
Chaffey	118	
Desert – General Drafting	112	
Associate Degree		1
Certificate 30 to < 60 semester units		1
Mt. San Jacinto – Engineering: Drafting Technology/Engineering Technologist Support	71	
Associate Degree		3
Certificate 30 to < 60 semester units		1
Norco College – Drafting Technology	267	
Associate Degree		4
Certificate 18 to < 30 semester units		6
Certificate 6 to < 18 semester units		16
Victor Valley – Drafting/Computer Aided Drafting	320	
Associate Degree		17
Total Community College Headcount (2016-17)	886	
Total Annual Average Community College Credentials (2014-17)		50

Source: LaunchBoard, IPEDS, COCI

0953.00 Drafting Technology program Strong Workforce outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 1,114 (CA Median: 1,284) [2016-17]
- Number of students who transferred to a 4-year institution: 60 (CA: 97)
- Employed in the second fiscal quarter after exit: 65% (CA: 69%)
- Median earnings in the second fiscal quarter after exit: \$10,087 (CA: \$8,606)
- Employed in the fourth fiscal quarter after exit: 66% (CA: 68%)
- Job closely related to field of study: 92% (CA: 70%) [2014-15]
- Median annual earnings: \$42,341 (CA: \$32,987)
- Median change in earnings: 48% (CA: 48%)
- The proportion of students who attained a living wage: 61% (CA: 61%)

Exhibit 9: Annual average community college student completions for mechanical drafting programs in the Inland Empire/Desert Region

0953.40 Mechanical Drafting	Annual Community College Headcount (2016-17)	Community College Annual Average Credentials (2014-17)
Chaffey – Drafting Technician: Mechanical	18	
Associate Degree		2
Mt. San Jacinto	14	
San Bernardino Valley	10	
Total Community College Headcount (2016-17)	42	
Total Annual Average Community College Credentials (2014-17)		2

Source: LaunchBoard, IPEDS, COCI

0953.40 Mechanical Drafting program Strong Workforce outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 42 (CA Median: 74) [2016-17]
- Number of students who transferred to a 4-year institution: N/A (CA: 17)
- Employed in the second fiscal quarter after exit: 56% (CA: 76%)
- Median earnings in the second fiscal quarter after exit: \$8,663 (CA: \$8,663)
- Employed in the fourth fiscal quarter after exit: N/A (CA: 90%)
- Job closely related to field of study: N/A (CA: 88%) [2014-15]
- Median annual earnings: \$34,910 (CA: \$35,735)
- Median change in earnings: 15% (CA: 31%)
- The proportion of students who attained a living wage: N/A (CA: 70%)

Sources

O*Net Online
 Labor Insight/Jobs (Burning Glass)
 Economic Modeling Specialists International (EMSI)
 CTE LaunchBoard
 MIT Living Wage Calculator
 Chancellor’s Office Curriculum Inventory (COCI, version 2.0)
 The Integrated Postsecondary Education Data System (IPEDS)

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

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

Architectural and Civil Drafters (17-3011)

Prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Use knowledge of building materials, engineering practices, and mathematics to complete drawings.

Sample job titles: Architectural Drafter, Architectural Draftsman, CAD Technician (Computer-Aided Design Technician), Drafter, Draftsman, Civil CAD Designer (Civil Computer Aided Design Designer), Civil CAD Tech (Civil Computer-Aided Design Technician), Civil Drafter, Computer-Aided Design Operator (CAD Operator), Computer-Aided Design Technician (CAD Technician), Computer-Aided Drafting and Design Drafter (CADD Drafter), Drafting Technician

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 61%

Electrical and Electronics Drafters (17-3012)

Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment.

Sample job titles: Design Drafter, Drafter, Integrated Circuit IC Layout Designer (IC Layout Designer), Layout Designer, Mask Designer, Printed Circuit Board PCB Designer (PCB Designer), Printed Circuit Board PCB Draftsman (PCB Draftsman), Senior Designer, Senior Printed Circuit Board PCB Designer, Associate Drafter, CAD Operator (Computer Aided Design Operator), CAD Technician (Computer Aided Drafting Technician), Electrical Designer, Electrical Drafter, Engineering Associate

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 61%



Mechanical Drafters (17-3013)

Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.

Sample job titles: CAD Designer (Computer Aided Design Designer), CAD Operator (Computer Aided Design Operator), Design Drafter, Designer, Drafter, Drafting Technician, Mechanical Designer, Mechanical Drafter, Product Designer, Project Designer

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 61%

Drafters, All Other (17-3019)

All drafters not listed separately.

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 61%



Table 1. 2017 to 2022 job growth, wages, education, training, and work experience required for the drafting technology occupational group, Inland Empire/Desert Region

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Architectural and Civil Drafters (17-3011)	1,128	28	2%	102	\$18.20 to \$29.60	\$24.15	\$51,500	Associate degree & none	None
Mechanical Drafters (17-3013)	472	8	2%	42	\$18.12 to \$28.71	\$22.67	\$50,000	Associate degree & none	None
Electrical and Electronics Drafters (17-3012)	365	19	5%	35	\$24.60 to \$36.19	\$30.15	\$62,800	Associate degree & none	None
Drafters, All Other (17-3019)	74	6	8%	8	\$22.41 to \$29.26	\$26.51	\$54,600	Associate degree & none	None
Total	2,039	61	3%	187	-	-	-	-	-

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.



Table 2. 2017 to 2022 job growth, wages, education, training, and work experience required for the drafting technology occupational group, Los Angeles County

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Architectural and Civil Drafters (17-3011)	4,227	(154)	(4%)	350	\$23.19 to \$35.61	\$27.99	\$61,100	Associate degree & none	None
Mechanical Drafters (17-3013)	1,042	(70)	(7%)	85	\$22.02 to \$33.14	\$26.57	\$58,800	Associate degree & none	None
Electrical and Electronics Drafters (17-3012)	782	(26)	(3%)	65	\$25.59 to \$38.09	\$31.76	\$67,200	Associate degree & none	None
Drafters, All Other (17-3019)	295	0	0%	25	\$23.11 to \$35.72	\$27.36	\$62,100	Associate degree & none	None
Total	6,346	(251)	(4%)	525	-	-	-	-	-

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.



Table 3. 2017 to 2022 job growth, wages, education, training, and work experience required for the drafting technology occupational group, Los Angeles, Riverside, and San Bernardino counties combined

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Architectural and Civil Drafters (17-3011)	5,355	(126)	(2%)	452	\$22.04 to \$34.58	\$27.14	\$59,100	Associate degree & none	None
Mechanical Drafters (17-3013)	1,514	(62)	(4%)	127	\$20.46 to \$31.63	\$25.54	\$56,000	Associate degree & none	None
Electrical and Electronics Drafters (17-3012)	1,147	(7)	(1%)	101	\$25.20 to \$37.56	\$31.26	\$65,800	Associate degree & none	None
Drafters, All Other (17-3019)	369	5	1%	33	\$22.99 to \$34.18	\$27.13	\$60,600	Associate degree & none	None
Total	8,386	(190)	(2%)	712	-	-	-	-	-

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.