

# Drafting Technology

*Inland Empire/Desert Region (Riverside and San Bernardino counties)*

*This workforce demand report uses state and federal job projection data developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.*

## Summary



## Introduction

This report provides labor market occupational demand and wages research and postsecondary program outcomes related to drafting technology. California Community College drafting technology (TOP 0953.00) programs prepare students for employment through instruction related to the planning, preparation, and interpretation of various engineering sketches for design and drafting duties, for circuits, machines, structures, weldments, or architectural plans. These programs include the application of advanced computer software

and hardware (Computer Assisted Drafting and Computer Assisted Design) to the creation of graphic representations and simulations in support of engineering projects (Taxonomy of Programs, 2012). There are a variety of community college programs related to drafting:

1. Drafting Technology (TOP 0953.00)
2. Architectural Drafting (0953.10)
3. Civil Drafting (0953.20)
4. Electrical, Electronic, and Electro-Mechanical Drafting (0953.30)
5. Mechanical Drafting (0953.40)

The knowledge, skills, and abilities trained by drafting technology programs lead to three community college-level occupations, collectively referred to as the drafting occupational group. Between 53% and 57% of incumbent workers in these occupations have a community college-level education, some college or an associate degree, as their highest level of educational attainment. The occupations included in the drafting occupational group are:

- Architectural and Civil Drafters (SOC 17-3011)
- Electrical and Electronics Drafters (17-3012)
- Mechanical Drafters (17-3013)

## Job Counts and Projections

In 2020, there were 1,927 total drafting jobs in the region. Employment for the drafting occupational group is projected to increase by 4% through 2025, with 202 job openings expected annually. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers aged 55 years and greater in the region.

*Exhibit 1: Five-year projections for the drafting occupational group, 2020-2025*

Occupation	2020 Jobs	2025 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Architectural and Civil Drafters	1,101	1,170	6%	600	120	24%
Mechanical Drafters	523	522	0%	250	50	28%
Electrical and Electronics Drafters	303	317	5%	160	32	25%
<b>Total</b>	<b>1,927</b>	<b>2,009</b>	<b>4%</b>	<b>1,010</b>	<b>202</b>	<b>25%</b>

Source: Emsi 2022.1

An online job advertisement search for drafting jobs was conducted to reveal the details about the employers seeking these workers, including the time it takes to fill positions, earnings information, and in-demand skills.

Over the previous 12 months, fewer than 100 advertisements were posted for architectural and civil drafters and electrical and electronics drafters in the region. To ensure there were sufficient advertisements from which to obtain reliable advertisement information, the job search for these occupations was expanded to include all advertisements posted in California.

Exhibit 2 shows the number of job ads posted during the last 12 months and the regional and statewide average time to fill this job. Regional employers spent an average of 35 days filling online job advertisements for mechanical drafters, six days less than the statewide time to fill. Time to fill information reveals that regional employers likely face fewer challenges filling open mechanical drafter positions than other employers in California.

*Exhibit 2: Job ads and time to fill*

Occupation	Job Ads	Regional Average Time to Fill (Days)	Statewide Average Time to Fill (Days)
Electrical and Electronics Drafters*	1,912	-	42
Architectural and Civil Drafters*	755	-	44
Mechanical Drafters	101	35	41
<b>Total</b>	<b>2,768</b>	<b>35</b>	<b>42</b>

Source: Burning Glass – Labor Insights

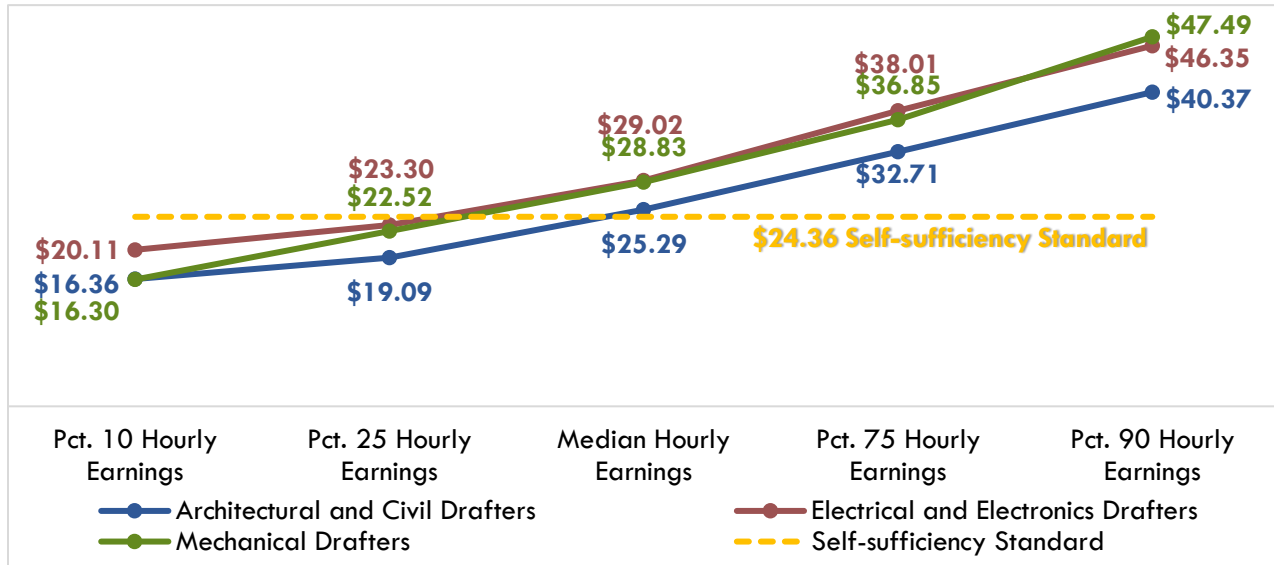
\*California job advertisement information

## Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide self-sustainable income. The University of Washington estimates that a self-sufficient hourly rate for a single adult with one school-age child is \$24.36 per hour or \$51,452 annually in Riverside County; \$23.73 per hour or \$50,119 annually in San Bernardino County (Pearce, 2021). For this study, the higher hourly earnings requirement in Riverside County is adopted as the self-sufficiency standard for the two-county region.

Exhibit 3 displays the hourly earnings for the drafting occupational group in the Inland Empire/Desert Region. The median hourly earnings for the drafting occupational group surpass the regional self-sufficiency standard, indicating that at least 50% of workers earn a self-sustainable wage.

Exhibit 3: Hourly earnings by percentile



Source: Emsi 2022.1

Benefits information, provided by the occupational guides developed by the California Labor Market Information Division, is only available for architectural and civil drafters. Benefits for architectural and civil drafters often include sick leave, vacation, health insurance, and retirement plans (Detailed Occupational Guides, 2022).

### Advertised Salary from Online Job Ads

Exhibit 4 displays online job ad salary data for the drafting occupational group over the last 12 months. Online job ad salary information reveals that employers are willing to pay the drafting occupational group an average annual salary between \$53,000 and \$84,000, above the region's \$51,452 annual (\$24.36 hourly) self-sufficiency standard. Consider the salary information with caution since only 34% (936 out of 2,768) of online job advertisements for these occupations provided salary information. The salary figures are prorated to reflect full-time, annual earnings status.

Exhibit 4: Advertised salary information

Occupation	Number of job ads	Real-Time Salary Information				Average Annual Salary
		Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	
Mechanical Drafters	57	-	46%	51%	3%	\$53,000
Electrical and Electronics Drafters*	469	4%	17%	67%	52%	\$84,000
Architectural and Civil Drafters*	410	3%	32%	47%	18%	\$59,000

Source: Burning Glass – Labor Insights

\*California job advertisement information

## Employers, Skills, Education, and Work Experience

Exhibit 5 displays the employers who posted the most job ads for the drafting occupational group over the last 12 months. Showing employer names provides some insight into where students may find employment after completing a program. RoadSafe Traffic Systems posted the most advertisements for the drafting occupational group in the region, primarily seeking civil drafters (CAD Designer – (Civil/Traffic)).

*Exhibit 5: Employers posting the most job ads for the drafting occupational group*

Occupation	Top Employers	
Mechanical Drafters (n=101)	<ul style="list-style-type: none"> <li>• Actalent</li> <li>• Coneybeare LLC</li> <li>• CDM Smith</li> </ul>	<ul style="list-style-type: none"> <li>• Cryoworks Inc</li> <li>• Superior Tank Company</li> </ul>
Electrical and Electronics Drafters* (n=1,912)	<ul style="list-style-type: none"> <li>• Intel Corporation</li> <li>• Apple, Inc.</li> <li>• Qualcomm</li> <li>• Skyworks</li> <li>• nSys Design Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced Micro Devices, Inc.</li> <li>• Actalent</li> <li>• Texas Instruments</li> <li>• Raytheon</li> <li>• Marvell Technology, Inc.</li> <li>• UST</li> </ul>
Architectural and Civil Drafters* (n=755)	<ul style="list-style-type: none"> <li>• HCI Systems, Inc.</li> <li>• Actalent</li> <li>• Kennedy Jenks Consultants</li> <li>• Coffman Engineers</li> </ul>	<ul style="list-style-type: none"> <li>• Tetra Tech</li> <li>• RoadSafe Traffic Systems, Inc.</li> <li>• Rick Engineering</li> <li>• IMEG Incorporated</li> </ul>

Source: Burning Glass – Labor Insights

\*California job advertisement information

Exhibit 6 lists a sample of specialized, employability, and software and programming skills employers seek when looking for workers to fill drafting occupational group positions. Specialized skills are occupation-specific skills that employers request for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job ads may be utilized to guide curriculum development.

Computer-aided drafting/design (CAD) is a common specialized skill for the mechanical drafters and architectural and civil drafters occupations. All three occupations commonly require AutoCAD software skills, according to online job ads.

*Exhibit 6: Sample of in-demand skills from employer job ads*

Occupation	Specialized Skills	Employability Skills	Software and Programming Skills
Mechanical Drafters (n=94)	<ul style="list-style-type: none"> <li>• Computer-Aided Drafting/Design (CAD)</li> <li>• 3D Modeling/Design</li> <li>• Mechanical Engineering</li> <li>• Mechanical Design</li> <li>• Calculation</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Teamwork/ Collaboration</li> <li>• Problem Solving</li> <li>• Detail-Oriented</li> <li>• Organizational Skills</li> </ul>	<ul style="list-style-type: none"> <li>• AutoCAD</li> <li>• SolidWorks</li> <li>• Revit</li> <li>• Microsoft Excel</li> </ul>
Electrical and Electronics Drafters* (n=1,876)	<ul style="list-style-type: none"> <li>• Simulation</li> <li>• Circuit Design</li> <li>• Analog Design</li> <li>• Schematic Diagrams</li> <li>• Computer Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Teamwork/ Collaboration</li> <li>• Problem Solving</li> <li>• Detail-Oriented</li> <li>• Planning</li> </ul>	<ul style="list-style-type: none"> <li>• AutoCAD</li> <li>• Microsoft Office</li> <li>• Python</li> <li>• PERL Scripting Language</li> <li>• Debugging</li> </ul>
Architectural and Civil Drafters* (n=716)	<ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Computer-Aided Drafting/Design (CAD)</li> <li>• Calculation</li> <li>• Project Management</li> <li>• Plumbing Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Detail-Oriented</li> <li>• Teamwork/ Collaboration</li> <li>• Organizational Skills</li> <li>• Planning</li> </ul>	<ul style="list-style-type: none"> <li>• AutoCAD</li> <li>• Revit</li> <li>• Microsoft Office</li> <li>• Civil 3D</li> <li>• Autodesk</li> </ul>

Source: Burning Glass – Labor Insights

\*California job advertisement information

Exhibit 7 displays the typical entry-level education, educational attainment, and minimum advertised education requirements for the drafting occupational group. According to the Bureau of Labor Statistics, between 53% and 57% of incumbent workers in this field hold a community college-level of educational attainment; "some college, no degree," and an "associate degree." Between 13% and 37% of employers posting job advertisements for the drafting occupational group sought candidates with an associate degree.

*Exhibit 7: Typical entry-level education, educational attainment, and minimum advertised education requirements*

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Number of Job Ads	Real-Time Minimum Advertised Education Requirement		
				High school or vocational training	Associate degree	Bachelor's degree or higher
Mechanical Drafters	Associate degree	57%	59	31%	37%	32%
Electrical and Electronics Drafters**	Associate degree	57%	1,463	10%	13%	77%
Architectural and Civil Drafters**	Associate degree	53%	480	20%	30%	50%

Source: Emsi 2021.4, Burning Glass – Labor Insights

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

\*\*California job advertisement information

Exhibit 8 displays the work experience typically required to enter each occupation and the real-time work experience requirements from employer job ads. Over the last twelve months, between 26% and 46% of employers sought candidates with zero to two years of previous work experience.

*Exhibit 8: Work experience required and real-time work experience requirements*

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of job ads	0 – 2 years	3 – 5 years	6+ years
Mechanical Drafters	None	72	46%	42%	12%
Electrical and Electronics Drafters*	None	1,376	26%	38%	36%
Architectural and Civil Drafters*	None	504	40%	43%	17%

Source: Burning Glass – Labor Insights

\*California job advertisement information

## Student Completions and Programs Outcomes

The drafting occupational group may receive training from a variety of community college programs. Exhibit 9 displays regional drafting training opportunities. Community college programs related to drafting include:

- Drafting Technology (0953.00)
- Architectural Drafting (0953.10)
- Civil Drafting (0953.20)
- Electrical, Electronic, and Electro-Mechanical Drafting (0953.30)
- Mechanical Drafting (0953.40)

*Exhibit 9: Drafting programs offered at regional community colleges*

College	Drafting Technology (TOP 0953.00)	Architectural Drafting (0953.10)	Civil Drafting (0953.20)	Electrical, Electronic, and Electro-Mechanical Drafting (0953.30)	Mechanical Drafting (0953.40)
Barstow					
Chaffey		X			X
Copper Mountain	X				
Crafton Hills					
College of the Desert	X				
Moreno Valley					
Mt. San Jacinto	X				
Norco	X	X			X
Palo Verde					
Riverside City					
San Bernardino Valley				X	
Victor Valley	X	X			
<b>Count of Programs</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>2</b>
<b>Average Annual Awards</b>	<b>48</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>9</b>

Source: COE Program Inventory

Exhibit 10 displays student completions for drafting technology (TOP 0953.00) programs over the last three academic years (2018-21). In the previous three academic years, regional community colleges have issued 48 awards annually in drafting technology programs. Copper Mountain College has no known drafting technology program awards between the 2018 and 2021 academic years. Program completion and student outcome methodologies are found in the appendix.

*Exhibit 10: 2018-21, Annual average community college awards for drafting technology programs in the region*

<b>TOP 0953.00 – Drafting Technology</b>	<b>Academic Year 2018-19</b>	<b>Academic Year 2019-20</b>	<b>Academic Year 2020-21</b>	<b>Total CC Annual Average Awards, Academic Years 2018-21</b>
<b>College of the Desert</b>				<b>0</b>
Certificate 30 < 60 semester units	0	0	1	0
<b>Mt. San Jacinto</b>				<b>6</b>
Associate Degree	6	3	2	4
Certificate 30 < 60 semester units	5	0	0	2
Certificate 16 < 30 semester units	0	1	0	0
<b>Norco College</b>				<b>28</b>
Associate Degree	12	8	3	8
Certificate 18 < 30 semester units	16	0	0	5
Certificate 16 < 30 semester units	0	8	2	3
Certificate 6 < 18 semester units	21	9	5	12
<b>Victor Valley</b>				<b>14</b>
Associate Degree	8	18	11	12
Certificate 16 < 30 semester units	0	5	0	2
<b>Total</b>	<b>68</b>	<b>52</b>	<b>24</b>	<b>48</b>

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 11. The outcome methodology is available in the appendix section of this report.

*Exhibit 11: 0953.00 – Drafting technology strong workforce program outcomes*

<b>Strong Workforce Program Metrics: 0953.00 – Drafting Technology Academic Year 2018-19, unless noted otherwise</b>	<b>Inland Empire/Desert Region</b>	<b>California</b>
Unduplicated count of enrolled students (2019-20)	650	8,059
Completed 9+ career education units in one year (2019-20)	24%	28%
Perkins Economically disadvantaged students (2019-20)	81%	75%
Students who attained a noncredit workforce milestone in a year (2019-20)	-	46%
Students who earned a degree, certificate, or attained apprenticeship (2019-20)	32	229
Transferred to a four-year institution (transfers)	43	479
Job closely related to the field of study (2017-18)	63%	67%
Median annual earnings (all exiters)	\$34,120	\$40,984
Median change in earnings (all exiters)	25%	26%
Attained a living wage (completers and skills-builders)	64%	61%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 12 displays student completions for architectural drafting (TOP 0953.10) programs over the last three academic years. In the previous three academic years, regional community colleges have issued five awards annually in architectural drafting programs. Norco College's architectural drafting program was developed in December 2020 and did not report awards in the 2020-21 academic year.

*Exhibit 12: 2018-21, Annual average community college awards for architectural drafting programs in the region*

<b>TOP 0953.10 – Architectural Drafting</b>	<b>Academic Year 2018-19</b>	<b>Academic Year 2019-20</b>	<b>Academic Year 2020-21</b>	<b>Total CC Annual Average Awards, Academic Years 2018-21</b>
<b>Chaffey</b>				<b>3</b>
Associate Degree	1	3	4	3
Certificate 30 < 60 semester units	0	1	0	0
Certificate 16 < 30 semester units	0	0	1	0
<b>Victor Valley</b>				<b>1</b>
Certificate 16 < 30 semester units	0	4	0	1
<b>Total</b>	<b>1</b>	<b>8</b>	<b>5</b>	<b>5</b>

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 13.

*Exhibit 13: 0953.10 – Architectural drafting strong workforce program outcomes*

<b>Strong Workforce Program Metrics: 0953.10 – Architectural Drafting Academic Year 2018-19, unless noted otherwise</b>	<b>Inland Empire/Desert Region</b>	<b>California</b>
Unduplicated count of enrolled students (2019-20)	55	1,474
Completed 9+ career education units in one year (2019-20)	40%	42%
Perkins Economically disadvantaged students (2019-20)	95%	77%
Students who attained a noncredit workforce milestone in a year (2019-20)	-	35%
Students who earned a degree, certificate, or attained apprenticeship (2019-20)	-	54
Transferred to a four-year institution (transfers)	-	54
Job closely related to the field of study (2017-18)	-	91%
Median annual earnings (all exiters)	\$30,912	\$33,868
Median change in earnings (all exiters)	-	38%
Attained a living wage (completers and skills-builders)	-	52%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 14 displays student completions for mechanical drafting (TOP 0953.40) programs over the last three academic years. In the previous three academic years, regional community colleges have issued nine awards annually in mechanical drafting programs.

*Exhibit 14: 2018-21, Annual average community college awards for mechanical drafting programs in the region*

<b>TOP 0953.40 – Mechanical Drafting</b>	<b>Academic Year 2018-19</b>	<b>Academic Year 2019-20</b>	<b>Academic Year 2020-21</b>	<b>Total CC Annual Average Awards, Academic Years 2018-21</b>
<b>Chaffey</b>				<b>3</b>
Associate Degree	5	0	4	3
<b>San Bernardino</b>				<b>6</b>
Certificate 6 < 18 semester units	15	0	3	6
<b>Total</b>	<b>20</b>	<b>0</b>	<b>7</b>	<b>9</b>

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 15.

*Exhibit 15: 0953.40 – Mechanical drafting strong workforce program outcomes*

<b>Strong Workforce Program Metrics: 0953.40 – Mechanical Drafting Academic Year 2018-19, unless noted otherwise</b>	<b>Inland Empire/Desert Region</b>	<b>California</b>
Unduplicated count of enrolled students (2019-20)	59	993
Completed 9+ career education units in one year (2019-20)	24%	29%
Perkins Economically disadvantaged students (2019-20)	83%	73%
Students who attained a noncredit workforce milestone in a year (2019-20)	-	35%
Students who earned a degree, certificate, or attained apprenticeship (2019-20)	-	50
Transferred to a four-year institution (transfers)	-	30
Job closely related to the field of study (2017-18)	-	69%
Median annual earnings (all exiters)	\$47,028	\$47,888
Median change in earnings (all exiters)	4%	38%
Attained a living wage (completers and skills-builders)	68%	72%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 16 displays awards reported by other postsecondary education providers in industrial and product design (CIP 50.0404) programs. Completion data is compiled from the Integrated Postsecondary Education Data System (IPEDS) for the most recent three years available. On average, one other postsecondary education institution in the region has issued two awards annually over the last three academic years in programs related to drafting.

*Exhibit 16: Other educational providers industrial and product design programs, three-year annual average credentials in the Inland Empire/Desert Region*

<b>50.0404 – Industrial and Product Design</b>	<b>Academic Year 2016-17</b>	<b>Academic Year 2017-18</b>	<b>Academic Year 2018-19</b>	<b>Other Educational Providers Annual Average Credentials, Academic Years 2016-19</b>
<b>The Fab School</b>				<b>2</b>
Award <1 academic year	0	0	6	2
<b>Total</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>

Source: IPEDS

## Recommendation

Community college drafting programs provide the knowledge, skills, and abilities that prepare students for employment as architectural and civil drafters, electrical and electronic drafters, and mechanical drafters. Employment for the drafting occupational group is projected to increase by 4% through 2025, with 202 job openings expected annually. The median hourly earnings for the drafting occupational group surpass the regional self-sufficiency standard, indicating that at least 50% of workers earn a self-sustainable wage.

Five community college programs provided training relevant to the drafting occupational group. Combined, regional community college programs related to drafting issued 62 awards annually over the last three academic years. One other non-community college postsecondary education provider issued an average of two awards annually in programs related to drafting over the previous three academic years. Combined, regional education providers issued approximately 64 awards annually.

The Centers of Excellence recommends expanding drafting technology programs to meet the regional demand for more drafting occupational group workers. Colleges considering this program should partner with applicable employers to document the skills needed for students to quickly earn self-sustainable earnings after exiting these programs.

### Contact

Michael Goss

Paul Vaccher

Centers of Excellence, Inland Empire/Desert Region

[michael.goss@chaffey.edu](mailto:michael.goss@chaffey.edu)

April 2022

## References

Burning Glass Technologies. (2022). *Labor Insights/Jobs*. Retrieved from <https://www.burning-glass.com/>

California Commission on Teacher Credentialing (CTC). (2022). *Drafting Permits (CL-797)*. Retrieved from [https://www.ctc.ca.gov/credentials/leaflets/child-development-permits-\(cl-797\)](https://www.ctc.ca.gov/credentials/leaflets/child-development-permits-(cl-797))

California Community Colleges Chancellor's Office. (2022). *Chancellor's Office Curriculum Inventory (COCI)*, version 3.0. Retrieved from <https://coci2.cctechcenter.org/programs>

California Community Colleges Chancellor's Office. LaunchBoard. (2022). *California Community Colleges LaunchBoard*. Retrieved from <https://www.calpassplus.org/Launchboard/Home.aspx>

California Community Colleges Chancellor's Office. LaunchBoard. (2022a). *Strong Workforce Program Metrics Data Element Dictionary*. Pg. 3. Retrieved from <https://www.calpassplus.org/MediaLibrary/calpassplus/launchboard/Documents/SWP-DED.PDF>

California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. (2021). *Data Mart*. Retrieved from <https://datamart.cccco.edu/datamart.aspx>

California Community Colleges Chancellor's Office, Curriculum and Instructional Unit, Academic Affairs Division. (2012). *Taxonomy of Programs, 6<sup>th</sup> Edition, Corrected Version*. Retrieved from <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Digital-Innovation-and-Infrastructure/Research/Files/TOPmanual6200909corrected12513.ashx?la=en&hash=94C709CA83C0380828415579395A5F536736C7C1>

Carnevale, A. P., Jayasundera, T., & Repnikov, D. (n.d.). Understanding Online Job Ads Data. Retrieved from <https://cew.georgetown.edu/wp-content/uploads/2014/11/OCLM.Tech.Web.pdf>

Economic Modeling Specialists International (Emsi). (2022). *Datarun 2022.1*. Retrieved from <https://www.economicmodeling.com/>

Labor Market Information Division. Employment Development Department of California. (2022). *Detailed Occupational Guides*. Retrieved from <https://www.labormarketinfo.edd.ca.gov/OccGuides/Search.aspx>

National Center for O\*NET Development. (2022). O\*NET OnLine. Retrieved from <https://www.onetonline.org/>

Pearce, D. University of Washington. (2021). *Self Sufficiency Standard – California*. Retrieved from <http://www.selfsufficiencystandard.org/california>

## Appendix: Occupation definitions, sample job titles, five-year projections, and earnings for drafting 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 Designer, Architectural Drafter, Architectural Draftsman, Civil Drafter, Computer-Aided Design Designer (CAD Designer), Computer-Aided Drafting and Design Drafter (CADD Drafter), Computer-Aided Drafting Designer (CAD Designer), Drafting Technician, Draftsman, Draftsperson

*Entry-Level Educational Requirement:* Associate degree

*Work Experience Required:* None

*Training Requirement:* None

*Incumbent workers with a Community College Award or Some Postsecondary Coursework:* 53%

#### **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:** CAD Operator (Computer Aided Design Operator), Design Drafter, Designer, Drafter, Electrical Designer, Electrical Drafter, Layout Designer, Line Staker, Mask Designer, Staking Engineer

*Entry-Level Educational Requirement: Associate degree*

*Work Experience Required: None*

*Training Requirement: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 57%*

### **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, Drafter, Drafting Technician, Mechanical Designer, Mechanical Drafter, Product Designer, Project Designer

*Entry-Level Educational Requirement: Associate degree*

*Work Experience Required: None*

*Training Requirement: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 57%*

## Appendix: Methodology

Exhibits 10, 12, and 14 display the average annual California Community College (CCC) awards conferred during the three academic years between 2018 and 2021 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from California's Employment Development Department's Unemployment Insurance database records. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2021 a). Finally, employment in a job related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2021 a).

Job advertisement data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job advertisements often do not reveal employers' hiring intentions; it is unknown if employers plan to hire one or multiple workers from a single online job ad or if they are collecting resumes for future hiring needs. A closed job ad may not be the result of a hired worker.

Table 1. 2020 to 2025 job growth, wages, entry-level education, training, and work experience required for the drafting occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino counties combined)

Occupation (SOC)	2020 Jobs	5-Year Change (New Jobs)	5-Year % Change (New Jobs)	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10 <sup>th</sup> to 90 <sup>th</sup> percentile)	Median Hourly Wage (50 <sup>th</sup> percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Architectural and Civil Drafters (17-3011)	1,101	70	6%	120	\$16.36 to \$40.37	\$25.29	\$56,800	Associate degree & None	None
Mechanical Drafters (17-3013)	523	(1)	(0%)	50	\$16.30 to \$47.49	\$28.83	\$64,400	Associate degree & None	None
Electrical and Electronics Drafters (17-3012)	303	14	5%	32	\$20.11 to \$46.35	\$29.02	\$66,000	Associate degree & None	None
<b>Total</b>	<b>1,927</b>	<b>82</b>	<b>4%</b>	<b>202</b>	-	-	-	-	-

Source: Emsi 2022.1