

Architecture and Architectural Technology

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

Summary

- Employment for the architecture occupational group is expected to **increase by 8% between 2018 and 2023** in the Inland Empire/Desert Region. A total of **916 job openings** will be available over the five-year timeframe, or **183 annual job openings**.
- The entry-level wage for each of the occupations in the architecture occupational group is **above the Family Needs Calculator estimate of \$11.97 per hour** for a single adult living in Riverside County and \$11.63 for a single adult living in San Bernardino County.
- There are **23 credentials issued annually** from regional community college architecture and architectural technology programs.

Introduction

This report provides data on the occupations related to the California Community College architecture and architectural technology program (TOP 0201.00). This program prepares students for employment by providing instruction on the planning, organization, and enclosure of space for functional and aesthetic purposes, including the design of structures, testing of materials, estimating, environmental impact studies, and dealing with contracts and specifications (Taxonomy of Programs, 2012). The occupations included in the architecture occupational group are the following:

- *Architectural and Civil Drafters*
- *Electrical and Electronics Drafters*
- *Mechanical Drafters*

Job Opportunities

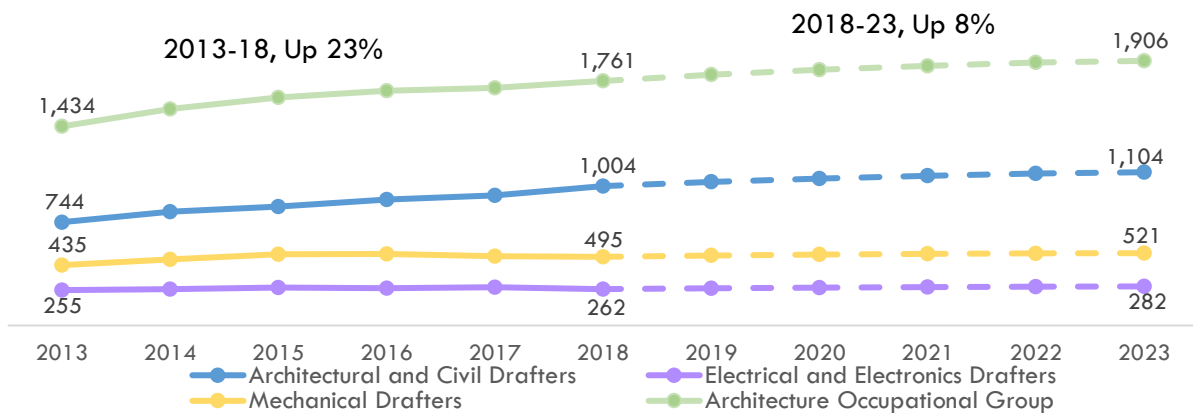
In 2018, there were 1,761 jobs in the architecture occupational group in the Inland Empire/Desert region (IEDR). This occupational group is projected to increase employment by 8% by 2023. Employers in the region will need to hire 916 workers over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 1 displays five-year projected job growth for the architecture occupational group. Exhibit 2 displays historical and projected jobs for the architecture occupational group.

Exhibit 1: Five-year projections for the architecture occupational group

Occupation	2018 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Architectural and Civil Drafters	1,004	10%	542	108	26%
Mechanical Drafters	495	5%	240	48	27%
Electrical and Electronics Drafters	262	8%	133	27	25%
Total	1,761	8%	916	183	26%

Source: EMSI 2019.3

Exhibit 2: Historical and projected jobs for the architecture occupational group, 2013-2023



Source: EMSI 2019.3

Job Postings

Real-time labor market information from employer job advertisements is used in this report as another way to gauge demand for the architecture occupational group. Exhibit 3 displays the number of job ads posted during the last 12 months along with the regional and statewide average time to fill for the architecture occupational group in the IEDR. On average, local employers fill online job postings for the architecture occupational group within 44 days. This regional average is seven days shorter than the statewide average, indicating that employers in the region face fewer challenges when seeking candidates to fill these positions than other employers in California.

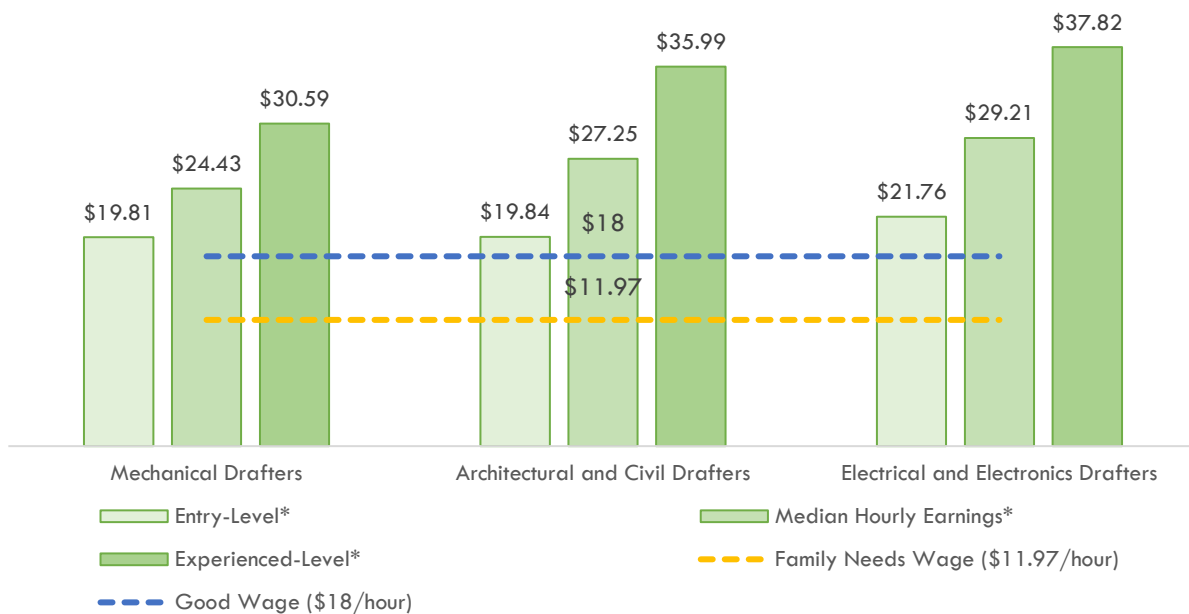
Exhibit 3: Job ads and time to fill for the architecture occupational group, Sep 2018 – Aug 2019

Occupation	Job Ads	Regional Average Time to Fill (Days)	California Average Time to Fill (Days)
Mechanical Drafters	133	42	48
Architectural and Civil Drafters	53	49	57
Electrical and Electronics Drafters	44	46	52
Total	230	44	51

Earnings and Benefits

The entry-level wage for each of the occupations in the architecture occupational group is above the Family Needs Calculator estimate of \$11.97 per hour for a single adult living in Riverside County and \$11.63 for a single adult living in San Bernardino County. The Family Needs Calculator measures the minimum income necessary to cover all of an individual or family’s basic expenses (Pearce & Manzer, 2018). The Metropolitan Policy Program at Brookings would classify architecture positions as “good jobs” because they provide an entry-level wage that allows workers to become economically independent and secure, above \$18 per hour (\$37,440 per year), with employer-sponsored health insurance (Shearer, et al., pg. 25). Benefits for the occupations in the architecture occupational group vary by employer, but large employers in the IEDR typically offer medical insurance in addition to other benefits according to occupational guides developed by the California Labor Market Information Division (“Detailed Guide,” 2019). Exhibit 4 displays hourly earnings for the architecture occupational group.

Exhibit 4: Hourly earnings for the architecture occupational group



Source: EMSI 2019.3

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

An alternative way to determine what wages workers can expect to earn is by extracting wage information from online job postings. Exhibit 5 displays advertised salary data from real-time job postings for the architecture occupational group over the last 12 months. This information should be viewed with caution, as 65% of job postings do not contain salary information. Please note that salary figures are prorated to reflect full-time, annual wage status. Real-time salaries are similar to traditional median wages for these occupations.

Exhibit 5: Advertised salary information from job ads, Sep 2018 – Aug 2019

Occupation	Number of job postings	Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	Average Annual Earnings
Mechanical Drafters	47	15%	66%	15%	4%	\$45,000
Architectural and Civil Drafters	21	-	43%	48%	9%	\$55,000
Electrical and Electronics Drafters	12	17%	25%	42%	16%	\$60,000

Source: Burning Glass – Labor Insights

Employers, Skills, Education, and Work Experience

Exhibit 6 displays the employers posting the most job ads for the architecture occupational group during the last 12 months in the IEDR.

Exhibit 6: Sample of employers posting job ads for the architecture occupational group, Sep 2018 – Aug 2019

Occupation	Employers
Mechanical Drafters (n=58)	<ul style="list-style-type: none"> Complete Coach Works Champion Homes Freeman Advanced Professional Engineering Consultants (APEC) QCP – Quick Crete Products Stater Bros Market
Architectural and Civil Drafters (n=33)	<ul style="list-style-type: none"> Freelancer Drafting, Inc. R M Byrd & Associate, Inc. Spray Enclosure Technologies, Inc. 20/20 Plumbing & Heating, Inc.
Electrical and Electronics Drafters (n=19)	<ul style="list-style-type: none"> Crown Technical Systems STV Group, Inc. Roll-A-Shade General Micro Systems MiTek Industries, Inc.

Source: Burning Glass – Labor Insights

Exhibit 7 displays a sample of specialized, employability, and software and programming skills that employers are seeking when looking for workers to fill positions in the architecture occupational group. Specialized skills are occupation-specific skills that employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is commonly referred to as “soft skills.” The skills requested in job postings may be utilized as a helpful guide for curriculum development.

Exhibit 7: Sample of in-demand skills from employer job ads for the architecture occupational group, Sep 2018 – Aug 2019

Occupation	Specialized Skills	Employability Skills	Software and Programming Skills
Mechanical Drafters (n=107)	<ul style="list-style-type: none"> Mechanical Design Plumbing Project Management 	<ul style="list-style-type: none"> Communication Skills Teamwork/Collaboration Organizational Skills 	<ul style="list-style-type: none"> AutoCAD Microsoft Office SolidWorks Revit
Architectural and Civil Drafters (n=51)	<ul style="list-style-type: none"> Plumbing Budgeting Project Management 	<ul style="list-style-type: none"> Multi-Tasking Teamwork/Collaboration Communication Skills 	<ul style="list-style-type: none"> AutoCAD Microsoft Office Revit SolidWorks
Electrical and Electronics Drafters (n=43)	<ul style="list-style-type: none"> Electrical Diagrams/Schematics Electrical Engineering Wiring Diagrams 	<ul style="list-style-type: none"> Detail-Oriented Communication Skills Physical Abilities 	<ul style="list-style-type: none"> AutoCAD Microsoft Office SolidWorks

Source: Burning Glass – Labor Insights

Exhibit 8 displays the entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census (2016-17), and the minimum advertised education requirement from employer job ads.

Exhibit 8: Typical entry-level education, educational attainment, and minimum advertised education requirements for the architecture occupational group, Sep 2018 – Aug 2019

Occupation	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
			Number of job postings	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Mechanical Drafters	Associate degree	61%	33	48%	52%	-
Architectural and Civil Drafters	Associate degree	61%	18	78%	22%	-
Electrical and Electronics Drafters	Associate degree	61%	24	13%	87%	-

Source: EMSI 2019.3, Burning Glass – Labor Insights

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

Exhibit 9 displays the work experience typically required to enter each occupation and the real-time work experience requirement from employer job ads.

Exhibit 9: Work experience required and real-time work experience requirements, Sep 2018 – Aug 2019

Occupation	Work Experience Typically Required	Real-Time Work Experience Required from Job Ads			
		Number of job postings	0 – 2 years	3 – 5 years	6+ years
Mechanical Drafters	None	77	48%	47%	5%
Architectural and Civil Drafters	None	40	38%	62%	-
Electrical and Electronics Drafters	None	36	28%	56%	17%

Source: EMSI 2019.3, Burning Glass – Labor Insights

Student Completions and Program Outcomes

Exhibit 10 displays the average annual regional California Community College (CCC) credentials conferred during the three academic years between 2015 and 2018, from the California Community Colleges Chancellor’s Office Management Information Systems (MIS) Data Mart, along with the enrollments from the most recent year available on LaunchBoard. Credentials are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case in order to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year. Enrollments are the count of enrollments in courses assigned to the TOP code in the selected year. The relevant TOP code is from the Taxonomy of Programs manual, and the corresponding program titles used at each college (in *italics*) are sourced from the Chancellor’s Office Curriculum Inventory (COCI). Please note, a credential is not always equal 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.

Exhibit 10: Annual average community college credentials and enrollments for the architecture and architectural technology programs in the IEDR

0201.00 – Architecture and Architectural Technology	CCC Enrollments, Academic Year 2016-17	CCC Annual Average Credentials, Academic Years 2015-18
Desert - Architectural Technology	373	
Associate of Science (A.S.) degree		9
Certificate requiring 30 to < 60-semester units		2
Norco – Architecture	-	
Associate of Science (A.S.) degree		1
Certificate requiring 18 to < 30-semester units		1
Certificate requiring 6 to < 18-semester units		10
San Bernardino Valley – Architecture and Environmental Design/Computer-Aided Drafting Technician	297	
Total CCC Enrollments, Academic Year 2016-17	678	
Total Annual Average CCC Credentials, Academic Years 2015-18		23

Source: LaunchBoard, Management Information Systems Data Mart, COCI

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 records provided by California’s Employment Development Department’s Unemployment Insurance database. 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, 2019a). Finally, employment in a job closely 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, 2017). Data from the latest academic year for each metric is provided in Exhibit 11.

Exhibit 11: 0201.00 – Architecture and architectural technology strong workforce program outcomes

Strong Workforce Program Metrics: 0201.00 – Architecture and Architectural Technology Academic Year 2015-16, unless noted otherwise	Inland Empire/Desert region	California Median
Course enrollments (2016-17)	678	319
Completed 12+ units in one year (2016-17)	99	41
Economically disadvantaged students* (2016-17)	77%	67%
Transferred to a four-year institution* (transfers)	39	19
Employed in the fourth fiscal quarter after exit (all exiters)	82%	65%
Median annual earnings* (all exiters)	\$30,092	\$29,987
Job closely related to the field of study (2014-15)	N/A	70%
Median change in earnings (all exiters)	30%	47%
Attained a living wage (completers and skills-builders)	60%	64%

Source: LaunchBoard

*Data for these metrics is available in Community College Pipeline. All others are available in Strong Program Workforce Metrics

Recommendation

Community College architecture and architectural technology programs prepare students for employment by providing instruction on the planning, organization, and enclosure of space for functional and aesthetic purposes. Occupations related to this training program are expected to have 183 annual job openings over the next five years, 2018 to 2023. The 25th percentile wage for each occupation examined in this report are above the \$18.00 per hour “good wage” established in the *Advancing Opportunity in California’s Inland Empire* report. Job postings reveal that employers are looking for a candidate with a community college-level education. Local colleges providing training produced 23 total awards. Assuming that one award was conferred to one student, this number is far below the projected number of annual job openings. The COE recommends expanding or creating new architecture and architectural technology program programs in the Inland Empire/Desert Region to meet employer demand.

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Appendix: Occupation definitions, sample job titles, five-year projections for architecture occupations

Occupation Definitions (SOC) code), Education and Training Requirement, Community College Educational 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, Architectural Technician, CAD Technician (Computer-Aided Design Technician), CADD Operator (Computer-Aided Design and Drafting Operator), Detailer, Drafter, Draftsman, Truss Designer, Civil Designer, Civil Drafter, Drafting Technician, Draftsman, Draftsperson

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Incumbent workers with a Community College Award 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, Designer, 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), Drafter, Electrical Designer, Electrical Drafter, Engineering Agent, Engineering Associate, Line Staker, Staking Engineer

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Incumbent workers with a Community College Award 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

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 61%

Table 1: 2018 to 2023 job growth, wages, education, training, and work experience required for the architecture occupational group, Inland Empire/Desert region

Occupation (SOC)	2018 Jobs	5-Yr Change (New Jobs)	5-Yr % Change (New Jobs)	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (25 th to 75 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Architectural and Civil Drafters (17-3011)	1,004	100	10%	108	\$19.84 to \$35.99	\$27.25	\$60,400	Associate degree & None	None
Mechanical Drafters (17-3013)	495	26	5%	48	\$19.81 to \$30.59	\$24.43	\$54,600	Associate degree & None	None
Electrical and Electronics Drafters (17-3012)	262	20	8%	27	\$21.76 to \$37.82	\$29.21	\$63,500	Associate degree & None	None
Total	1,761	145	8%	183	-	-	-	-	-

Source: EMSI 2019.3