

# CMC CTE Advisory Committee Minutes 2019

Program Area: \_\_\_\_\_  
 Faculty Discussion Leader(s) \_\_\_\_\_  
 Minutes by: \_\_\_\_\_

**Attendance Record**

Industry Representatives

| <u>Name</u> | <u>Representing</u> | <u>Email address</u> | <u>Phone Number</u> |
|-------------|---------------------|----------------------|---------------------|
| 1 _____     | _____               | _____                | _____               |
| 2 _____     | _____               | _____                | _____               |
| 3 _____     | _____               | _____                | _____               |
| 4 _____     | _____               | _____                | _____               |
| 5 _____     | _____               | _____                | _____               |

Educational Representatives

| <u>Name</u> | <u>Representing</u> | <u>Email address</u> | <u>Phone Number</u> |
|-------------|---------------------|----------------------|---------------------|
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| 2 _____     | _____               | _____                | _____               |
| 3 _____     | _____               | _____                | _____               |
| 4 _____     | _____               | _____                | _____               |
| 5 _____     | _____               | _____                | _____               |

Students, Staff, and other representatives

| <u>Name</u> | <u>Representing</u> | <u>Email address</u> | <u>Phone Number</u> |
|-------------|---------------------|----------------------|---------------------|
| 1 _____     | _____               | _____                | _____               |
| 2 _____     | _____               | _____                | _____               |
| 3 _____     | _____               | _____                | _____               |
| 4 _____     | _____               | _____                | _____               |
| 5 _____     | _____               | _____                | _____               |

**Section 1: Curriculum Validation (courses)**

Review the course outline and validate that the competencies (skills) are current, relevant and meet industry standards. If more than one course, the curriculum for each course must be reviewed and approved and recommendations noted. For each course, discuss whether there are any outdated competencies, procedures, practices or terms that should be removed from the course outline. Also, discuss whether there are competencies that need to be added to the course outline.

Results to approve courses (write in each course reviewed):

1 \_\_\_\_\_

- Approved
- Approved with Changes\*
- Not approved

Notes:

Focus on X-Ref as much as possible and consider CAM in addition to 3-d printing. Use surfaces, plotting and help menu. This looks like a well thought out curriculum in a non-compete environment. It looks like a course of study that walks a student through the foundational building blocks of a technical career. Along with CAD/GIS it is important for students to obtain exposure to 3-D drawing and printing, which will prepare them for working with data that is multidimensional as well as in motion (e.g. modeling earthquakes, flooding, or driving directions).

2

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Approved   
Approved with Changes\*   
Not approved

Notes: \_\_\_\_\_

3

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Approved   
Approved with Changes\*   
Not approved

Notes: \_\_\_\_\_

4

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Approved   
Approved with Changes\*   
Not approved

Notes: \_\_\_\_\_

5

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Approved   
Approved with Changes\*   
Not approved

Notes: \_\_\_\_\_

6

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Approved   
Approved with Changes\*   
Not approved

Notes: \_\_\_\_\_

7

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Approved   
Approved with Changes\*   
Not approved

Notes: \_\_\_\_\_

**Section 2: Programs of Study**

List your programs of study below. You can copy the relevant pages of the CMC Catalog to distribute to your Advisory group if you would like. For each program, make any notes necessary based on the discussion with your committee.

Programs:

Advisory notes:

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**Section 3: Industry Certification/Connection**

Are there any industry certifications required for students to work in this field? List all known certifications here.

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**Section 4: Skill Assessment Validation**

Discuss the method and criteria used to evaluate whether your students acquired the identified skills and knowledge (competencies) covered in your program. Discuss exams, project scoring rubrics, grade policy etc. Record any comments or recommendations.

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**Section 5: Core Indicator Discussion**

Discuss Chancellor's office Core Indicator data for your program area. Record any recommendations from the committee on addressing deficient indicators.

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**Section 6: Labor Market Conditions**

Verify local labor market conditions

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**Section 7: Other Business**

Document any marketing ideas, employment opportunities, donation ideas, advisory member recommendations, community and classroom engagement opportunities and other relevant comments/ideas here.

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# Computer-Aided Design and Drafting (CADD)

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

## Summary

- Employment for the computer-aided design and drafting (CADD) occupational group is expected to **increase by 7% between 2018 and 2023** in the Inland Empire/Desert Region. A total of **985 job openings, or 197 annual job openings** will be available over the five-year timeframe.
- The **entry-level wage** for the CADD occupational group is **above the MIT Living Wage estimate of \$12.39 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 annual average number of program credentials issued for the selected community college programs in the region (**52 annual average community college credentials, 3 other educational institution credentials, 55 total**), and the annual openings for the CADD occupational group across the region (**197 average annual openings**).

## Introduction

This report provides data on occupations related to the California Community College drafting technology (TOP 0953.00), architectural drafting (TOP 0953.10), civil drafting (0953.20), electrical, electronic, and electro-mechanical drafting (TOP 0953.30), and mechanical drafting (TOP 0953.40) programs. These programs prepare students for employment as drafters. Program descriptions are available on page 5 of this report. The occupations included in the CADD occupational group are the following:

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

## Job Opportunities

In 2018, there were 1,952 jobs in the CADD occupational group in the Inland Empire/Desert region. This occupational group is projected to increase employment by 7% by 2023. Employers in the region will need to hire 985 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 projections for the CADD occupational group in the Inland Empire/Desert region.

*Exhibit 1: Five-year projections for the CADD occupational group*

| 2018 Jobs | 2023 Jobs | 5-Yr % Change (New Jobs) | 5-Yr Openings (New + Replacement Jobs) | Annual Openings (New + Replacement Jobs) | % of workers age 55+ |
|-----------|-----------|--------------------------|--|--|----------------------|
| 1,952     | 2,088     | 7%                       | 985                                    | 197                                      | 25%                  |

Source: EMSI 2018.4

## Earnings

The entry-level wage for the CADD occupational group is above the MIT Living Wage estimate of \$12.39 per hour for a single adult living in the Inland Empire/Desert region (Glasmeier, 2019). These wages are also sufficient for two working adults and one child (\$14.75 per hour, per adult, or \$30,680 annually for each adult). Exhibit 2 displays wage information for the CADD occupational group in the Inland Empire/Desert region.

*Exhibit 2: Earnings, 25<sup>th</sup> to 75<sup>th</sup> percentile, Median, and Annual Average*

| CADD Occupational Group             | Entry to Experienced Hourly Wage Range* | Median Wage* | Average Annual Earnings |
|-------------------------------------|---|--------------|-------------------------|
| Electrical and Electronics Drafters | \$26.97 to \$38.75                      | \$32.10      | \$67,700                |
| Drafters, All Other                 | \$22.68 to \$34.61                      | \$28.69      | \$59,000                |
| Architectural and Civil Drafters    | \$19.95 to \$32.37                      | \$25.45      | \$55,400                |
| Mechanical Drafters                 | \$18.23 to \$27.58                      | \$22.23      | \$48,900                |

Source: EMSI 2018.4

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, and experienced is 75<sup>th</sup> percentile wage.

## Job Postings, Employers, Skills, and Education

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 CADD occupational group in the Inland Empire/Desert region. On average, local employers fill online job postings for the CADD occupational group with 44 days. This regional average is six days longer than the national average, indicating that it is more difficult for local employers to find qualified candidates.

*Exhibit 3: Job ads and time to fill, Apr 2018 – Mar 2019*

| CADD Occupational Group             | Job Ads    | Regional Average Time to Fill (Days) | California Average Time to Fill (Days) |
|-------------------------------------|------------|--------------------------------------|--|
| Drafters, All Other                 | 252        | 43                                   | 49                                     |
| Mechanical Drafters                 | 141        | 42                                   | 48                                     |
| Architectural and Civil Drafters    | 62         | 49                                   | 57                                     |
| Electrical and Electronics Drafters | 57         | 47                                   | 52                                     |
| <b>Total</b>                        | <b>512</b> | <b>44</b>                            | <b>50</b>                              |

Source: Burning Glass – Labor Insights

Exhibit 4 displays the employers posting the most job ads for the CADD occupational group during the last 12 months in the Inland Empire/Desert region.

*Exhibit 4: Employers posting the most job ads, Apr 2018 – Mar 2019*

| CADD Occupational Group                    | Employers   |
|--|---|
| Drafters, All Other (n=159)                | <ul style="list-style-type: none"> <li>Edison International</li> <li>Triage Partners LLC</li> </ul>     |
| Mechanical Drafters (n=69)                 | <ul style="list-style-type: none"> <li>Complete Coach Works</li> <li>Champion Homes</li> </ul>          |
| Architectural and Civil Drafters (n=37)    | <ul style="list-style-type: none"> <li>AECOM</li> <li>Empire Built, Inc.</li> </ul>                     |
| Electrical and Electronics Drafters (n=29) | <ul style="list-style-type: none"> <li>Crown Technical Systems</li> <li>Edison International</li> </ul> |

Source: Burning Glass – Labor Insights

Exhibit 5 displays a sample of specialized, employability, and software and programming skills that employers are seeking when looking for workers to fill positions in the CADD 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. All drafting occupations are displaying high demand for communication, AutoCAD and Microsoft Office skills.

Exhibit 5: Sample of in-demand skills from employer job ads, Apr 2018 – Mar 2019

| CADD Occupational Group                    | Specialized Skills   | Employability Skills   | Software and Programming Skills   |
|--|--|--|---|
| Drafters, All Other (n=218)                | <ul style="list-style-type: none"> <li>Engineering Design</li> <li>Telecommunications</li> <li>Calculation</li> </ul>        | <ul style="list-style-type: none"> <li>Communication Skills</li> <li>Detail-Oriented</li> <li>Teamwork/ Collaboration</li> </ul> | <ul style="list-style-type: none"> <li>AutoCAD</li> <li>Microsoft Office</li> <li>SolidWorks</li> </ul> |
| Mechanical Drafters (n=111)                | <ul style="list-style-type: none"> <li>Project Management</li> <li>Mechanical Design</li> <li>3D Modeling/ Design</li> </ul> | <ul style="list-style-type: none"> <li>Communication Skills</li> <li>Organizational Skills</li> <li>Research</li> </ul>          | <ul style="list-style-type: none"> <li>AutoCAD</li> <li>Microsoft Office</li> <li>SolidWorks</li> </ul> |
| Architectural and Civil Drafters (n=54)    | <ul style="list-style-type: none"> <li>Plumbing Systems</li> <li>Budgeting</li> <li>Project Management</li> </ul>            | <ul style="list-style-type: none"> <li>Communication Skills</li> <li>Multi-Tasking</li> <li>Problem Solving</li> </ul>           | <ul style="list-style-type: none"> <li>AutoCAD</li> <li>Microsoft Office</li> <li>Revit</li> </ul>      |
| Electrical and Electronics Drafters (n=55) | <ul style="list-style-type: none"> <li>Calculation</li> <li>Electrical Design</li> <li>Project Management</li> </ul>         | <ul style="list-style-type: none"> <li>Communication Skills</li> <li>Planning</li> <li>Detail-Oriented</li> </ul>                | <ul style="list-style-type: none"> <li>AutoCAD</li> <li>Microsoft Office</li> <li>Revit</li> </ul>      |

Source: Burning Glass – Labor Insights

Exhibit 6 displays the work experience and 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 6: Work experience, typical entry-level education, educational attainment, and minimum advertised education requirements for the CADD occupational group, Apr 2018 – Mar 2019

| Occupation                       | Typical Entry-Level Education Requirement | Educational Attainment* | Minimum Advertised Education Requirement from Job Ads |  |                  |                             |
|----------------------------------|---|-------------------------|---|--|------------------|-----------------------------|
|                                  |   |                         | Number of Job Ads (n=)                                | High school diploma or vocational training | Associate degree | Bachelor's degree or higher |
| Drafters, All Other              | Associate degree                          | 61%                     | 115   | 33%  | 41%              | 26%                         |
| Mechanical Drafters              | Associate degree                          | 61%                     | 53  | 32%  | 26%              | 42%                         |
| Architectural and Civil Drafters | Associate degree                          | 61%                     | 24  | 46%  | 29%              | 25%                         |

| Occupation                          | Typical Entry-Level Education Requirement | Educational Attainment* | Minimum Advertised Education Requirement from Job Ads |  |                  |                             |
|-------------------------------------|---|-------------------------|---|--|------------------|-----------------------------|
|                                     |   |                         | Number of Job Ads (n=)                                | High school diploma or vocational training | Associate degree | Bachelor's degree or higher |
| Electrical and Electronics Drafters | Associate degree                          | 61%                     | 31  | 13%  | 64%              | 23%                         |

Source: EMSI 2018.4, Burning Glass – Labor Insights

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

## Student Completions and Program Outcomes

Exhibits 7, 9, and 12 display the average annual regional California Community College (CCC) credentials conferred during the three academic years between 2014 and 2017, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, along with the headcount 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 order to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year. Headcount is the unduplicated number of students who enrolled in one or more courses in the program. 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.

Community college student outcome information is sourced 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. 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 Exhibits 8, 10, 11, and 13.

Program completion and Strong Workforce student outcome data in this section are organized by TOP code. Please note that Civil Drafting (TOP 0953.20) does not have any reported programs award completions or Strong Workforce programs metrics in the region. Electrical, Electronic, and Electro-Mechanical Drafting (TOP 0953.30) does not have any reported programs completions but does display Strong Workforce course metrics.



**Drafting Technology (TOP 0953.00):** Planning, preparation, and interpretation of various engineering sketches for design and drafting duties, for circuits, machines, structures, weldments, or architectural plans. Includes 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.

*Exhibit 7: Annual average community college credentials and headcount for the drafting technology program in the Inland Empire/Desert Region*

| <b>0953.00 Drafting Technology – local program title</b>            | <b>CCC Headcount, Academic Year 2016-17</b> | <b>CCC Annual Average Credentials, Academic Years 2014-17</b> |
|---|---|---|
| <b>Chaffey</b>  | 118   |   |
| <b>Desert – General Drafting</b>                                    | 112   |   |
| Associate Degree  |   | 1   |
| Certificate 30 to < 60 semester units                               |   | 1   |
| <b>Mt. San Jacinto – Engineering: Drafting Technology</b>           | 71  |   |
| Associate Degree  |   | 3   |
| Certificate 30 to < 60 semester units                               |   | 1   |
| <b>Norco College – Drafting Technology</b>                          | 267   |   |
| Associate Degree  |   | 4   |
| Certificate 18 to < 30 semester units                               |   | 6   |
| Certificate 6 to < 18 semester units                                |   | 16  |
| <b>Victor Valley – Drafting</b>                                     | 320   |   |
| Associate Degree  |   | 17  |
| <b>Total CCC Headcount, Academic Year 2016-17</b>                   | <b>886</b>                                  |   |
| <b>Total Annual Average CCC Credentials, Academic Years 2014-17</b> |   | <b>50</b>   |

Source: LaunchBoard, MIS Data Mart, COCI

*Exhibit 8: Drafting technology strong workforce program outcomes*

| <b>Strong Workforce Program Metrics:<br/>0953.00 Drafting Technology<br/>Academic Year 2015-16, unless noted otherwise</b> | <b>Inland Empire/Desert Region</b> | <b>California Median</b> |
|--|------------------------------------|--------------------------|
| Course enrollments (2016-17)   | 1,114                              | 189                      |
| Completed 12+ units in one year (2016-17)  | 150                                | 36                       |
| Transferred to a 4-year institution  | 60                                 | 19                       |
| Employed in the fourth fiscal quarter after exit   | 65%                                | 72%                      |
| Median annual earnings*  | \$27,694                           | \$35,977                 |
| Job closely related to the field of study (2014-15)  | 92%                                | 94%                      |
| Median change in earnings  | 36%                                | 44%                      |
| Attained a living wage   | 62%                                | 65%                      |
| Economically disadvantaged students* (2016-17)   | 71%                                | 65%                      |

Source: LaunchBoard

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

**Architectural Drafting (TOP 0953.10):** Preparation of working drawings and electronic simulations for architectural and related construction projects.

*Exhibit 9: Annual average community college credentials and headcount for the architectural drafting program in the Inland Empire/Desert Region*

| <b>0953.10 Architectural Drafting – local program title</b>         | <b>CCC Headcount, Academic Year 2016-17</b> | <b>CCC Annual Average Credentials, Academic Years 2014-17</b> |
|---|---|---|
| <b>Chaffey – Drafting: Architectural</b>                            | 28  |   |
| Associate Degree  |   | 1*  |
| <b>Victor Valley – Architectural CADD Technician</b>                | 21  |   |
| <b>Total CCC Headcount, Academic Year 2016-17</b>                   | <b>49</b>                                   |   |
| <b>Total Annual Average CCC Credentials, Academic Years 2014-17</b> |   | <b>1*</b>   |

Source: LaunchBoard, MIS Data Mart, COCI

\*Chaffey awarded one associate degree in 2016-17

*Exhibit 10: Architectural drafting strong workforce program outcomes*

| <b>Strong Workforce Program Metrics:<br/>0953.10 Architectural Drafting<br/>Academic Year 2015-16, unless noted otherwise</b> | <b>Inland Empire/Desert Region</b> | <b>California Median</b> |
|---|------------------------------------|--------------------------|
| Course enrollments (2016-17)  | 59                                 | 48                       |
| Completed 12+ units in one year (2016-17)   | N/A                                | 25                       |
| Transferred to a 4-year institution   | N/A                                | 10                       |
| Employed in the fourth fiscal quarter after exit  | N/A                                | 68%                      |
| Median annual earnings*   | N/A                                | \$28,635                 |
| Job closely related to the field of study (2014-15)   | N/A                                | 100%                     |
| Median change in earnings   | N/A                                | 71%                      |
| Economically disadvantaged students* (2016-17)  | 67%                                | 64%                      |

Source: LaunchBoard

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

**Civil Drafting (TOP 0953.20):** Preparation of working drawings and electronic simulations in support of civil engineers, geologic engineers, and related professionals.

The Inland Empire/Desert region does not have any reported program completions or Strong Workforce metrics for this program.

**Electrical, Electronic, and Electro-Mechanical Drafting (TOP 0953.30):** Development of working schematics and representations in support of electrical/electronic engineers, computer engineers, electro-mechanical engineers, and related professionals.

The Inland Empire/Desert region does not have any reported program completions for this program.

*Exhibit 11: Electrical, electronic, and electro-mechanical drafting strong workforce program outcomes*

| <b>Strong Workforce Program Metrics:<br/>0953.30 Electrical, Electronic, and Electro-Mechanical Drafting<br/>Academic Year 2015-16, unless noted otherwise</b> | <b>Inland<br/>Empire/Desert<br/>Region</b> | <b>California<br/>Median</b> |
|--|--|------------------------------|
| Course enrollments (2016-17)   | 36   | 36                           |
| Completed 12+ units in one year (2016-17)  | 21   | 21                           |
| Median annual earnings*  | N/A  | \$47,789                     |
| Economically disadvantaged students* (2016-17)   | 89%  | 89%                          |

Source: LaunchBoard

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

**Mechanical Drafting (TOP 0953.40):** Development of working drawings and electronic simulations in support of mechanical and industrial engineers and related professionals.

*Exhibit 12: Annual average community college credentials and headcount for the mechanical drafting program in the Inland Empire/Desert Region*

| <b>0953.40 Mechanical Drafting – local program title</b>            | <b>CCC Headcount, Academic Year 2016-17</b> | <b>CCC Annual Average Credentials, Academic Years 2014-17</b> |
|---|---|---|
| <b>Chaffey – Drafting: Mechanical</b>                               | 18  |   |
| Associate Degree  |   | 2   |
| <b>Mt. San Jacinto</b>  | 14  |   |
| <b>San Bernardino</b>   | 10  |   |
| <b>Total CCC Headcount, Academic Year 2016-17</b>                   | <b>42</b>                                   |   |
| <b>Total Annual Average CCC Credentials, Academic Years 2014-17</b> |   | <b>2</b>  |

Source: LaunchBoard, MIS Data Mart, COCI

*Exhibit 13: Mechanical drafting strong workforce program outcomes*

| <b>Strong Workforce Program Metrics:<br/>0953.40 Mechanical Drafting<br/>Academic Year 2015-16, unless noted otherwise</b> | <b>Inland Empire/Desert Region</b> | <b>California Median</b> |
|--|------------------------------------|--------------------------|
| Course enrollments (2016-17)   | 42                                 | 35                       |
| Completed 12+ units in one year (2016-17)  | 14                                 | 13                       |
| Transferred to a 4-year institution  | N/A                                | 0                        |
| Employed in the fourth fiscal quarter after exit   | N/A                                | 67%                      |
| Median annual earnings*  | \$34,774                           | \$35,201                 |
| Job closely related to field of study (2014-15)  | N/A                                | 100%                     |
| Median change in earnings  | N/A                                | 65%                      |
| Economically disadvantaged students* (2016-17)   | 74%                                | 66%                      |

Source: LaunchBoard

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

Credentials granted from other educational providers outside of the California Community College system are displayed in Exhibit 14, along with the relevant CIP code. This is the final release data compiled from the Integrated Postsecondary Education Data System (IPEDS) for the most recent three years available.

*Exhibit 14: Annual average other educational providers credentials awarded for CAD/CADD drafting and/or design technology/technician programs*

| <b>15.1302 CAD/CADD Drafting and/or Design Technology/Technician</b>  | <b>Other Educational Providers Annual Average Credentials, Academic Years 2013-16</b> |
|---|---|
| <b>Westech College</b>  |   |
| Award 1<2 academic yrs  | 3   |
| <b>Total Annual Average Other Credentials, Academic Years 2013-16</b> | <b>3</b>  |

Source: IPEDS



## References

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## Contact

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April 2019



## **Appendix: Occupation definitions, sample job titles, five-year projections for CADD 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:** Architect, Architectural Designer, Architectural Drafter, Architectural Draftsman, Architectural Intern, CAD Technician (Computer-Aided Design Technician), Drafter, Draftsman, Intern Architect, Project Manager, Civil Designer, Civil Drafter, Computer-Aided Design Designer (CAD Designer), Computer-Aided Design Operator (CAD Operator), Computer-Aided Design Technician (CAD Technician), Computer-Aided Drafting and Design Drafter (CADD Drafter), Computer-Aided Drafting Designer (CAD Designer), 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:** Circuit Board Drafter, Electrical Computer Aided Design and Drafting Technician, Electrical Drafter, Electrical Systems Drafter, Electronic Drafter, Printed Circuit Board Drafter

*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%*

**Drafters, All Other (17-3019)**

All drafters not listed separately.

**Sample job titles:** AutoCAD Technician, Blueprint Engineer, Blueprint Tracer, CAD Designer (Computer-Aided Design Designer), CAD Draftsman (Computer-Aided Design Draftsman), CAD Operator (Computer-Aided Design Operator), Chief Design Drafter, Chief Drafter, Commercial Drafter, Computer Drafter, Detail Drafter, Detailer, Drafter Apprentice, Drafting Detailer, Drafting Engineer, Drafting Layout Man, Drafting Layout Worker, Draughtsman, Drawing Checker, Drawing Tracer, Engineering Drafter, Engineering Technician, Form Designer, Geological Drafter, Hull Drafter, Job Captain, Laboratory Worker, Marine Drafter, Steel Detailer, Tracer, Utilities Estimator and Drafter

*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 CADD occupational group, Inland Empire/Desert Region

| Occupation (SOC)                              | 2018 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)    | 1,114        | 84          | 8%            | 114                                      | \$19.95 to \$32.37             | \$25.45             | \$55,400                | Associate degree & none                                      | None                     |
| Mechanical Drafters (17-3013)                 | 468          | 22          | 5%            | 45                                       | \$18.23 to \$27.58             | \$22.23             | \$48,900                | Associate degree & none                                      | None                     |
| Electrical and Electronics Drafters (17-3012) | 265          | 21          | 8%            | 27                                       | \$26.97 to \$38.75             | \$32.10             | \$67,700                | Associate degree & none                                      | None                     |
| Drafters, All Other (17-3019)                 | 104          | 10          | 10%           | 11                                       | \$22.68 to \$34.61             | \$28.69             | \$59,000                | Associate degree & none                                      | None                     |
| <b>Total</b>                                  | <b>1,952</b> | <b>136</b>  | <b>7%</b>     | <b>197</b>                               | -                              | -                   | -                       | -  | -                        |

Source: EMSI 2018.4

\*Entry Hourly is 25<sup>th</sup> percentile wage, the median is 50<sup>th</sup> percentile wage, experienced is 75<sup>th</sup> percentile wage.