



# **Program Review - Overall Report**

**2024 - 2027**

**Instructional: Drafting Technology**

**Overall Trends**

**What overall trends do you see in success, retention, program of study, educational planning, and awards over the past 3 or more years?**

The Data below shows unbalanced gender population. We need to expand services equitable to all genders. as well as the minorities.

Gender	Enrolled	Retained	Retention Rate	DI	Close Gap
<b>Female</b>	<b>10</b>	<b>7</b>	<b>70.0%</b>	<b>0</b>	<b>1</b>
Asian	Masked Data			0	
Hispanic	Masked Data			0	
White	Masked Data			0	
<b>Male</b>	<b>48</b>	<b>37</b>	<b>77.1%</b>	<b>0</b>	<b>0</b>
African American	Masked Data			0	
Asian	Masked Data			0	
Hispanic	23	17	73.9%	0	1
White	16	13	81.3%	0	0
Two or More	Masked Data			0	
Unknown	Masked Data			0	
<b>Total</b>	<b>58</b>	<b>44</b>	<b>75.9%</b>	<b>0</b>	<b>0</b>

## Data Review

[Open in Power BI](#)

department-level disaggregated success data

Data as of 8/22/23, 10:24 AM

Filtered by **disc** (is DFT), **inst\_meth2** (is Hybrid), **ay** (is 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, or 2022-23)

### Certificates

Gender x Ethnicity	18-19	19-20	20-21	21-22	22-23	Total
<input type="checkbox"/> <b>Female</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>11</b>
Hispanic/Latino	1	2		2	2	7
White	2		1	1		4
<input type="checkbox"/> <b>Male</b>	<b>13</b>	<b>6</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>26</b>
Asian	4					4
Black or African American		1				1
Hispanic/Latino	4	3		2	4	13
Two or More Races	1					1
White	4	2	1			7
<b>Total</b>	<b>16</b>	<b>8</b>	<b>2</b>	<b>5</b>	<b>6</b>	<b>37</b>

## Data Review

[Open in Power BI](#)

Program Awards

Data as of 10/3/23, 12:59 PM

Filtered by **CertAppr** (is 1), **Annual** (is 18-19, 19-20, 20-21, 21-22, or 22-23), **ProgramTitle** (is 3D Mechanical Drafting or Drafting Technology)

**Please add any relevant documents here.**

## **Disaggregated Student Subgroups**

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**Look at the disaggregated student subgroups in success, retention, program of study, educational planning, and awards for your area. Are there any equity gaps that you will address in the next 3 years?**

Equity in enrollment for male/female. Increase the Female enrollment by 15%.

**If there are any concerning trends over the past 3 or more years, or if equity gaps exist, what is your action plan to address them?**

Advocate the Program in high school, ESL classes, outreach in fairs.

**Please add any relevant documents here.**

## Drafting Technology

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### Program/Unit Goal

DFT/23

### Goal Cycle

2024 - 2027

### What are you doing now in support of this goal?

Drafting Technology certificate program prepares individuals the basic skills and knowledge in the field of drafting to perform as a general drafter. Students can advance their skills later on in Mechanical or Architectural drafting. This program gives individuals knowledge and skills to develop working drawings and electronic simulations in support of engineering drafting and related professionals. The content includes the application of Manual Drafting, Computer Assisted Drafting and technical communication to the creation of graphic representations and simulations in support of engineering projects.

Upon successful completion of this program, students should be able to:

1. An ability to apply and integrate computer technology in the design process, exhibiting skills necessary for entry level employment, as a drafter in the drafting industry.
1. Knowledge of engineering drawing skills and practice in the solution of industry related design projects.

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). Attached find LMI report.

### What are your plans (3-year) regarding this goal?

1. Develop Makers activities and team building around project-based study, out of class activities such as attending regional and national student competitions.
2. Update resources, tool and materials for each course as well as whole program
3. ZTC

### Please add any relevant documents here.

[3D Mechanical Drafting Certificate POR-Updated.docx](#)

[Drafting Technology - Updated.docx](#)

### Mapping

Educational Master Plan (2020-2025): ( )

- 2025 Objective 1.3 (Student Services):
- 2025 Objective 4.2 (Planning and Development):
- 2025 Objective 8.1 (Planning and Development):
- 2030 Goal 11: Operations:
- 2030 Goal 12: Resources:

### Evidence

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#### Evidence Date

11/30/2023

**Please provide any assessment data or other evidence that supports this Program/Unit Goal.**

# Program/Unit Goals

### Program of Study and Student Educational Plan

**Program of Study**

Search


- Select all
- 3D Game Modeling and Animation
- 3D Mechanical Drafting
- Accounting Basics for Small Business
- Admin Justice/Law Enforcement Basic Peace ...
- Admin of Justice/Law Enf Basic Peace Officer I...
- Admin of Justice/Law Enf Basic Peace Officer ...
- Admin of Justice: Basic Correctional Deputy A...
- Admin of Justice: Investigative Assistant
- Admin of Justice-Basic Correctional Deputy A...
- Admin of Justice-Investigative Assistant
- Admin/Clinical Medical Asst
- Administration & Information Systems
- Administration of Justice
- Administration of Justice/Corrections
- Administration of Justice/Law Enforcement
- Administration of Justice: Crime Scene Investi...

This report contains:

- Most recent program of study for all students enrolled at Norco College annually
- Student Educational Plan completion annually

Select one or more programs on the left

Source: Colleague Student Information System



Student Educational Plan	2019-20	2020-21	2021-22	2022-23	Total
Abbreviated and Comprehensive Ed Plan	3.16%	3.32%	4.14%	3.83%	<b>3.59%</b>
Abbreviated Ed Plan	3.95%	6.79%	8.72%	4.17%	<b>5.74%</b>
Comprehensive Ed Plan	32.29%	20.90%	19.87%	16.49%	<b>22.69%</b>
No Ed Plan	60.60%	68.99%	67.28%	75.50%	<b>67.99%</b>

Gender by Ethnicity	2021-22	2022-23
<b>Female</b>	<b>9705</b>	<b>8995</b>
African-American	674	583
American Indian	27	17
Asian	915	862
Hispanic	5814	5454
Pacific Islander	26	23
Two or More	259	314
Unreported	130	90
White	1860	1652
<b>Male</b>	<b>7811</b>	<b>6701</b>
African-American	509	428
American Indian	27	17
Asian	875	786
Hispanic	4269	3644
Pacific Islander	38	32
Two or More	208	210
Unreported	203	127
White	1682	1457
<b>Non-Binary</b>	<b>8</b>	<b>15</b>
African-American		1
Asian		1
Hispanic	2	7
Two or More	2	1
Unreported		1
White	4	5
<b>Unreported</b>	<b>111</b>	<b>85</b>
African-American	4	7
<b>Total</b>	<b>17635</b>	<b>15796</b>

**Is there a resource request associated with this Goal?**

Yes

**If yes, please provide a short description.**

Updated data shows the reason why the new goals are needed.

**Please add any relevant documents here.**

**1. Which equity-related professional development trainings have members of your area participated in to improve student learning, student support, and/or college support?**

Autodesk University 2024, 2025, 2026

**2. What knowledge or skills/techniques have members in your area implemented from these trainings and what changes have you seen?**

All Makerspace tool running the Design/Make workshop / conference/trainings. Also for Design course field trips with students and Architectural site visiting

**3. What additional equity-related professional development/trainings do you seek to better support your area?**

To hire a lab technician/Manager to supervise Makers club students due to complexity of the tools and skills that is required to maintain the Makers lab.

**Please add any relevant documents here.**

**Are all your courses current (within four years)?**

Yes

**What percentage of your courses are out of date?**

0%

**If you have courses that are not current, are they in the curriculum process?**

N/A

**For out of date courses that are not already in progress of updating, what is your plan?**

**Do you have proposals in progress for all the DE courses you intend to file?**

**Do you require help to get your courses up to date?**

**Please add any relevant documents here.**



**Farshid Mirzaei**

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**Date**

03/01/2024

**Observation**

**What did you notice?**

Enrolment increase by offering NC sections

**Course(s)**

DFT 30/31/42/42B/62

**SLO(s)**

100%

**Discussion/Analysis**

**Please paste any relevant screenshots here.**

Dicipline average outcome score 100% and 2.9 for Mastery Level

**Please add any relevant documents here.**

## 3D Printer

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### Resource Year

2024 - 2027

### What resources do we already have?

Advanced 3D Print Laser - see attached quote

### What resources do you need?

Perskins - Job placement - CTE

### \$ Amount Requested

64,000

### Resource Type

ITEM: Instructional Supplies

### Please summarize how this request supports one or more EMP Goals, Equity goals, your program plans or goals, and/or is supported by outcomes assessment data.

This equipment is supporting all STEM and CTE students in the Maker's club where students build their projects.

### This request for my area is Priority #:

1

### Is this request

New

### For Administrative Use Only

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### For Administrative Use Only

The printer is high res, different than the regular printers that we have in ATEC109 or Stem building. Currently we have to send students to RCC to do their prints for the STEM/CTE projects.

### Funding Status

### Notes

### Council Ranking

## Lab Technician

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### Resource Year

2024 - 2027

### What resources do we already have?

limited time Volunteer faculties

### What resources do you need?

a technician/lab Manager to supervise the Makers lab

### \$ Amount Requested

100,000

### Resource Type

STAFF: Classified Professional, Confidential, Mgr

### Please summarize how this request supports one or more EMP Goals, Equity goals, your program plans or goals, and/or is supported by outcomes assessment data.

To support equity and increase the enrolment for STEM / CTE students

### This request for my area is Priority #:

1

### Is this request

New

## Specialized CAD/CAM office computers to handle various Windows based CAD course software

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**Resource Year**

2024 - 2027

**What resources do we already have?**

Old Windows office computer since 2018 (new office laptops can not support the needs) also current imac which is supporting half of the graphic CAD programs.

**What resources do you need?**

CTE/Perkins

**\$ Amount Requested**

6,000

**Resource Type**

ITEM: Equipment, Services, Software, Furniture

**Please summarize how this request supports one or more EMP Goals, Equity goals, your program plans or goals, and/or is supported by outcomes assessment data.**

To be efficient using a proper computer so I don't have to wait hours to get back to a students on their simple CAD assignments!

**This request for my area is Priority #:**

1

**Is this request**

New

## Equipments and tools

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**Resource Year**

2024 - 2027

**What resources do we already have?**

Makers lab tool that need s to be maintained and improved.

**What resources do you need?**

Perkins/CTE/job placement fund

**\$ Amount Requested**

60,000

**Resource Type**

ITEM: Equipment, Services, Software, Furniture

**Please summarize how this request supports one or more EMP Goals, Equity goals, your program plans or goals, and/or is supported by outcomes assessment data.**

to add new tools to Makers club to support their CTE and STEM projects such as 3D plane competition and rocketery

**This request for my area is Priority #:**

2

**Is this request**

New

## Lab Technician

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**Resource Year**

2024 - 2027

**What resources do we already have?**

limited time Volunteer faculties

**What resources do you need?**

a technician/lab Manager to supervise the Makers club lab

**\$ Amount Requested**

100,000

**Resource Type**

STAFF: Classified Professional, Confidential, Mgr

**Please summarize how this request supports one or more EMP Goals, Equity goals, your program plans or goals, and/or is supported by outcomes assessment data.**

To support equity and increase the enrolment for STEM / CTE students

**This request for my area is Priority #:**

1

**Is this request**

New

**Lab Printers - laser B&W and color**

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**Resource Year**

2024 - 2027

**What resources do we already have?**

old printers (over 10 years)

**What resources do you need?**

black and white priter, and color printer .

**\$ Amount Requested**

20,000

**Resource Type**

ITEM: Equipment, Services, Software, Furniture

**Please summarize how this request supports one or more EMP Goals, Equity goals, your program plans or goals, and/or is supported by outcomes assessment data.**

Every students need a print! This is for Drafting class that constantly need prints o assignments. Equity, basic needs for the discipline

**This request for my area is Priority #:**

1

**Is this request**

New

**Resource Request**

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**What resources do we already have?**

CTE, Perkins, General Fund

**Potential Funding Source(s)**

CTE: Strong Workforce Project (SWP),CTE: Perkins (VTEA),General Fund,Equity

**What resources do you need?**

Professional development, training, workshop in the Architectural Graphics field

**Request related to EMP goal or Assessment?**

EMP Goal 1,EMP Goal 3,EMP Goal 4,EMP Goal 6

**\$ Amount Requested**

4,200

**Resource Type**

FACULTY: Professional Development

**The evidence to support this request can be found in:**

Data Review,Equity,Program Review: Curriculum

**This request for my area is Priority #:**

1

**Professional Development Activity Funding Request Application**

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**Attendee and Activity Information**

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**Has this professional development request been discussed and approved by your department chair?**

Yes

**Date of Request**

**Activity Date(s)**

**Attendee Name**

Farshid Mirzaei

**Position**

Full-time Faculty

**Discipline**

DFT

**Name of Activity and Organization/Sponsor**

Autodesk University Expo

## Faculty Professional Development Requests

### Link to Activity Website

<https://www.autodesk.com/autodesk-university/blog/Registration-Now-Open-AU-2023-2023>

### Location

In state

### City, State

Las Vegas, NV

### Have you sought any other co-sponsorship (other internal and/or external funding)?

No

If yes, list source and total dollar amount.

### Estimated Costs (\$)

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#### Registration

What is included with Registration?

Air Travel or Mileage (65.5 cents/mile)

Hotel (tax included)

Airport Parking

Ground Transportation

Meals (\$75/day maximum)

Hotel Parking

Incidentals

Total Costs

4,200

### Justification for Funding Request

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Select the categories of professional development that best support your request. (Check all that apply)

Briefly describe the objective of the activity and how it will benefit you and the work you do for the college. If this activity aligns with the objectives of any special programs, grants, or plans (e.g., Equity, AB 705, Guided Pathways, STEM, etc.) please explain.

## Faculty Professional Development Requests

How do you plan to share the information gained from the activity to your department/division? See "Dissemination Plan Ideas" document for ways to disseminate information and check all that apply.

Briefly explain your selection above.

Is there anything else you would like to add?

### Approve and Submit

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Proof of approval is uploaded, ready to submit?

No

Please upload proof of approval for travel from your department chair or Dean.

### For Administrative Use Only

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Funding Status

Notes

## Faculty Hiring Resource Requests



**Program Review Reflections**

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**What would make program review meaningful and relevant for your unit?**

Partnership with the community and industries around the region.  
Updated and develop the programs based on the needs of student and the community.  
Project based learning

**What questions do we need to ask to understand your program plans, goals, needs?**

How to keep the retention and provide student learning support including the tutoring and out of class activities.

**What types of data do you need to support your program plans, goals, needs?**

Where the students go after the graduation / drop ? How to keep them in contact to inspire new students.  
Number of graduates who go to higher degrees vs the one who stay with a job after graduation.

**If there are any supporting documents you would like to attach, please attach them here.**

**Submission**

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**All parts of my Program Review have been completed and it is ready for review.**










Yes

# Drafting and Design Occupations

## Labor Market Analysis: San Diego County

August 2023

### Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
 <b>Proceed with New Program</b>	 	 	<input type="checkbox"/> Doctorate Degree <input type="checkbox"/> Master's Degree <input type="checkbox"/> Bachelor's Degree <input checked="" type="checkbox"/> Associate Degree <input type="checkbox"/> Some College or Certificate <input type="checkbox"/> HS Diploma or Equivalent <input type="checkbox"/> Less than a HS Diploma <input type="checkbox"/> Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
 	<p>HIGH</p> 	<p>LOW</p> 	

This brief provides labor market information about *Drafting and Design Occupations* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *Drafting and Design Occupations* include “Architectural and Civil Drafters,” “Commercial and Industrial Designers,” “Drafters, All Other,” “Electrical and Electronics Drafters,” and “Mechanical Drafters.” According to available labor market information, *Drafting and Design Occupations* in San Diego County have a labor market demand of 284 annual job openings (while average demand for a single occupation in San Diego County is 289 annual job openings), and eight institutions supply 151 awards for these occupations, suggesting that there is a supply gap in the labor market. On average, entry-level wages are above the living wage. This brief recommends proceeding with developing a new program or modifying an existing program because 1) entry-level wages pay at or above the living wage and 2) a supply gap exists for these occupations.

## Introduction

This report provides labor market information in San Diego County for the following occupational codes in the Standard Occupational Classification (SOC)<sup>1</sup> system:

- **Architectural and Civil Drafters** (SOC 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.
- **Commercial and Industrial Designers** (SOC 27-1021): Design and develop manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.
- **Drafters, All Other** (SOC 17-3019) All drafters not listed separately.
- **Electrical and Electronics Drafters** (SOC 17-3012): Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment.
- **Mechanical Drafters** (SOC 17-3013): Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.

For the purpose of this report, these occupations are referred to as *Drafting and Design Occupations*.

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<sup>1</sup> The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. [bls.gov/soc/](https://www.bls.gov/soc/).

## Projected Occupational Demand

Between 2022 and 2027, *Drafting and Design Occupations* are projected to increase by 102 net jobs or four percent (Exhibit 1a). Employers in San Diego County will need to hire 284 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

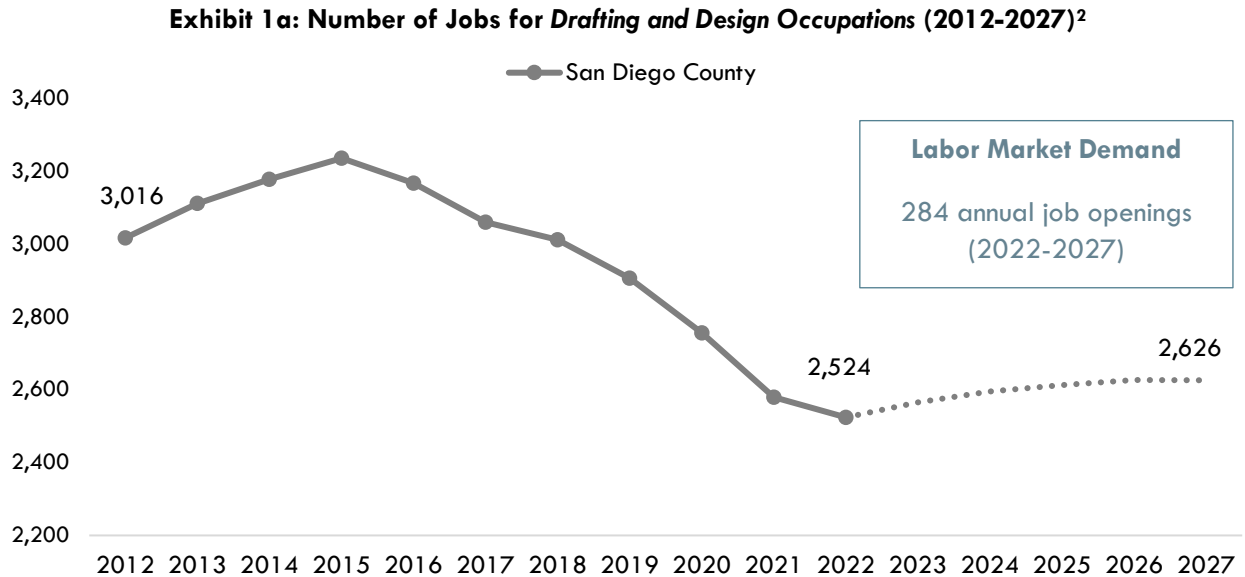


Exhibit 1b disaggregates the projected number of jobs change by occupation. “Architectural and Civil Drafters” are projected to have the most labor market demand between 2022 and 2027, with 152 annual job openings.

**Exhibit 1b: Number of Jobs for Drafting and Design Occupations in San Diego County (2022-2027)<sup>3</sup>**

Occupational Title	2022 Jobs	2027 Jobs	2022 - 2027 Net Jobs Change	2022-2027 % Net Jobs Change	Annual Job Openings (Demand)
Architectural and Civil Drafters	1,181	1,246	65	5%	152
Mechanical Drafters	504	507	3	1%	48
Commercial and Industrial Designers	384	399	15	4%	37
Drafters, All Other	240	247	7	3%	24
Electrical and Electronics Drafters	215	227	12	6%	23
<b>Total</b>	<b>2,524</b>	<b>2,625</b>	<b>102</b>	<b>4%</b>	<b>284</b>

<sup>2</sup> Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

<sup>3</sup> Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

## Earnings

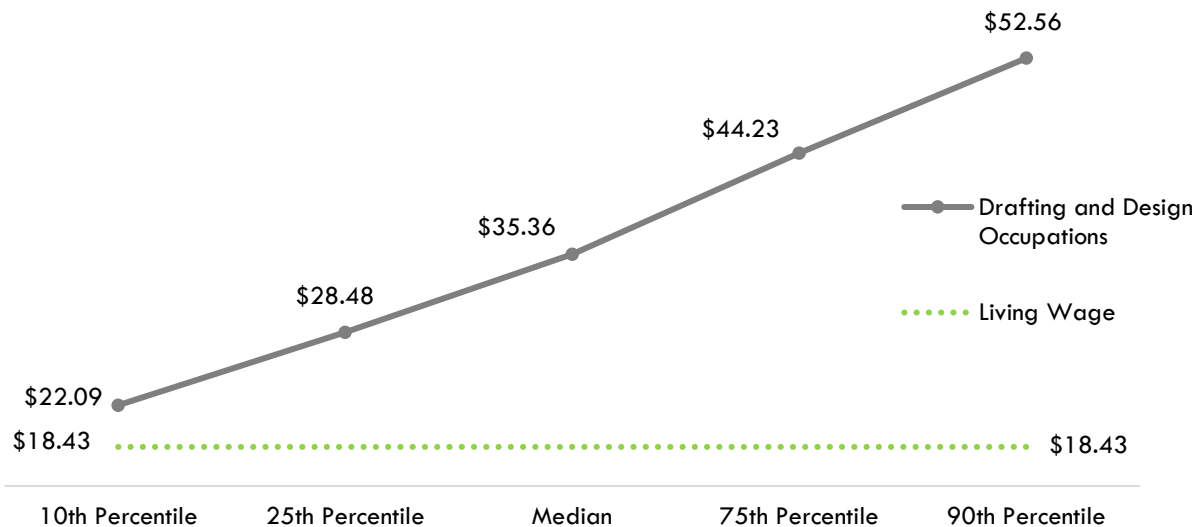
Exhibit 2a disaggregates hourly earnings by occupation. The entry-level hourly earnings for *Drafting and Design Occupations* range from \$26.77 to \$33.99.

**Exhibit 2a: Hourly Earnings for Drafting and Design Occupations in San Diego County<sup>4</sup>**

Occupational Title	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Commercial and Industrial Designers	\$33.99	\$41.25	\$52.76
Electrical and Electronics Drafters	\$27.36	\$33.16	\$41.90
Architectural and Civil Drafters	\$27.19	\$30.45	\$37.35
Drafters, All Other	\$27.11	\$36.03	\$44.67
Mechanical Drafters	\$26.77	\$35.90	\$44.48

On average, the entry-level hourly earnings for *Drafting and Design Occupations* are \$28.48; this is more than the living wage for a single adult in San Diego County, which is \$18.43 per hour (Exhibit 2b).<sup>5</sup>

**Exhibit 2b: Average Hourly Earnings<sup>6</sup> for Drafting and Design Occupations in San Diego County<sup>7</sup>**



<sup>4</sup> Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

<sup>5</sup> "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. [insightccd.org/family-needs-calculator/](https://insightccd.org/family-needs-calculator/).

<sup>6</sup> 10th and 25th percentiles could be considered entry-level wages, and 75th and 90th percentiles could be considered experienced wages for individuals who may have been in the occupation longer, received more training than others, etc.

<sup>7</sup> Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

## Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.<sup>8</sup> There are **eight** TOP codes and **12** CIP codes related to *Drafting and Design Occupations* (Exhibit 3).

**Exhibit 3: Related TOP and CIP Codes for Drafting and Design Occupations<sup>9</sup>**

TOP or CIP Code	TOP or CIP Program Title
TOP 0201.00	Architecture and Architectural Technology
TOP 0953.00	Drafting Technology
TOP 0953.10	Architectural Drafting
TOP 0953.20	Civil Drafting
TOP 0953.30	Electrical, Electronic, and Electro-Mechanical Drafting
TOP 0953.40	Mechanical Drafting
TOP 0953.60	Technical Illustration
TOP 1009.00	Applied Design
CIP 04.0401	Environmental Design/Architecture
CIP 04.0901	Architectural Technology/Technician
CIP 15.0101	Architectural Engineering Technology/Technician
CIP 15.1301	Drafting and Design Technology/Technician, General
CIP 15.1302	CAD/CADD Drafting and/or Design Technology/Technician
CIP 15.1303	Architectural Drafting and Architectural CAD/CADD
CIP 15.1304	Civil Drafting and Civil Engineering CAD/CADD
CIP 15.1305	Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD
CIP 15.1306	Mechanical Drafting and Mechanical Drafting CAD/CADD
CIP 50.0401	Design and Visual Communications, General
CIP 50.0404	Industrial and Product Design
CIP 50.0410	Illustration

<sup>8</sup> TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart ([datamart.cccco.edu](http://datamart.cccco.edu)) and CIP data comes from the Integrated Postsecondary Education Data System ([nces.ed.gov/ipeds/use-the-data](http://nces.ed.gov/ipeds/use-the-data)).

<sup>9</sup> This brief uses a conservative estimate of program supply and only calculates awards from the TOP codes in Exhibit 3.

According to TOP data, six community colleges supply the region with awards for these occupations: Cuyamaca College, MiraCosta College, Palomar College, San Diego City College, San Diego Mesa College, and Southwestern College. According to CIP data, two non-community-college institutions supply the region with awards Newschool of Architecture and Design and University of California-San Diego (Exhibit 4).

**Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions  
(Program Year 2019-20 through Program Year 2020-21 Average)**

TOP6 or CIP Code	TOP6 or CIP Program Title	3-Yr Annual Average CC Awards (PY19-20 to PY21-22)	Other Educational Institutions 2-Yr Annual Average Awards (PY19-20 to PY20-21)	Total Average Supply (PY19-20 to PY21-22)
0201.00	Architecture and Architectural Technology	<b>43</b>	<b>0</b>	<b>43</b>
	• MiraCosta	9	0	
	• Palomar	8	0	
	• San Diego Mesa	12	0	
	• Southwestern	14	0	
0953.00	Drafting Technology	<b>41</b>	<b>0</b>	<b>41</b>
	• MiraCosta	16	0	
	• Palomar	19	0	
	• Southwestern	6	0	
0953.10	Architectural Drafting	<b>17</b>	<b>0</b>	<b>17</b>
	• Cuyamaca	7	0	
	• Palomar	10	0	
0953.30	Electrical, Electronic, and Electro-Mechanical Drafting	<b>5</b>	<b>0</b>	<b>5</b>
	• Palomar	5	0	
0953.40	Mechanical Drafting	<b>12</b>	<b>0</b>	<b>12</b>
	• Cuyamaca	6	0	
	• MiraCosta	3	0	
	• Palomar	3	0	
0953.60	Technical Illustration	<b>1</b>	<b>0</b>	<b>1</b>
	• San Diego City	1	0	
1009.00	Applied Design	<b>3</b>	<b>0</b>	<b>3</b>

TOP6 or CIP Code	TOP6 or CIP Program Title	3-Yr Annual Average CC Awards (PY19-20 to PY21-22)	Other Educational Institutions 2-Yr Annual Average Awards (PY19-20 to PY20-21)	Total Average Supply (PY19-20 to PY21-22)
	<ul style="list-style-type: none"> <li>MiraCosta</li> </ul>	3	0	
50.0401	Design and Visual Communications, General	0	23	23
	<ul style="list-style-type: none"> <li>University of California-San Diego</li> </ul>	0	23	
50.0404	Industrial and Product Design	0	6	6
	<ul style="list-style-type: none"> <li>Newschool of Architecture and Design</li> </ul>	0	6	
			<b>Total</b>	<b>151</b>

## Demand vs. Supply

Comparing labor demand (annual openings) with labor supply<sup>10</sup> suggests that there is a **supply gap** for these occupations in San Diego County, with 284 annual openings and 151 awards. Comparatively, there are 3,233 annual openings in California and 2,645 awards, suggesting that there is also a **supply gap** across the state<sup>11</sup> (Exhibit 5).

### Exhibit 5: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

	Demand (Annual Openings)	Supply <sup>12</sup> (Total Annual Average Supply)	Supply Gap or Oversupply
San Diego	284	151	133
California	3,233	2,645	588

**Please note:** This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.

<sup>10</sup> Labor supply can be found from two different sources: Lightcast or the California Community Colleges Chancellor's Office MIS Data Mart. Lightcast uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

<sup>11</sup> "Supply and Demand," Centers of Excellence Student Outcomes, <https://coecc.net/our-resources/>.

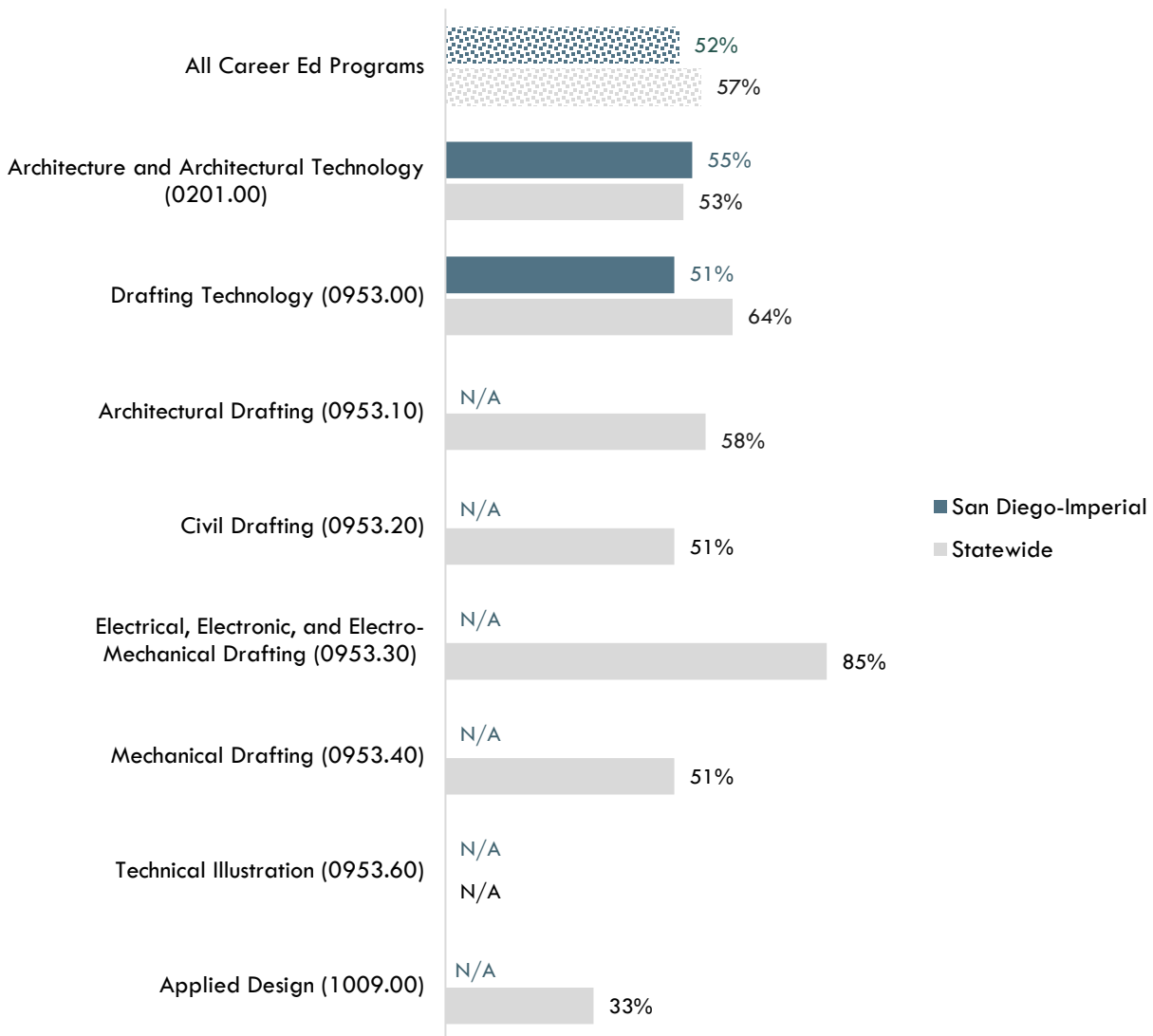
<sup>12</sup> Awards included: associate degree; award <1 year; award 1<2 years; and postsecondary awards.



## Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 51 to 55 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *Drafting and Design Occupations*, compared 33 to 85 percent statewide and 57 percent of students in Career Education programs in general across the state (Exhibit 6a).<sup>13</sup>

**Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program, PY2020-21<sup>14</sup>**



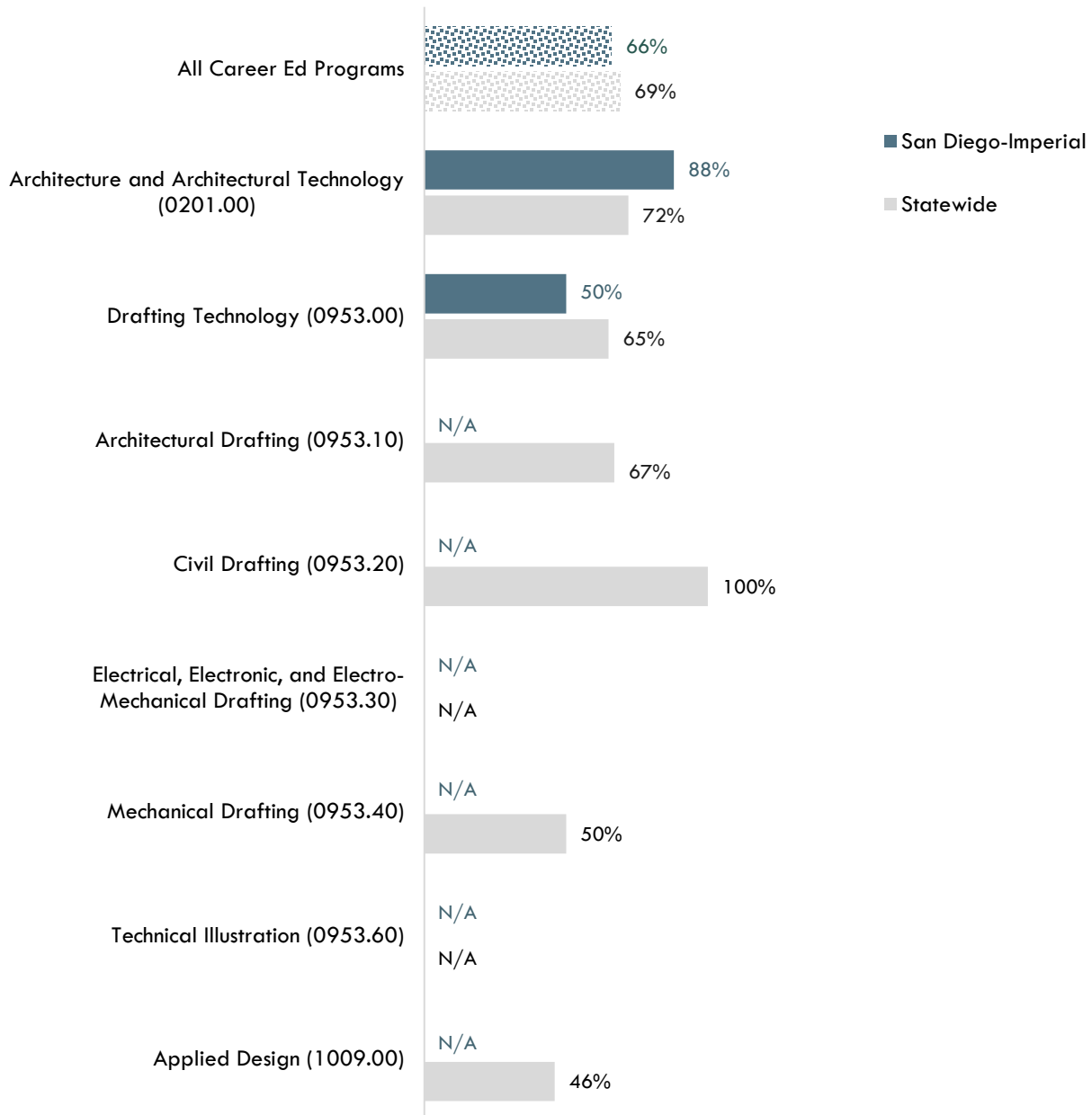
"N/A" indicates insufficient data

<sup>13</sup> "California Community Colleges Strong Workforce Program," California Community Colleges, [calpassplus.org/LaunchBoard/SWP.aspx](http://calpassplus.org/LaunchBoard/SWP.aspx).

<sup>14</sup> Most recent year with available data is Program Year 2020-21. Among completers and skills builders who exited, the percentage of students who attained a living wage.

According to the California Community Colleges LaunchBoard, 50 to 88 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a program related to *Drafting and Design Occupations*, compared to 46 to 100 percent statewide and 69 percent of students in Career Education programs in general across the state (Exhibit 6b).<sup>15</sup>

**Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program, PY2019-20<sup>16</sup>**



"N/A" indicates insufficient data

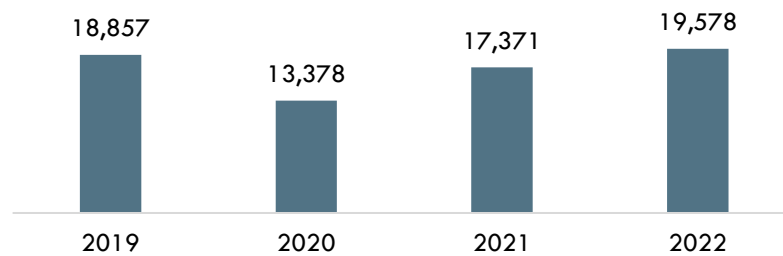
<sup>15</sup> "California Community Colleges Strong Workforce Program," California Community Colleges, [calpassplus.org/LaunchBoard/SWP.aspx](http://calpassplus.org/LaunchBoard/SWP.aspx).

<sup>16</sup> Most recent year with available data is Program Year 2019-20. Percentage of Students in a Job Closely Related to Field of Study: Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

## Online Job Postings

This report analyzes not only historical and projected (traditional LMI) data, but also recent data from online job postings (real-time LMI). Online job postings may provide additional insight about recent changes in the labor market that are not captured by historical data. Between 2019 and 2022, there was an average of 17,296 online job postings per year for *Drafting and Design Occupations* in San Diego County (Exhibit 7). Please note that online job postings do **not** equal labor market demand; demand is represented by annual job openings (see Exhibit 1 b). While this brief includes online jobs postings data to help with curriculum development, the community colleges should note that this type of data is impacted by several variables: employers may post a position multiple times to increase the pool of applicants; a job posting can remain posted after a business decides not to fill a position; or an employer may use one posting to fill multiple positions, for example.

**Exhibit 7: Number of Online Job Postings for *Drafting and Design Occupations* in San Diego County (2019-2022)<sup>17</sup>**



<sup>17</sup> Lightcast; "Job Posting Analytics." 2018-2022.

## Top Employers

Between January 1, 2020 and December 31, 2022, the top five employers in San Diego County for *Drafting and Design Occupations* were [GPAC](#), [Apple](#), [Randstad](#), [Motion Recruitment](#), and [CyberCoders](#) based on online job postings (Exhibit 8).

### Exhibit 8: Top Employers for *Drafting and Design Occupations* in San Diego County<sup>18</sup>

Top Employers	
<ul style="list-style-type: none"><li>• GPAC</li><li>• Apple</li><li>• Randstad</li><li>• Motion Recruitment</li><li>• CyberCoders</li></ul>	<ul style="list-style-type: none"><li>• Esri</li><li>• Intel</li><li>• Aerotek</li><li>• Actalent</li><li>• Boeing</li></ul>

## Education, Skills, and Certifications

*Drafting and Design Occupations* have a national educational attainment ranging from an [associate degree](#) to a [bachelor's degree](#) (Exhibit 9a).

### Exhibit 9a: National Educational Attainment for *Drafting and Design Occupations*<sup>19</sup>

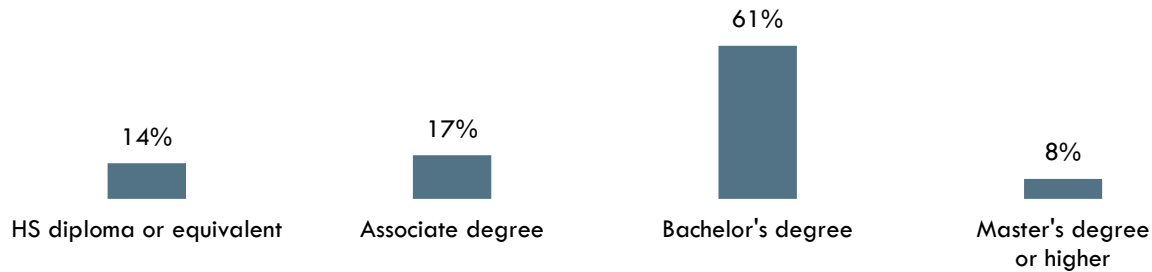
Occupational Title	Typical Entry-Level Education
Commercial and Industrial Designers	Bachelor's degree
Architectural and Civil Drafters	Associate degree
Drafters, All Other	Associate degree
Electrical and Electronics Drafters	Associate degree
Mechanical Drafters	Associate degree

<sup>18</sup> Lightcast, "Job Posting Analytics." 2020-2022.

<sup>19</sup> Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

Based on online job postings between January 1, 2020 and December 31, 2022 in San Diego County, employers posted a **bachelor's degree** as the most requested educational requirement for *Drafting and Design Occupations* (Exhibit 9b).<sup>20</sup>

**Exhibit 9b: Educational Requirements for *Drafting and Design Occupations* in San Diego County<sup>21</sup>**



\*May not total 100 percent due to rounding

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2020 and December 31, 2022.

**Exhibit 10: Top Skills for *Drafting and Design Occupations* in San Diego County<sup>22</sup>**

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> <li>Product Design</li> <li>Computer-Aided Design</li> <li>Prototyping</li> <li>New Product Development</li> <li>User Experience</li> <li>Project Management</li> <li>Visual Design</li> <li>Product Engineering</li> <li>Wireframing</li> <li>User Research</li> <li>Marketing</li> <li>Electrical Engineering</li> <li>User Interface</li> <li>Interaction Design</li> <li>Workflow Management</li> </ul>	<ul style="list-style-type: none"> <li>Communications</li> <li>Research</li> <li>Detail Oriented</li> <li>Problem Solving</li> <li>Management</li> <li>Self-Motivation</li> <li>Leadership</li> <li>Writing</li> <li>Innovation</li> <li>Customer Service</li> <li>Verbal Communication Skills</li> <li>Presentations</li> <li>Planning</li> <li>Operations</li> <li>Sales</li> </ul>	<ul style="list-style-type: none"> <li>AutoCAD</li> <li>Figma</li> <li>Autodesk Revit</li> <li>SolidWorks</li> <li>Microsoft Excel</li> <li>Python</li> <li>Adobe Photoshop</li> <li>Microsoft Outlook</li> <li>Invision</li> <li>Cascading Style Sheets</li> <li>Adobe Illustrator</li> <li>HyperText Markup Language</li> <li>Microsoft PowerPoint</li> <li>Adobe Creative Suite</li> <li>Apple IOS</li> </ul>

<sup>20</sup> Lightcast; "Job Posting Analytics." 2020-2022.

<sup>21</sup> "Educational Attainment for Workers 25 Years and Older by Detailed Occupation," Bureau of Labor Statistics, last modified April 9, 2021. [bls.gov/emp/tables/educational-attainment.htm](https://bls.gov/emp/tables/educational-attainment.htm).

<sup>22</sup> Lightcast; "Job Posting Analytics." 2020-2022.

Exhibit 11 lists the top certification that appeared in online job postings between January 1, 2020 and December 31, 2022.

**Exhibit 11: Top Certification for *Drafting and Design Occupations* in San Diego County<sup>23</sup>**

Top Certification in Online Job Postings

1. Enterprise Desktop Administrator (Microsoft Certified IT Professional)
  2. Security Clearance
  3. LEED Accredited Professional (AP)
  4. Engineer in Training
  5. Secret Clearance
  6. Master Of Business Administration (MBA)
  7. Professional Engineer (PE) License
  8. Product Certification
  9. Top Secret Clearance
  10. Six Sigma Green Belt
  11. Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)
  12. NICET Certification (National Institute For Certification In Engineering Technologies)
  13. Project Management Professional Certification
  14. Land Surveyor In Training
  15. Microsoft Certified Professional
- 

<sup>23</sup> Lightcast; "Job Posting Analytics." 2020-2022.

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Center of Excellence for the San Diego & Imperial Counties Community Colleges



### Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

**RIVERSIDE COMMUNITY COLLEGE DISTRICT  
PROGRAM OUTLINE of RECORD**

**Narrative**

College: R\_\_\_ M\_\_\_ N\_X

TOPs Code: 0953.00, 0953.40

CIP Code: NAS539/NAS539B/NAS539C/NCE539

**DRAFTING TECHNOLOGY CERTIFICATE**

**Program Narrative**

**Item 1. Program Goals and Objectives**

Drafting Technology certificate program prepares individuals the basic skills and knowledge in the field of drafting to perform as a general drafter. Students can advance their skills later on in Mechanical or Architectural drafting. This program gives individuals knowledge and skills to develop working drawings and electronic simulations in support of engineering drafting and related professionals. The content includes the application of Manual Drafting, Computer Assisted Drafting and technical communication to the creation of graphic representations and simulations in support of engineering projects.

Upon successful completion of this program, students should be able to:

1. An ability to apply and integrate computer technology in the design process, exhibiting skills necessary for entry level employment, as a drafter in the drafting industry.
2. Knowledge of engineering drawing skills and practice in the solution of industry related design projects.

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). Attached find LMI report.

**Item 2. Catalog Description**

**PROGRAM PREREQUISITE:**

None

**SHORT DESCRIPTION of PROGRAM**



This program prepares individuals to apply technical skills and advanced computer software and hardware to the creation of graphic representations and simulation in support of drafting and engineering design problems typical of industry. This includes instruction in engineering graphics, computer-aided drafting (CAD), two-dimensional and engineering graphics. Students completing this certificate will be qualified for an entry level drafting or design position.

### Item 3. Program Requirements

Required Courses: 14-15 units

Course	Title	Units	Sequencing
DFT/ENE21	Drafting	3	Semester 1, Fall
DFT/ENE27	Technical Communications	3	Semester 1, Fall
DFT/ENE30	Computer Aided Drafting	3	Semester 1, Fall
DFT/ENE51 OR CON 62	Blueprint Reading	2-3	Semester 1, Fall
ENE41	Engineering Graphics	3	Semester 2 Spring

Plus, an additional 6-8 units from the following elective courses:

Course	Title	Units	Sequencing
DFT/ENE60 OR MAT 36	Math for Engineering Technology OR Trigonometry	3 OR 4	Semester 1, Fall
CON60	Introduction to Construction	3	Semester 2 Spring
ARE37	Architectural Design	3	Semester 2 Spring
DFT/ENE42	SolidWorks I	3	Semester 2 Spring
MAN 56	CNC Machine Set-up and Operation	4	Semester 2 Spring

Total Program Units: 20 -23 units

### Associate of Science Degree

The Associate of Science Degree in Drafting Technology will be awarded upon completion of the degree requirements, including general education and other graduation requirements as described in the college catalog.

### Item 4. Master Planning

Riverside Community College District is dedicated to the success of its students and to the development of the communities it serves. By facilitating its Colleges and learning centers to provide educational and student services, it meets the needs and expectations of its unique communities of learners. The District provides the Colleges with leadership in the areas of advocacy, resource stewardship, and planning.

Norco College inspires a diverse student body by an inclusive innovative approach to learning through its pathways to transfer, professional, career and technical education, certificates, and degrees. We are proud to be a pivotal hub for scholarship, arts and culture, dynamic technologies, and partnerships. Norco College encourages self-empowerment and is dedicated to transforming the lives of our students, employees, and community.

The goal of this program is to provide a diverse population of adult learners with the opportunity to build their understanding of general Drafting techniques needed for drafting job performance, which is essential for setting up and operating a quality drafting service business/shop.

### **Item 5. Enrollment and Completer Projections**

The college expect to offer all courses in the certificate twice per year, and each class will be offered to 34 students. Students can complete the program within a year.

### **Item 6. Place of Program in Curriculum/Similar Programs**

Current Norco College Drafting Technology program includes:

<u>Required Courses (25-27 units)</u>	<u>Units</u>
DFT/ENE-21 Drafting	3
DFT/ENE-22 Engineering Drawing	3
DFT/ENE-28 Technical Design	3
DFT/ENE-30 Computer Aided Drafting (CAD)	3
DFT/ENE-42 SolidWorks I	3
DFT/ENE-51 Blueprint Reading	2
ENE-52 Geometric Dimensioning and Tolerancing	2
DFT/ENE-60 Math for Engineering Technology	3
or	
MAT-36 Trigonometry	4
Electives(Choose from list below)	3-4
 <u>Electives (3-4 units)</u>	
DFT/ARE-24 Architectural Drafting	3
DFT/ENE-23 Descriptive Geometry	3
DFT/ELE/ Technical Communications	3
ENE-27 DFT/ENE-42B SolidWorks II	3
MAN-56CNC Machine Set-Up and Operation	4

The current Drafting Technology certificate at Norco College doesn't give option to students who want to continue their education/career in the current drafting industry. New proposal focuses on essential related skills to perform the drafting job as well as a base courses allowing students to continue their education/career in variety of industries. This changes needed to be made as proposed in Item 3 to prepare students with sufficient skills for the job market.

### **Item 7. Similar Programs at Other Colleges in Service Area**

Norco College is the only community college in the region that kept long certificate in Drafting. Most of Colleges transferred Drafting Technology Certificate toward Mechanical, Civil or Architectural Drafting. In separate proposals Advancing Mechanical and Architectural Certificates are proposed, however the current Drafting Technology certificate needs to focus on common courses to serve all industries which allows students more options along the road.

**Item 8. Transfer Preparation Information (if applicable)**

The courses in this proposal are transferable as listed below.

Course	Title	Units	Transferable to
DFT/ENE21	Drafting	3	UC, CSU
DFT/ENE27	Technical Communications	3	CSU
DFT/ENE30	Computer Aided Drafting	3	UC, CSU
DFT/ENE51	Blueprint Reading	3	CSU
CON62	Print Reading for Construction	3	CSU
ARE37	Technical Communications	3	UC, CSU
DFT/ENE42	SolidWorks I	3	CSU
MAT36	Trigonometry	3	CSU
ENE 41	Engineering Graphics	3	CSU

Reference to [Norco College course catalog](#)



## Drafting Technology Advisory Meeting Minutes

**Meeting Date and Time:** Mar. 17, 2023 (9:00AM-11:00AM)

**Meeting Location:** Norco College, ATEC 109

### Attendees:

Farshid Mirzaei, DFT Faculty Norco College, farshid.mirzaei@norcolle.edu  
Adria Salvatore, Association of Woodworking & Furnishing Suppliers, adria@awfs.org  
Ramses Sandoval-Ochoa, RedBuilt, rsandoval-ochoa@redbuilt.com  
Wyatt Hess

*This is a summary of an Advisory Meeting held with the purpose of gaining industry insight and advice on the drafting programs proposed by Norco College. Each meeting is unique and the conversation flows in different directions due to the expertise of those present. What follows are the highlights of the meeting.*

1. Welcome and Introductions, start at 9:10am
2. Norco College's Drafting Updates
  - a. Course offerings, upcoming classes, credit/non-credit options, apprenticeship opportunities
    - i. Hybrid, online, non-credit now available
3. Programs used in industry
  - a. Fusion360, Revit, AutoCad, Simple 3d
4. Concepts/Skills that industry would like to be seen in new applicants
  - a. Ability to apply drafting concepts to solve complex, real world problems; sketching freehand skills; ability to use differing metrics and measurements between differing companies; cost estimates; proper use of scales (real vs. drawing); need for more practical skills; drone pilot's licensed by the FAA for surveys
5. What soft skills would you like to see?
  - a. Ability to work as a team
6. Conclude meeting, group taken on tour of Drafting Lab, Machining Lab and Automation Lab



# Advisory Committee Meeting 2020

## Agenda

Online Zoom Session  
April 30, 2020

Anticipated attendees: Farshid Mirzaei, Full Time Faculty Norco College  
Ashlee Johnson, Full Time Faculty Norco College  
Industry Advisers: Gary Miller, Miller Architecture  
Gilbert Alcala, Alcala Architecture  
Elena Cisneros, Roadsafe Traffic  
George Balteria, Northeast Trees  
Dave Koons, Architect  
Tim Mast Jr., Cryoworks

- |                     |   |
|---------------------|---|
| 12:30 pm - 12:45 pm | Welcome & Introductions   |
| 12:45 pm - 1:45 pm  | Advisory Board Discussions<br><i>Industry subgroups &amp; Norco College faculty</i><br><i>Industry trends, program curriculum feedback &amp; workforce preparedness</i><br><i>Follow-up &amp; next steps, internships &amp; interest card</i> |
| 1:45-1:50pm         | Closing Remarks and Adjournment   |



## Advisory Meeting Notes

1. Introductions- **Faculty introduced themselves and Advisory Committee members introduced themselves. Advisory Committee Members in attendance: Tim Mast Jr., Elena Cisneros, George Balteria, Dave Koons, and Gilbert Alcala**
2. Advisory members to review Programs-Ashlee and Farshid presented the curriculum and stated desire to revise curriculum for 1 or more of the programs and needed advisory feedback.
  - a. **Feedback and approval for Drafting Technology curriculum.-**

DFT/ELE 27 Technical Communications Course (3 units) is optional and faculty presented option of making it mandatory.

Gary Miller recommended foundations of sketching/drafting and software.

MAT-36 Trigonometry discussed if it is needed to meet industry standards.

Dave Koons agreed Trigonometry should be removed from mandatory curriculum and make it optional or remove altogether and add it to Mechanical Drafting Program instead. ARE-24 and 25 with Revit updates to possibly add to curriculum. Drafting should be very foundational and feeding into the Architectural and Engineering programs and set transfer students up for success. (Classes Tech Communication DFT/ENE 27, 28, 22 to stay) Recommendation: Removal or optional Class MAN 56, Blueprint Reading DFT/ENE 51 better to offer it as an option between print trading for Construction or machining. That is like more focus to your type of work or pre reading for construction and architecture.

That way the student has got those two options, because before that they were just forced on drafting technology to machining only, but if we offer it with the both options It can serve both construction and Machining/Mechanical Drafting.
  - b. **Feedback and approval for 3D Mechanical Drafting Program-** Tim Mast Jr.

Recommended Hand Sketching/Drafting Curriculum to put as first course/class to take in program. Add AutoCAD and Engineering Technology to the Drafting Certificate. Dave Koons and Tim Mast Jr. both stated a high demand from manufacturers for “Shop Drawings” that can be in their offices and do the shop drawings that go back to the architect. (Structural Shop Drawings Jobs like certificate/degrees at Mt. Sac) Steel Structures and metals construction. (Add Classes: DFT/ENE 27 Technical Communication)
  - c. **Feedback and approval for Architectural Graphics curriculum-**Gary Miller recommended need for students to know how to do drafting, of floor plans as example, as well as operating the software. Miller emphasized that students learn not just how to operate software but understand what the objects mean that they are drawing and that

they learn drafting conventions such as dimensioning, what information belongs on which sheets. Drafters from tech programs draw a technical picture but with little or no information. Tim Mast Jr. emphasized basics of industry terminology and definitions as well as office protocol as part of Technical Communication class. Dave Koons recommended Blueprint Reading or Document Reading Class needed. (Add : DFT/ENE-51 Blueprint reading, Technical Comm DFT/ENE 27, ARE-25) Suggestion from Dave Koons and Ashlee Johnson on a Basic Project Management Class.

- a. **Industry standards** - Industry is utilizing REVIT in addition to or instead of AutoCAD. Recommendation to advertise our ARE-24 and 25 classes that teach REVIT so we meet 10 + student enrollment. Entry level positions are being asked to do Specifications, so training in Specifications is important.
  - b. **State/industry certifications** – Suggest to give options to students in all certificates if they want to pursue higher degree later on to be able to transfer their courses. AA as an option.
  - c. **Suggestions:** Elena Cisneros recommended emphasis on Civil Engineering Classes in Drafting Technology or Architecture curriculum to add as Optional Classes to obtain certificate. Discussions over the importance that students understand the 2 pathways of certificate and/or associate degree and transfer capacity and that all the industry professions agreed students in this field may want to go back to school to get more education, so classes will hopefully all be made transferable.
- 3. Faculty to review curriculum changes and any hardware/software upgrades.**
- a. **What else should we consider to remain current with equipment, hardware, and software used in industry?** Industry is utilizing REVIT in addition to or instead of AutoCAD. Recommendation to advertise our ARE-24 and 25 classes that teach REVIT so we meet 10 + student enrollment. Virtual Reality Flybys training, software, and technical drafting, RHINO. Miller's opinion: there is greater demand for REVIT skills than Autocad.
- 4. Review employment procedures:**
- a. **How do advisory members typically recruit employees?** Online job boards, some advisories reach out to local colleges to post their jobs on College Job Board.
  - b. **Is there an internship process, if not how can we develop one?** Partnership with CSI could provide avenue for internships. NCARB has internship program to get one ready for license exam and meet state requirements. <https://www.ncarb.org/gain-axp-experience> (Course content FM). Miller suggested teaching the 32 CSI number system. Might only take one or two hours to introduce this numbering system. Many documents use this system in their annotation on drawings now. Likely to become much more prevalent.

- c. **What qualifications do they typically ask for?** Typically Certificate or Associate Degree is a minimum qualification. 4 year degrees are encouraged.
  - d. **Are there any recommendations for students to increase employability?-. A** recommendation from Gary Miller on a Pre-Architecture Program at Norco College. Recommendation from Dave Koons on industry partnerships, guest speakers in the classrooms for students, participation in Career Days. Advisory feedback that there is a High demand for Mechanical Drafting Students and pay rate high. Suggestion of Intro to Specs Specifications or Outline Specs course by Dave Koons, industry partner. He volunteered to do lectures and it is a high in demand job skill for Drafting
5. **What could we do to improve real world, on-the-job, work experience that students receive during their program?** Dave Koons suggested faculty provide in class guest speakers of industry professionals, tours of industry partner's offices and job sites. Gil Alcalá recommends field trips to understand 3 D versus 2D training to conceptualize the drawing and interpret real world, on-site drafting. George Balteria recommended field trips and cross-overs with the Construction Technology and bringing in real world drawings from projects straight from the city or straight from the company.

Summary of certificate for updates:

### **Drafting Technology Certificate:**

Required Courses: 14-15 units

<u>Course</u>	<u>Title</u>	<u>Units</u>
DFT/ENE21	Drafting	3
DFT/ENE27	Technical Communications	3
DFT/ENE30	Computer Aided Drafting	3
DFT/ENE51		
OR	Blueprint Reading	2-3
CON 62		
ENE41	Engineering Graphics	3

(ENE 41 is capstone project based, equivalent to ENE 22 plus ENE 28 to transfer to CSU)



Plus, an additional 6-8 units from the following elective courses:

<u>Course</u>	<u>Title</u>	<u>Units</u>
DFT/MAT 60	Math for Engineering Technology	3
OR	OR	OR
MAT 36	Trigonometry	4
CON60	Introduction to Construction	3
ARE37	Architectural Design	3
DFT/ENE42	SolidWorks I	3
MAN 56	CNC Machine Set-up and Operation	4

**Total Program Units: 20 -23 units**

### **3D Mechanical Drafting Certificate:**

Required Courses: 20 units

<u>Course</u>	<u>Title</u>	<u>Units</u>
DFT/ENE21	Drafting	3
DFT/ENE27	Technical Communications	3
DFT/ENE51	Blueprint Reading	2
DFT/ENE42	SolidWorks I	3

ENE52	Geometric Dimensioning & Tolerancing	3 (updated)
DFT/ENE30	Computer Aided Drafting	3
DFT/ENE42B	SolidWorks II	3

Elective Courses: 3-5 units

<u>Course</u>	<u>Title</u>	<u>Units</u>
MAT36	Trigonometry	4
MAN56	CNC Machine Set-Up and Operation	4
ENE41	Engineering Graphics	3
MAN35	Computer Aided Manufacturing-Mastercam	5

**Total Program Units: 23-25 units**

**ARCHITECTURAL GRAPHICS CERTIFICATE:**

Required Courses: 21 units

<u>Course</u>	<u>Title</u>	<u>Units</u>
DFT/ENE21	Drafting	3

DFT/ENE27	Technical Communications	3
CON62	Blueprint Reading for Construction	3
ARE24	Architectural Drafting	3
ARE25	Advanced Architectural Drafting	3
DFT/ENE30	Computer Aided Drafting	3
ARE37	Architectural Design	3

Plus, an additional 6 units from the following elective courses:

<u>Course</u>	<u>Title</u>	<u>Units</u>
ARE35	History of Architecture- Beginnings through Gothic	3
ARE36	History of Architecture: Renaissance to Modern	3
CON60	Introduction to Construction	3
CON74	Construction Estimating	3

**Total Program Units: 27 units**

Reference to Norco College course catalog

On an E-vote sent out on 5/1/2020, the committee voted on the updates above and replied for approval:

Farshid Mirzaei	YES
Ashlee Johnson	YES
Gary Miller, Miller	YES
Gilbert Alcala, Alcala	YES
Elena Cisneros	YES
George Balteria	YES
Dave Koons, Architect	YES
Tim Mast Jr.	YES

**RIVERSIDE COMMUNITY COLLEGE DISTRICT  
PROGRAM OUTLINE of RECORD  
Narrative**

College: R\_\_\_ M\_\_\_ N\_X

TOPs Code: 593.40

CIP Code: NCE863

## 3D MECHANICAL DRAFTING CERTIFICATE

### Program Narrative

#### **Item 1. Program Goals and Objectives**

3D Mechanical Drafting certificate program prepares individuals to apply basic Mechanical drafting knowledge and skills to development of working drawings and electronic simulations in support of mechanical and industrial engineers and related professionals. The content includes the application of advanced computer software and hardware, Computer Assisted Drafting, Computer Assisted Design (CAD) and Building Information Modeling (BIM) to the creation of graphic representations and simulations in support of engineering projects.

Upon successful completion of this program, students should be able to:

1. Demonstrate an understanding of 3D mechanical modeling so as to be able to capture design intent in a 3D model.
2. Map out the most efficient path in 3D model creation.
3. Reverse engineer existing parts and recreate them as 3D computer models.

Employment for mechanical drafters is expected to increase by 2% between 2017 and 2022 in the Inland Empire/Desert Region. Just over 200 job openings will be available over the five-year timeframe. The entry-level wage for mechanical drafters 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 (2 average annual community college awards), and the annual openings for mechanical drafters in the local region (42 annual job openings). Attached find LMI report.

#### **Item 2. Catalog Description**

##### PROGRAM PREREQUISITE:

None

##### SHORT DESCRIPTION of PROGRAM

This certificate includes courses intended to help students qualify for an entry level CAD operator/drafter or help someone, already in industry, to update their skills. Students can expect an entry level position as a CAD operator, mechanical drafter, engineering assistant and engineering technician.

### Item 3. Program Requirements

Required Courses: 20 units

Course	Title	Units	Sequencing
DFT/ENE21	Drafting	3	Semester 1, Fall
DFT/ENE27	Technical Communications	3	Semester 1, Fall
DFT/ENE51	Blueprint Reading	2	Semester 1, Fall
DFT/ENE42	SolidWorks I	3	Semester 1, Fall
DFT/ENE30	Computer Aided Drafting	3	Semester 1, Fall
DFT/ENE42B	SolidWorks II	3	Semester 2, Spring
ENE52	Geometric Dimensioning & Tolerancing	3 (updated)	Semester 2, Spring

Plus, an additional 3-5 units from the following elective courses:

Course	Title	Units	Sequencing
MAT36	Trigonometry	4	Semester 2, Spring
MAN56	CNC Machine Set-Up and Operation	4	Semester 2, Spring
MAN35	Computer Aided Manufacturing- Mastercam	5	Semester 2, Spring
ENE41	Engineering Graphics	3	Semester 2, Spring

Total Program Units: 23-25 units

### Associate of Science Degree

The Associate of Science Degree in 3D Mechanical Drafting will be awarded upon completion of the degree requirements, including general education and other graduation requirements as described in the college catalog

### Item 4. Master Planning

Riverside Community College District is dedicated to the success of its students and to the development of the communities it serves. By facilitating its Colleges and learning centers to provide educational and student services, it meets the needs and expectations of its unique communities of learners. The District provides the Colleges with leadership in the areas of advocacy, resource stewardship, and planning.

Norco College inspires a diverse student body by an inclusive innovative approach to learning through its pathways to transfer, professional, career and technical education, certificates, and degrees. We are proud to be a pivotal hub for scholarship, arts and culture, dynamic technologies, and partnerships. Norco College encourages self-empowerment and is dedicated to transforming the lives of our students, employees, and community.

The goal of this program is to provide a diverse population of adult learners with the opportunity to build their understanding of Mechanical Drafting skills needed for drafting job performance, which is essential for setting up and operating a quality Mechanical drafting service business/shop.

## Item 5. Enrollment and Completer Projections

The college expect to offer all courses in the certificate twice per year, and each class will be offered to 34 students. Students can complete the program within a year.

## Item 6. Place of Program in Curriculum/Similar Programs

Current Norco College 3D Mechanical program includes only:

ENE-21 Drafting	3
ENE-42 SolidWorks I	3
<u>ENE-42B SolidWorks II</u>	<u>3</u>
Total 9 units	

The current 3D Mechanical Drafting certificate at Norco College is lacking the print reading and other essential related skills to perform the drafting job. It needs to be updated with the industry needs as proposed in Item 3 to prepare students with sufficient skills for the job market.

## Item 7. Similar Programs at Other Colleges in Service Area

Chaffey College in San Bernardino County has a similar program.

### Drafting Certificate & Degree Requirements

Drafting Technician: Mechanical AS Degree Requirements

To obtain an Associate's Degree, students must complete both the major requirements below and the graduation requirements listed on pages 35-36.

COURSE NUMBER	NAME	UNITS
DRAFT 20	Computer-Aided Drafting and Design	4
DRAFT 21	Mechanical Design I	3
DRAFT 41	Computer-Aided Drafting and Design: Mechanical	4
DRAFT 43	Advanced CAD Modeling and Applications	3
DRAFT 78	Advanced Design Applications	4
EGTECH 10	Introduction to Engineering Design	4
EGTECH 16	Computer Integrated Manufacturing - CNC Material Removal	3
Total units for the major		25
<b>Required General Education courses:</b>		
PHYS 5*	The Ideas of Physics	3
PHYS 6*	The Ideas of Physics Laboratory	1
* or any advanced course in Physics with a laboratory		

**Item 8. Transfer Preparation Information (if applicable)**

All the courses in this proposal are transferable as listed below.

Course	Title	Units	Transferable to
DFT/ENE21	Drafting	3	UC, CSU
DFT/ENE27	Technical Communications	3	CSU
DFT/ENE51	Blueprint Reading	2	CSU
DFT/ENE42	SolidWorks I	3	CSU
ENE52	Geometric Dimensioning & Tolerancing	3 (updated)	CSU
DFT/ENE30	Computer Aided Drafting	3	UC, CSU
DFT/ENE42B	SolidWorks II	3	CSU
ENE41	Engineering Graphics	3	CSU