

# Engineering

Talent Demand Report 2023

Advancing San Diego

SAN DIEGO REGIONAL



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# San Diego's engineering talent pipeline

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# Executive summary

Through [Advancing San Diego](#)'s employer working groups (EWG), San Diego Regional EDC gains a real-time understanding of regional labor market information. The following Talent Demand Report is the culmination of the information gleaned from a series of working group meetings and surveys, all which serve to help San Diego training providers align curriculum to the needs of industry.

Given [their importance](#) in San Diego's innovation economy, as well as significant skill overlap lending to a buildable career, this report focuses on three engineering roles: **assemblers, engineering technicians, and general engineers**. The report outlines the way employers prioritize employability skills (also known as soft skills) as well as certifications requirements for all three occupations together. Trending technical skills (also known as hard skills) are assessed for each role individually.

**Training providers and educational programs are encouraged to use this report as a guide for curriculum development.** Those that are already meeting these requirements, or are in the process of updating curriculum according to these standards, are encouraged to apply to [become a Verified Program of Engineering Talent](#).

Employers interested in connecting with qualified programs can attend events hosted by EDC or reach out directly for a warm introduction.

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## Overview

# Advancing San Diego

Advancing San Diego is a collaborative effort to **better prepare San Diegans for quality jobs via locally-serving education institutions** and expand access to diverse, qualified talent for San Diego companies.

The program is helping the region meet its **Inclusive Growth goals** by strengthening relationships between local industry and education systems. Better alignment between these systems will allow the region to adequately prepare San Diegans for high-demand jobs, while allowing local employers—especially small businesses—to establish or expand recruitment relationships with locally-serving institutions.



### Communicate Industry Demand

Regularly quantify and communicate broad regional workforce demand.



### Adapt Existing Resources

Help adapt curriculum and workforce systems for better economic mobility.



### Expand Access for San Diegans

Explore unique solutions to remove barriers to entry into quality jobs.



## Overview

# Employer working group

Engineers drive San Diego's innovation economy. Companies rely on skilled professionals to build aerospace technology, develop the next generation of microchips, advance ship production, and drive discovery across nearly every industry. The continued growth of San Diego's innovation economy and subsequent rapid technological advancements lead to a **high demand for engineering professionals in San Diego.**

Leveraging strategies from the U.S. Chamber of Commerce Foundation's **Talent Pipeline Management®** framework, San Diego Regional EDC convened 13 local companies for its employer working group (EWG) that collectively employ more than 21K people in the region to gain a real-time picture of San Diego's talent needs. As part of a **series of regional talent demand reports**, the follow pages serve as a **snapshot of local demand for engineering professionals.**

## Employer working group companies



## Regional overview

# The economy

**3.3M+**

### POPULATION

across 18 cities

**\$253B**

### GDP

San Diego County

**\$83.5K**

### MEDIAN INCOME

per household

The San Diego region is consistently recognized for its **established tech and entrepreneurial ecosystem**, supported by distinguished universities and an **unrivaled quality of life**.

San Diego's economy—combined with the region's diverse communities, population, and global connectivity—supports the attraction and retention of top talent and **some of the world's most innovative companies**.

But there is work to be done to ensure San Diego can maintain this competitiveness. As a region, we must **prioritize economic inclusion** so more San Diegans can thrive.



Learn more at:

[inclusivesd.org](https://inclusivesd.org)

## Industry overview

# Innovation economy

#3

**BEST PLACE**  
for startups

27+

**INCUBATORS**

\$4.5B

**VC FUNDING**  
2022

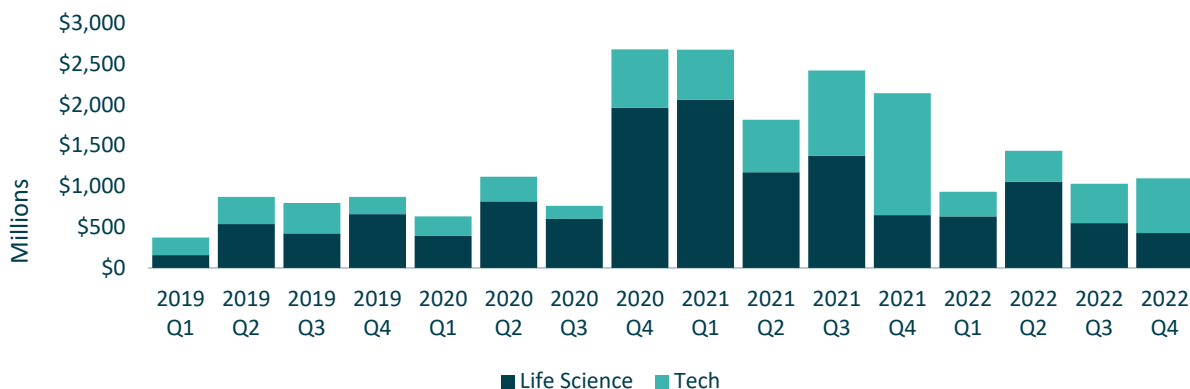
San Diego's innovation economy sits on a foundation of established industries, including **life sciences, aerospace, and information and communication technologies**. Over the last decade, the intellectual capital generated across these pillars has **accelerated growth in cybersecurity, software development, biotech, and clean energy**.

**Fueled by a collaborative culture and sophisticated support systems** focused on commercializing research and growing entrepreneurial, knowledge-based companies, San Diego's innovation economy plays a crucial role in the region's continued growth.



**Every job in innovation supports another two jobs elsewhere in the economy**

## Total VC in science and technology



## Occupation overview

# Occupations

This report will cover the three in-demand engineering-related occupations. The analysis will serve as a high-level guide on the skills and competencies needed for these entry-level roles in San Diego.

## Assemblers

Assemblers are responsible for assembling products and ensuring products are created efficiently and correctly. In addition, they provide the maintenance of assembled equipment, equipment analysis, and ensure any issues are dealt with accordingly.

## Engineering techs

Engineering technicians operate and program machine tools that are controlled by a computer to produce precision metal or plastic parts. To produce high-quality parts, machinists set up machines, write and test programs, and make adjustments as needed.

## General engineers

*Due to the vast array of engineering needs in San Diego, this report assesses the common themes across entry-level engineering roles.* Consistently, entry-level engineers are responsible for the application of scientific knowledge and the design, control, or use of building structures, equipment, or apparatus. This report covers electrical, systems, structural, aerospace, mechanical, industrial, civil, chemical, bio, environmental, and nuclear engineers.

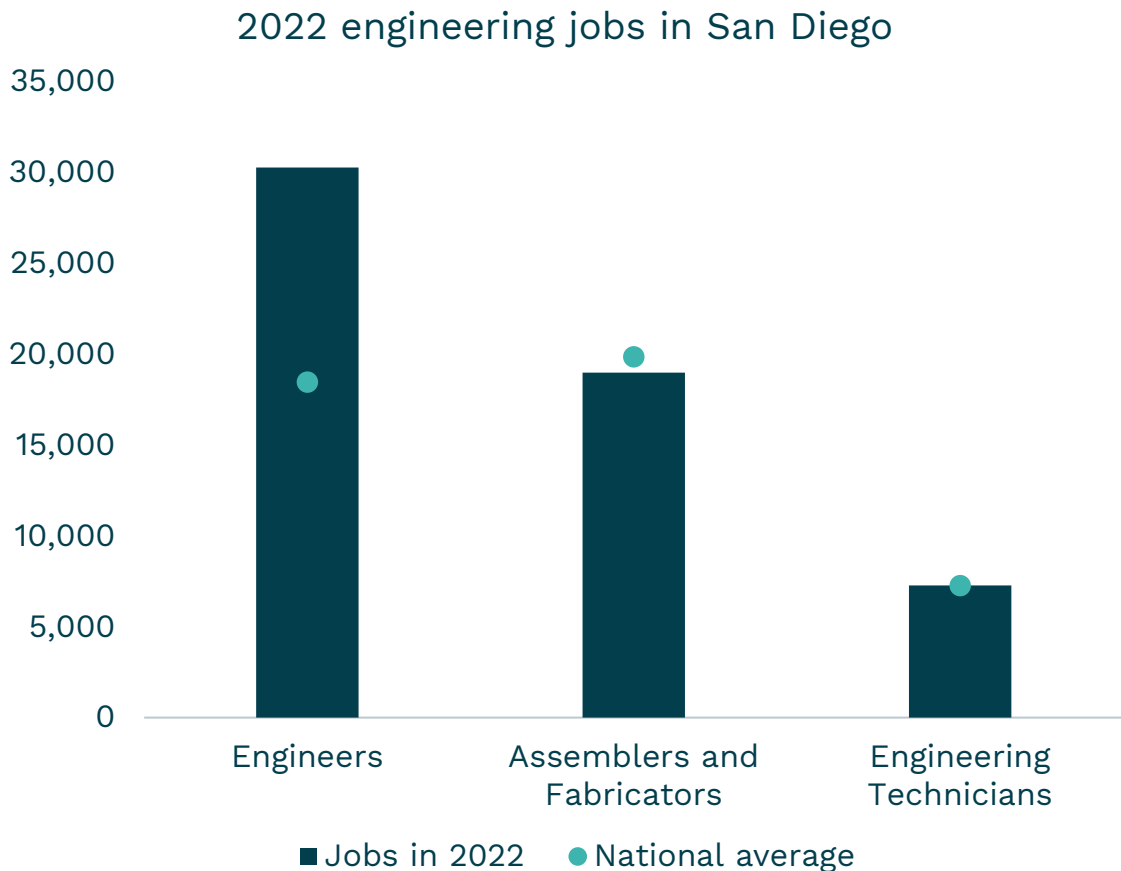


**Due to an alignment of skills, there is potential to create pathways through education across all occupations.**



## Talent demand

# Engineering demand



There is often a mismatch between standard occupation classification (SOC) system and real-life job titles. For example, an “aerospace engineer” may be referred to as a “mechanical engineer” in some job postings. This emphasizes the need for local labor market research.

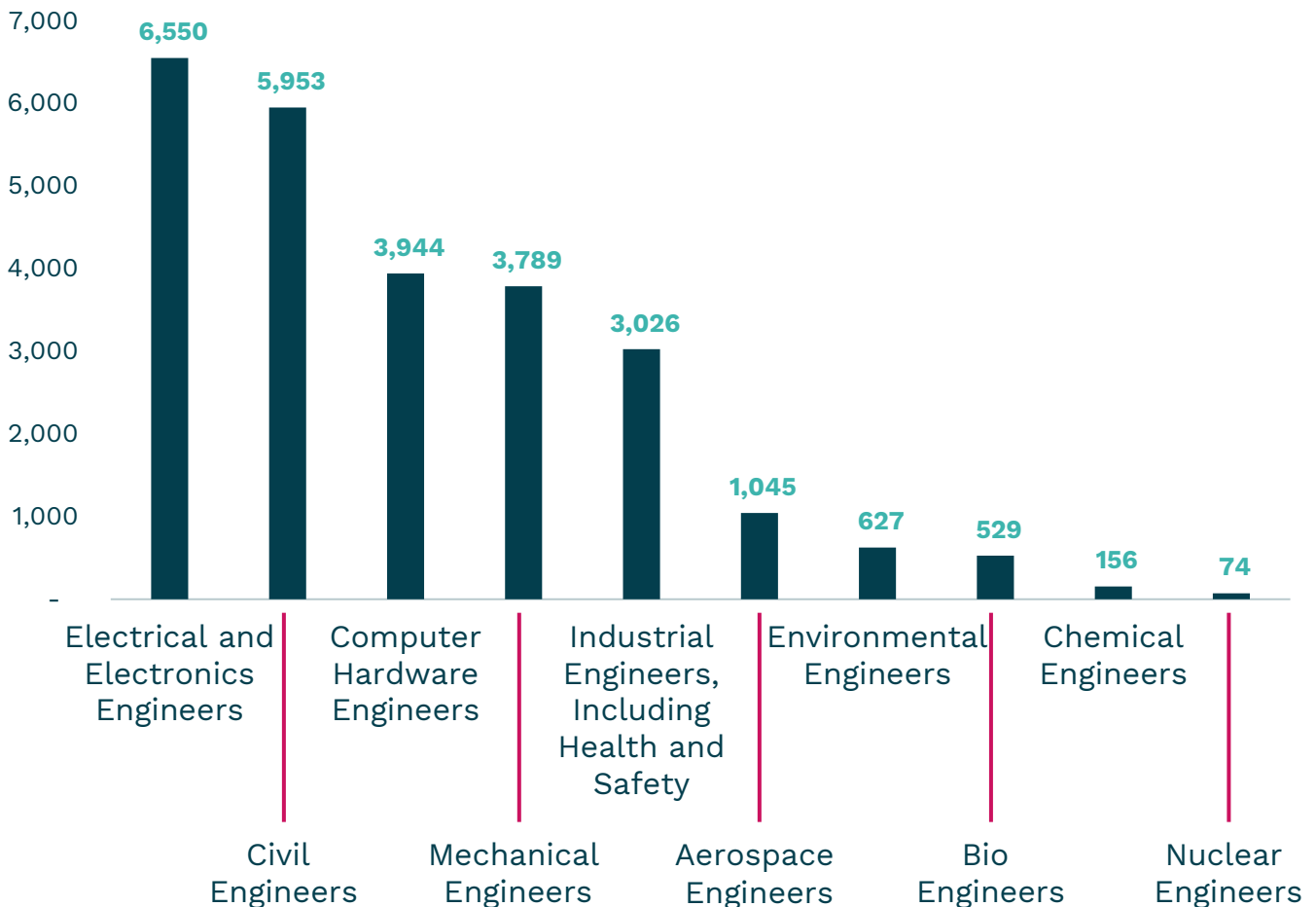


## Talent demand

# Engineering demand

**A double click into the 30K engineering jobs.**

2022 engineering jobs breakdown



Breaking down the 30K engineering jobs in the region, **employer working group findings are consistent with labor market information (LMI) around high-demand for electrical engineers.** However, LMI does not reflect the **rising demand expressed in the working group for systems engineers** who often cross-trained, specializing in integrating and managing complex systems.

# Talent supply

## Public universities

**1,810**

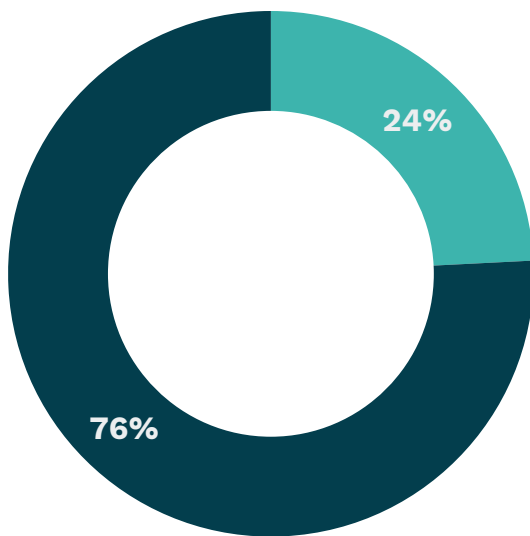
Engineering degree recipients at San Diego public universities.

**3,436**

Unique job postings for entry-level talent.

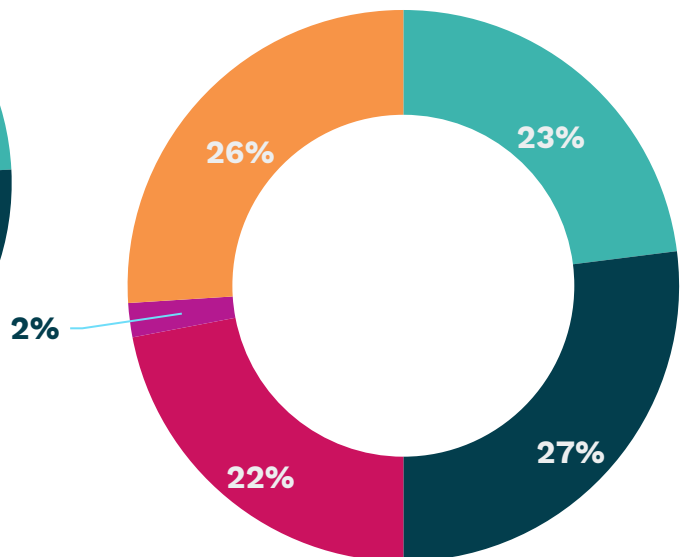
### 2022 engineering recipients

#### Gender



■ Female ■ Male

#### Ethnicity



■ Hispanic/Latino ■ White ■ Asian ■ Black ■ Other



**The gender and ethnicity gap continues throughout public university enrollment.**

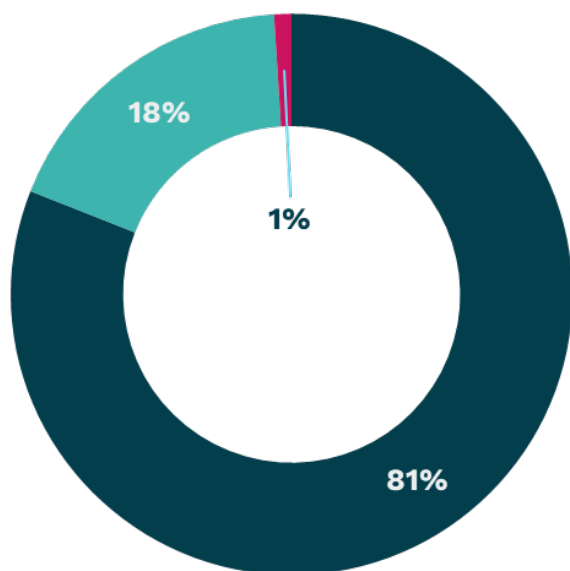
## Talent supply

# Community colleges

In the 2020-2021 academic year, there were **more than 1,000 students enrolled** in general engineering courses across all 10 of the region's community colleges, but only **59 students completed** programs related to general engineering. An associate's degree or certificate is an important pathway into entry-level assembler and engineering technician roles.

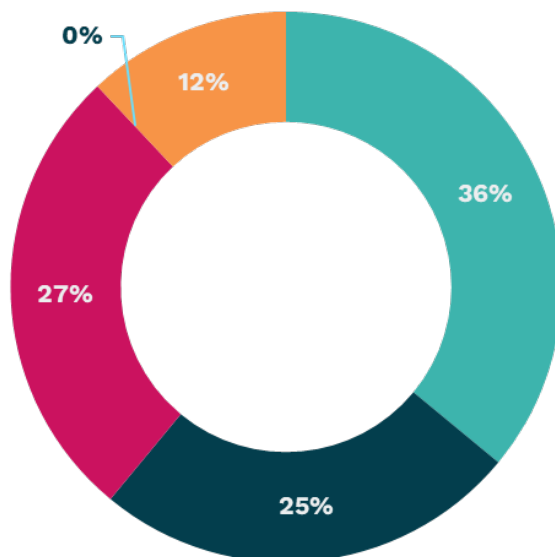
However, gaps between enrollment and completion, as well as **persistent gender gaps, raise concern for the health of the overall talent pipeline**. Increasing female enrollment would help increase the talent supply of engineers in our region. The graphs below reveal the demographic breakdown of the 59 program completers.

Gender



■ Male ■ Female ■ Masked Values

Ethnicity



■ Hispanic ■ White ■ Asian ■ Black ■ Other

## Talent supply

# The workforce of tomorrow

In the graduating class of 2022, only **47.7 percent of Hispanic** and **52.2 percent of Black** students met the requirements that qualify them to attend an education institution in the California State University or University of California systems.

Comparatively, **76.7 percent of Asian students** and **66 percent of White students** met these requirements. Students that identify as people of color make up more than half of our future workforce. There is a continued **need to invest in San Diego's Hispanic and Black youth**.

**481K**

K-12 PUBLIC  
SCHOOL  
ENROLLMENT

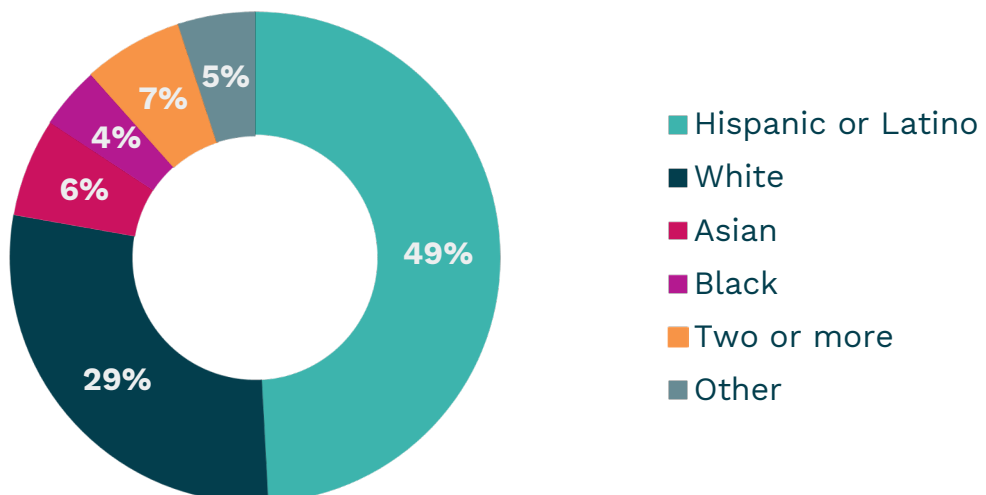
**34K**

HIGH SCHOOL  
GRADUATES IN  
2022

**19K**

GRADUATE A-G  
REQUIREMENTS

## K-12 Demographics

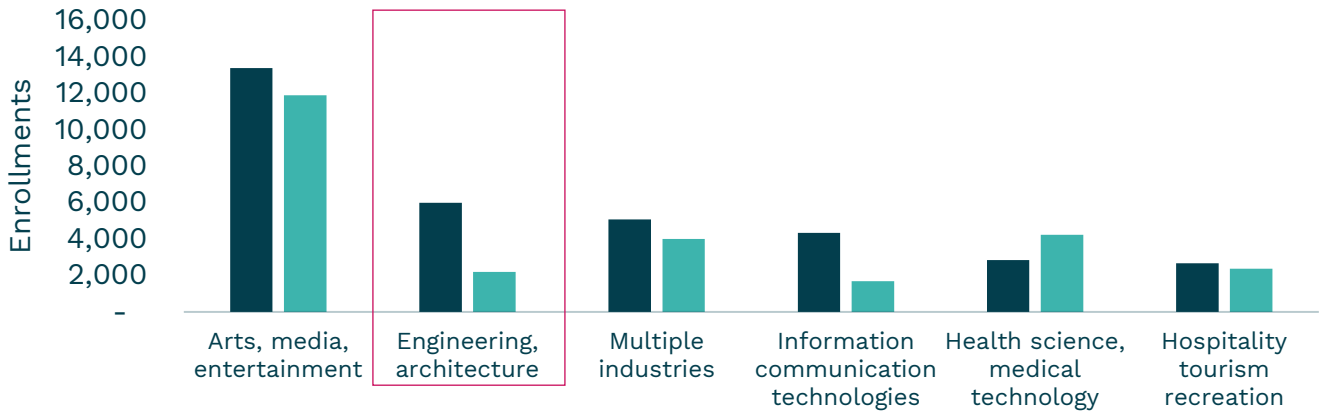


## Talent supply

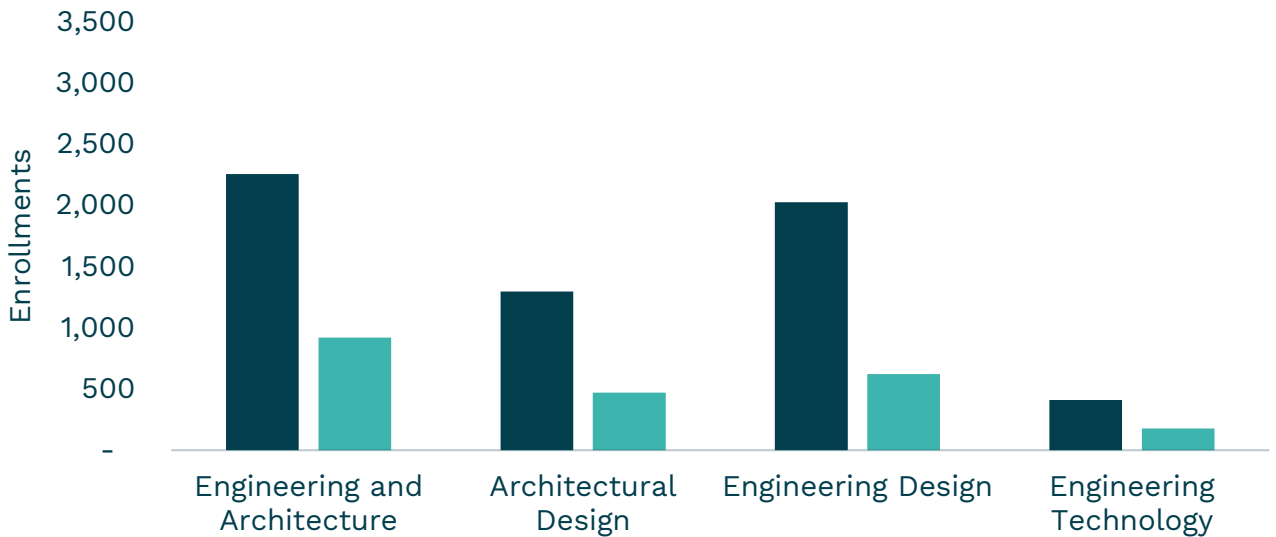
# K-12 career technical education

CTE enrollment 2018 - 2019

■ Male ■ Female



CTE engineering and architecture enrollment



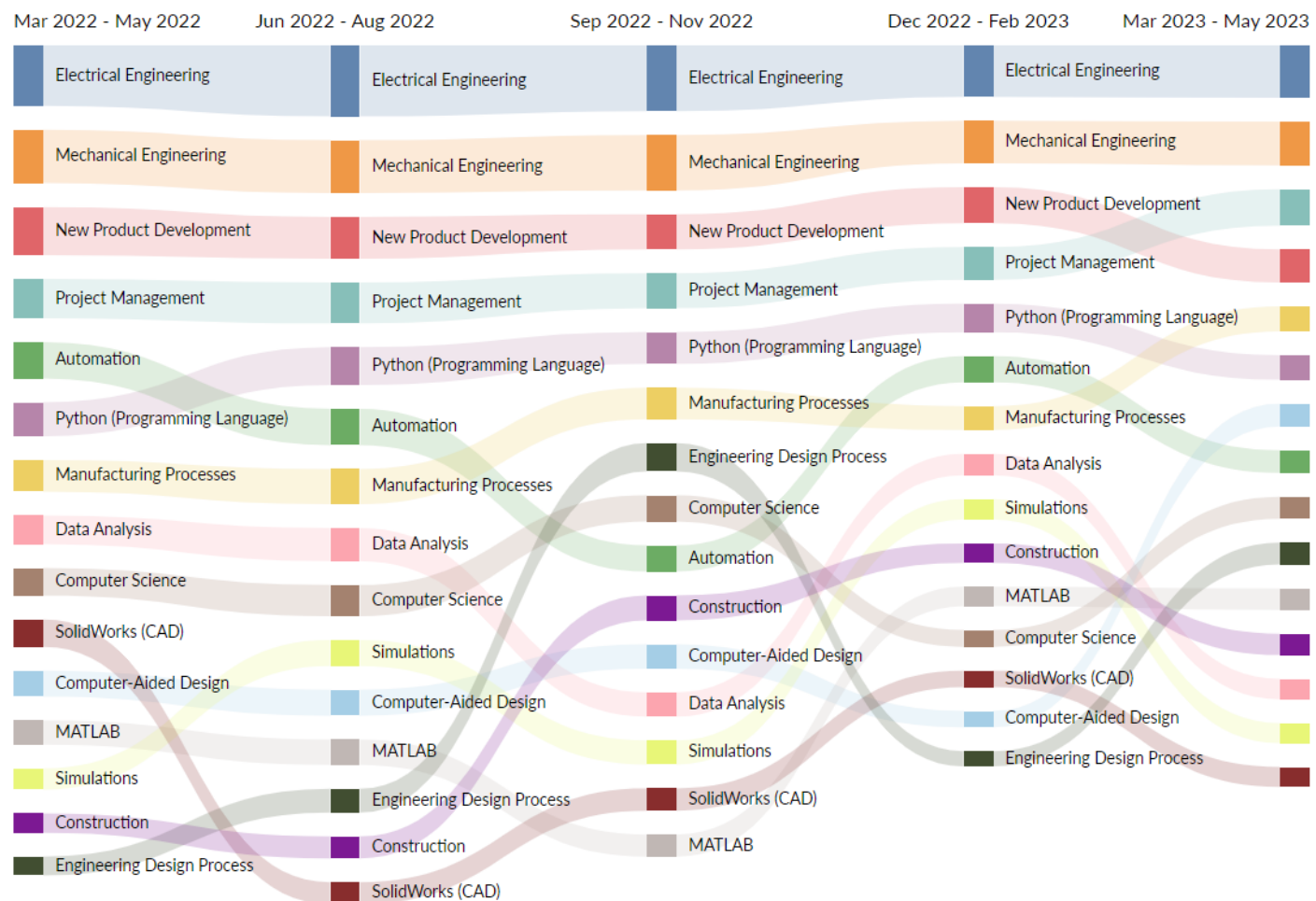
There continues to be a misalignment between the available career technical education (CTE) pathways at K-12 public schools and the overall job market in San Diego, where roles in **professional, scientific, and technical services** dominate. There is also a gender gap when it comes to K-12 CTE enrollment, especially in engineering pathways as is depicted above.

# Skills and competencies

## General trends

According to companies in the employer working group, **roles that require less training, such as assemblers, are paid a higher median hourly wage** than what the labor market information indicates.

The chart below highlights the most in-demand skills from unique job postings from 2022 – 2023. Each skill is highlighted in a different color and tracks the fluctuation of how often the skill is mentioned in job postings for engineering roles in San Diego.



# Skills and competencies

## Employability skills

### Critical thinking

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Uses logical thought processes to properly define challenges or problems, gather and interpret evidence, and draw reasoned conclusions.

### Dependability

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Building trust with others by keeping your word. Managing your time by planning and controlling how your work time is spent to achieve goals.

### Detail-oriented

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Ability to pay close attention to details and ensure accuracy and completeness in work. Being meticulous and methodical, with a focus on precision and thoroughness.

### Problem solving

---

Applies critical thinking skills to solve problems by generating, evaluating, and implementing effective solutions.



## Skills and competencies

# Assemblers

**19K**

**JOBS**

**1,026**

**AVG MONTHLY  
HIRES**

**\$37K**

**AVG  
SALARY**

“

*Exposing people to feeder positions such as assembler and engineering technician roles is critical. They can learn the basics and get visibility to higher paying jobs through continued education.*

”

## Trending technical skills

- **Basic electrical theory:** Knowledge of the function and operation of electrical equipment to ensure proper installation and to complete tasks such as troubleshooting electrical systems and equipment.
- **Basic tool knowledge:** Fundamental knowledge and ability to handle machines and tools.
- **Mechanical assembly:** Assemble components by mechanically fastening parts and subassemblies.



**75% of EWG members require a high school diploma for entry-level assemblers**

## Skills and competencies

# Engineering technicians

7.2K

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JOBS

258

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AVG MONTHLY  
HIRES

\$67K

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AVG  
SALARY

## Trending technical skills

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- **Equipment testing:** Develop criteria for test plans, test execution, and information capture for systems and components as a baseline for operational capability assessments.
- **Maintenance:** Regularly inspecting and servicing electrical, mechanical, industrial, production, or related systems and components to prevent future failures or restore to serviceable and acceptable operating conditions. Identify and resolve issues in systems.
- **Safety:** Work with internal safety department to get all test equipment safety approved prior to manufacturing using test equipment.

## Skills and competencies

# Engineering technicians cont.

- **Standardization:** Standardize and check Measuring and Test Equipment (M&TE) to specification to ensure accuracy, repeatability, and reproducibility.
- **Troubleshooting:** Trace errors within control systems and components.
- **Test plan knowledge:** Ability to work through test plans developing test equipment into full production manufacturing equipment. Interpret engineer's requests and expectations and develop test plans accordingly.



*Theoretical knowledge and education can only get you so far. Hands-on experience and internships are critical because it allows a student to learn about each company's intellectual property, which is something you can't get from just a classroom.*



Among the employer working group members, **43 percent** prefer a bachelor's degree, **29 percent** prefer an associate's degree, and **29 percent** require a high school diploma for entry-level engineering technicians.



## Skills and competencies

# General engineers

**30.2K**

**JOBS**

**708**

**AVG MONTHLY  
HIRES**

**\$110K**

**AVG  
SALARY**

## Trending technical skills

- **Data analysis:** Build systems for collecting, validating, and preparing high-quality data.
- **Model based systems engineering:** Knowledge of methodology used to support the requirements, design, analysis, verification, and validation associated with the development of complex systems.
- **Test equipment and processes:** Designing and implementing effective testing procedures to ensure the quality and reliability of products and systems.

Consistency in the way employers frame of engineering skills over the years:



**2020**

*With engineering fields blending, those trained with an **engineering mindset** often find that their skills are easily transferred across disciplines.*

**2023**

***Engineering is a type of framework or mindset** that relies heavily on critical thinking, problem resolution, and employability skills.*



## Skills and competencies

# General engineers cont.

## Other considerations

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- **Maintenance:** Regularly inspecting and servicing electrical, mechanical, industrial, production, or related systems and components to prevent future failures or restore to serviceable and acceptable operating conditions. Identify and resolve issues in systems.
- **Project management principles:** Basic knowledge of project goal planning and communication.
- **Technical process documentation:** Crafting a record that gives in-depth information about the purpose, application, or creation of a product, program, or service.

Employers repeatedly emphasize the importance of **work-based learning** as part of an engineer's training. Industry is also exploring ways to reimagine their role in more extensive forms of work-based learning; models like [apprenticeships](#) and [cooperative education](#) have emerged as critical for the transition from student to worker.



**43% of EWG members prefer a Bachelor's degree for entry-level engineering positions.**

# Advancing San Diego Verified Programs

Training programs receive recognition for:



Teaching the necessary  
technical skills



Refining critical  
employability skills



Ensuring access for a  
diverse population



Consistently engaging  
with industry



Demonstrating a history of  
collaboration in the region

## Verified Program benefits:

- Employer-recognized curriculum.
- Networking opportunities with regional employers and workforce partners.
- Public recognition through EDC's marketing channels, feature on EDC's talent dashboard (launching Fall 2023), and highlights on EDC's blog.
- EDC "short-list" for industry partnerships.
- Paid work-based learning opportunities for students.

Apply by October 9th!

For more information, contact Andrea Crisantes at [acs@sandiegobusiness.org](mailto:acs@sandiegobusiness.org)

# References

## **General economic data:**

[San Diego Regional EDC Regional Overview](#)

## **K-12 data:**

[State of California Department of Education](#)

## **Community college data:**

[CalPassPlus Community College Dashboard](#)

TOP code referenced: 0901

## **Public university data:**

[San Diego State University Institutional Research](#)

[CSU San Marcos Institutional Research](#)

[UC San Diego Institutional Research](#)

## **Labor market information data:**

[Lightcast Occupation Snapshot Report](#)

Learn more at [AdvancingSD.org](https://AdvancingSD.org)