







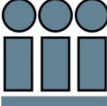


Chemical Technology Occupations

Labor Market Analysis: San Diego County

October 2023

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
 Proceed with Caution	 	 	<input type="checkbox"/> Doctorate Degree <input type="checkbox"/> Master's Degree <input type="checkbox"/> Bachelor's Degree <input type="checkbox"/> Apprenticeship <input type="checkbox"/> Associate Degree <input type="checkbox"/> Some College or Certificate <input checked="" type="checkbox"/> HS Diploma or Equivalent <input type="checkbox"/> Less Than a HS Diploma
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
 	<div style="background-color: #4a7c9c; color: white; padding: 2px; font-weight: bold;">LOW</div> 	<div style="background-color: #4a7c9c; color: white; padding: 2px; font-weight: bold;">HIGH</div> 	

This brief provides labor market information about *Chemical Technology Occupations* to assist the San Diego & Imperial Counties Community Colleges with program development and strategic planning. *Chemical Technology Occupations* include “Chemical Technicians,” “Chemical Plant and System Operators,” and “Chemical Equipment Operators and Tenders.” According to available labor market information, *Chemical Technology Occupations* in San Diego County have a labor market demand of 274 annual job openings (while average demand for a single occupation in San Diego County is 289 annual job openings), and no institutions supply awards for these occupations, suggesting that there is a supply gap in the labor market. This brief recommends proceeding with caution in developing a new program because while entry-level wages pay at or above the living wage and a supply gap exists for these occupations, **employers typically require a high school diploma or equivalent as the minimum educational requirement.**

Introduction

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

- **Chemical Equipment Operators and Tenders** (SOC 51-9011): Operate or tend equipment to control chemical changes or reactions in the processing of industrial or consumer products. Equipment used includes devulcanizers, steam-jacketed kettles, and reactor vessels.
- **Chemical Plant and System Operators** (SOC 51-8091): Control or operate entire chemical processes or system of machines.
- **Chemical Technicians** (SOC 19-4031): Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.

For the purpose of this report, these occupations are referred to as *Chemical Technology Occupations*.

Projected Occupational Demand

Between 2022 and 2027, employers in San Diego County will need to hire 274 workers annually to fill new jobs and backfill jobs in *Chemical Technology Occupations* due to attrition caused by turnover and retirement, for example (Exhibit 1). “Chemical Technicians” are projected to have the most labor market demand between 2022 and 2027, with 143 annual job openings.

Exhibit 1: Number of Jobs for Chemical Technology Occupations in San Diego County (2022-2027)²

Occupational Title	2022 Jobs	2027 Jobs	2022 - 2027 Net Jobs Change	2022-2027 % Net Jobs Change	Annual Job Openings (Demand)
Chemical Technicians	985	1,073	88	9%	143
Chemical Equipment Operators and Tenders	913	1,044	131	14%	128
Chemical Plant and System Operators	7	18	11	157%	3
Total	1,905	2,135	230	12%	274

¹ 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/).

² Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

Earnings

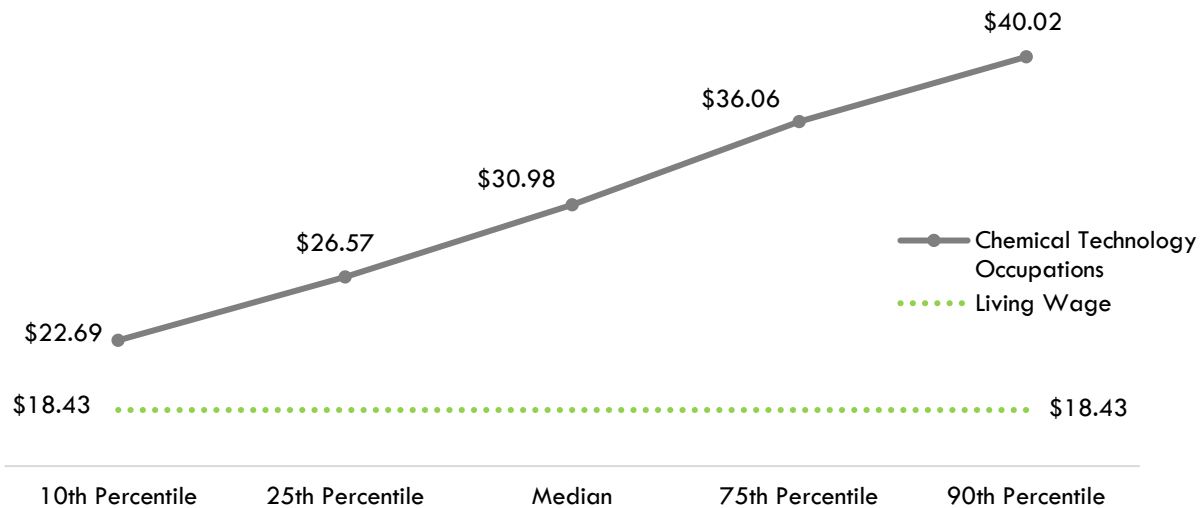
The entry-level hourly earnings for *Chemical Technology Occupations* range from \$18.71 to \$40.51 (Exhibit 2a).

Exhibit 2a: Hourly Earnings for Chemical Technology Occupations in San Diego County³

Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Chemical Plant and System Operators	\$40.51	\$44.68	\$50.85
Chemical Technicians	\$20.48	\$24.54	\$29.41
Chemical Equipment Operators and Tenders	\$18.71	\$23.71	\$27.92

On average, the entry-level hourly earnings for *Chemical Technology Occupations* are \$26.57; this is more than the living wage for a single adult in San Diego County, which is \$18.43 per hour (Exhibit 2b).⁴

Exhibit 2b: Average Hourly Earnings⁵ for Chemical Technology Occupations in San Diego County⁶



³ Lightcast 2023.03; QCEW, Non-QCEW, Self-Employed.

⁴ "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. insightccd.org/family-needs-calculator.

⁵ 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.

⁶ 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.⁷ There are **two** TOP codes and **two** CIP codes related to *Chemical Technology Occupations* (Exhibit 3).

Exhibit 3: Related TOP and CIP Codes for Chemical Technology Occupations⁸

TOP or CIP Code	TOP or CIP Program Title
TOP 0954.00	Chemical Technology
TOP 0955.00	Laboratory Science Technology
CIP 41.0301	Chemical Technology/Technician
CIP 41.0303	Chemical Process Technology

According to TOP and CIP data, **no** community college or non-community college supplies the region with awards for these occupations. (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 Institutions 2-Yr Annual Average Awards (PY19-20 to PY20-21)	Total Average Supply (PY19-20 to PY21-22)
0954.00	Chemical Technology	0	0	0
0955.00	Laboratory Science Technology	0	0	0
			Total	0

⁷ TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

⁸ This brief uses a conservative estimate of program supply and only calculates awards from the TOP codes in Exhibit 3.

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply⁹ suggests that there is a supply gap for these occupations in San Diego County, with 274 annual openings and zero awards. Comparatively, there are 1,898 annual openings in California and 29 awards, suggesting that there is also a supply gap across the state¹⁰ (Exhibit 5).

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

	Demand (Annual Openings)	Supply ¹¹ (Annual Awards)	Supply Gap or Oversupply
San Diego	274	0	274
California	1,898	29	1,869

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.

⁹ 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.

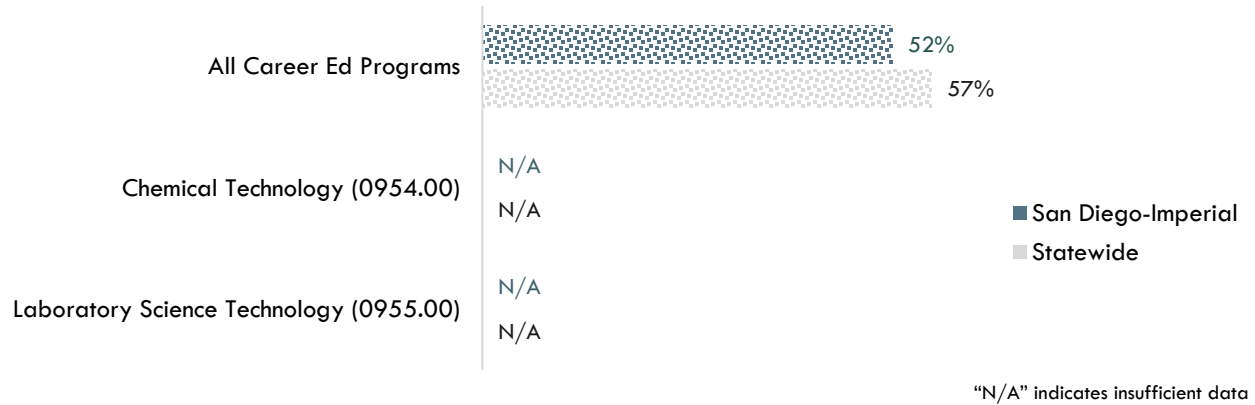
¹⁰ "Supply and Demand," Centers of Excellence Student Outcomes, <https://coecc.net/our-resources/>.

¹¹ Awards included: associate degree; award <1 year; award 1<2 years; and postsecondary awards.

Student Outcomes and Regional Comparisons

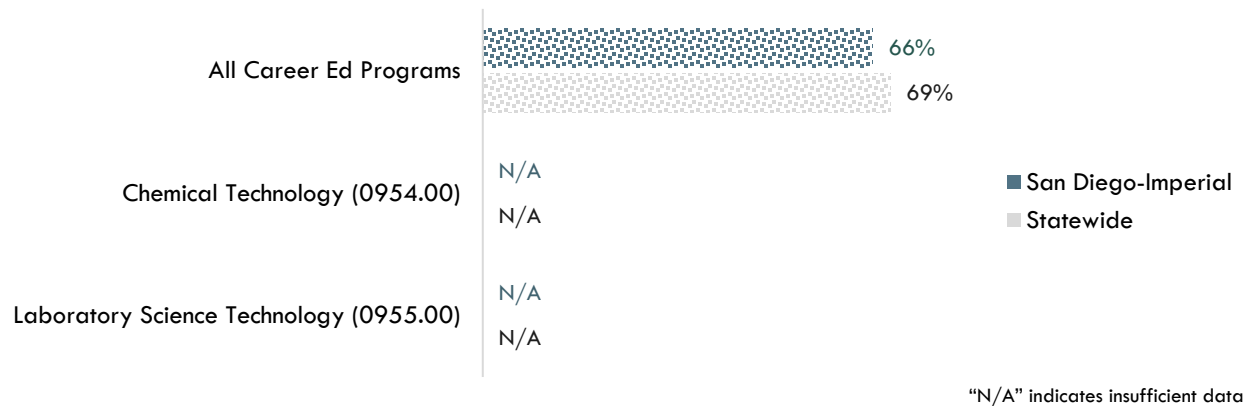
According to the California Community Colleges LaunchBoard, 57 percent of students earned a living wage in Career Education programs in general across the state (Exhibit 6a).¹²

Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program, PY2020-21¹³



According to the California Community Colleges LaunchBoard, 69 percent of students obtained a job closely related to their field of study in Career Education programs in general across the state (Exhibit 6b).¹⁴

Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program, PY2019-20¹⁵



¹² "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹³ 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.

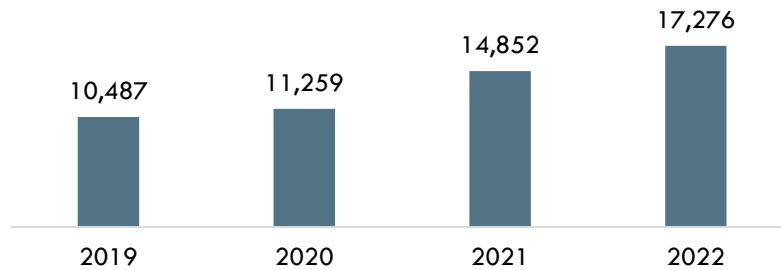
¹⁴ "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹⁵ 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 13,469 online job postings per year for *Chemical Technology 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). 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 *Chemical Technology Occupations* in San Diego County (2019-2022)¹⁶



¹⁶ 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 *Chemical Technology Occupations* were [Aerotek](#), [Kelly Services](#), [Charles River Laboratories](#), [Actalent](#), and [Randstad](#) based on online job postings (Exhibit 8).

Exhibit 8: Top Employers for *Chemical Technology Occupations* in San Diego County¹⁷

Top Employers	
<ul style="list-style-type: none">• Aerotek• Kelly Services• Charles River Laboratories• Actalent• Randstad	<ul style="list-style-type: none">• Avantor• University of California San Diego• SAIC• Labcorp Drug Development• United States Ecology Incorporated

Education, Skills, and Certifications

Chemical Technology Occupations have a national educational attainment ranging from a [high school diploma or equivalent](#) to an [associate degree](#) (Exhibit 9a).

Exhibit 9a: National Educational Attainment for *Chemical Technology Occupations*¹⁸

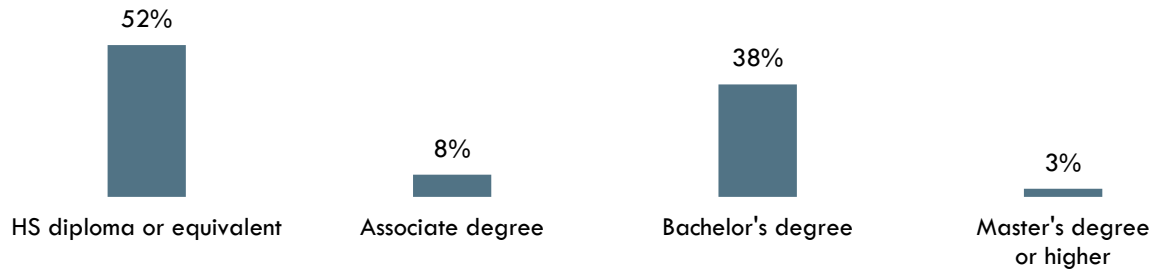
Occupational Title	Typical Entry-Level Education
Chemical Technicians	Associate degree
Chemical Plant and System Operators	High school diploma or equivalent
Chemical Equipment Operators and Tenders	High school diploma or equivalent

¹⁷ Lightcast, "Job Posting Analytics." 2020-2022.

¹⁸ 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 **high school diploma or equivalent** as the most requested educational requirement for *Chemical Technology Occupations* (Exhibit 9b).¹⁹

Exhibit 9b: Educational Requirements for Chemical Technology Occupations in San Diego County²⁰



*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 Chemical Technology Occupations in San Diego County²¹

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Chemistry • Biology • Good Manufacturing Practices • High-Performance Liquid Chromatography • Biochemistry • Forklift Truck • Standard Operating Procedure • Housekeeping • Laboratory Experience • Pharmaceuticals • Laboratory Equipment • Biochemical Assays • Analytical Techniques • Analytical Chemistry • Data Analysis 	<ul style="list-style-type: none"> • Communications • Research • Operations • Troubleshooting • Detail Oriented • Management • Quality Control • Writing • Lifting Ability • Computer Literacy • Problem Solving • Packaging And Labeling • Mathematics • Self-Motivation • Multitasking 	<ul style="list-style-type: none"> • Microsoft Excel • Microsoft Office

¹⁹ Lightcast; "Job Posting Analytics." 2020-2022.

²⁰ "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://www.bls.gov/emp/tables/educational-attainment.htm).

²¹ Lightcast; "Job Posting Analytics." 2020-2022.

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

Exhibit 11: Top Certification for *Chemical Technology Occupations* in San Diego County²²

Top Certifications in Online Job Postings

1. Security Clearance
 2. Transportation Worker Identification Credential (TWIC) Card
 3. Commercial Driver's License (CDL)
 4. Hazardous Materials Certification
 5. Cardiopulmonary Resuscitation (CPR) Certification
 6. CDL Class A License
 7. First Aid Certification
 8. DOT Certification
 9. Pesticide Applicator License
 10. Tanker Endorsement
 11. Hazmat Endorsement
 12. HAZWOPER Certification
 13. CDL Class B License
 14. American Association For Laboratory Animal Science (AALAS) Certification
 15. Certified First Responder (CFR)
-

²² Lightcast; "Job Posting Analytics." 2020-2022.

Prepared by:

Tina Ngo Bartel, Director (tngobartel@miracosta.edu)

John Edwards, Research Analyst (jedwards@miracosta.edu)

San Diego & Imperial Center of Excellence

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 (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.