

Biotechnology Occupations

Labor Market Analysis: San Diego County

March 2021

Summary



This brief provides labor market information about *Biotechnology Occupations* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *Biotechnology Occupations* include “Agricultural and Food Science Technicians,” “Biological Technicians,” “Chemical Technicians,” “Life, Physical, and Social Science Technicians, All Other,” and “Quality Control Analysts.” According to available labor market information, *Biotechnology Occupations* in San Diego County have a labor market demand of 492 annual job openings (while average demand for a single occupation in San Diego County is 277 annual job openings), and six educational institutions in San Diego County supply 117 awards for these occupations, suggesting that there is a supply gap in the labor market. Entry-level and median wages for all occupations are above the living wage. This brief recommends proceeding with a new program because 1) these occupations’ entry-level and median earnings are above the living wage; and 2) a supply gap exists for these positions. Colleges should note that **employers typically require a bachelor’s degree as the minimum educational requirement 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)¹ system:

- **Agricultural and Food Science Technicians** (SOC² 19-4011): Work with agricultural and food scientists in food, fiber, and animal research, production, and processing; and assist with animal breeding and nutrition. Conduct tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects. Includes technicians who assist food scientists or technologists in the research and development of production technology, quality control, packaging, processing, and use of foods.
- **Biological Technicians** (SOC 19-4021): Assist biological and medical scientists in laboratories. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, collect data and samples, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.
- **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.
- **Life, Physical, and Social Science Technicians, All Other** (SOC 19-4099): For this report, Life, Physical, and Social Science Technicians include:
 - **Quality Control Analysts** (19-4099.01): Conduct tests to determine quality of raw materials, bulk intermediate and finished products. May conduct stability sample tests.

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

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).

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Projected Occupational Demand

Between 2019 and 2024, *Biotechnology Occupations* are projected to increase by 218 net jobs or five percent (Exhibit 1a). During this period, employers in San Diego County are projected to hire 492 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

Exhibit 1a: Number of Jobs for *Biotechnology Occupations* (2009-2024)³

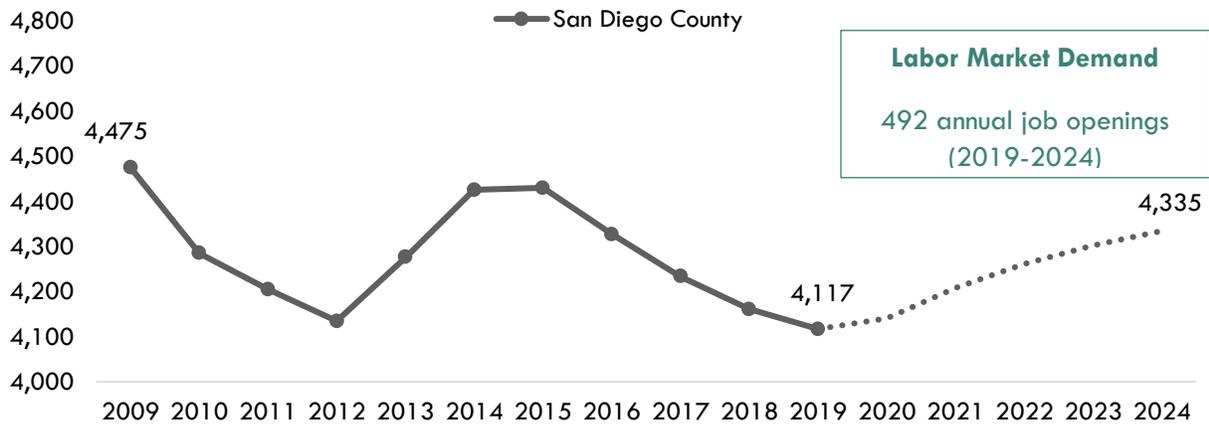


Exhibit 1b breaks down the projected number of jobs change by occupation more specifically “Biological Technicians” are projected to have the most labor market demand between 2019 and 2024, with 233 annual job openings (Exhibit 1b).

Exhibit 1b: Number of Jobs for *Biotechnology Occupations* in San Diego County (2019-2024)⁴

Occupational Title	2019 Jobs	2024 Jobs	2019 - 2024 Net Jobs Change	2019-2024 % Net Jobs Change	Annual Job Openings (Demand)
Biological Technicians	1,955	2,079	124	6%	233
Life, Physical, and Social Science Technicians, All Other	897	944	47	5%	118
Chemical Technicians	1,079	1,105	26	2%	114
Agricultural and Food Science Technicians	186	207	21	11%	27
Total	4,117	4,335	218	5%	492

³ EMSI 2020.04; QCEW, Non-QCEW, Self-Employed.

⁴ EMSI 2020.04; QCEW, Non-QCEW, Self-Employed.

Earnings

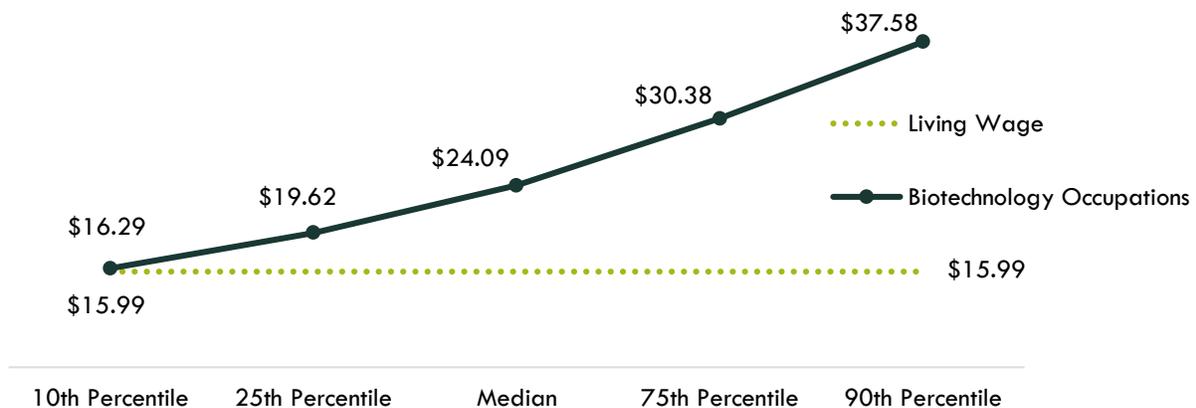
The entry-level hourly earnings for *Biotechnology Occupations* range from \$16.15 to \$25.20 (Exhibit 2a).

Exhibit 2a: Hourly Earnings for *Biotechnology Occupations* in San Diego County⁵

Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Life, Physical, and Social Science Technicians, All Other	\$25.20	\$31.50	\$41.23
Biological Technicians	\$19.84	\$24.51	\$29.32
Chemical Technicians	\$17.31	\$21.40	\$26.61
Agricultural and Food Science Technicians	\$16.15	\$18.96	\$24.34

On average, the entry-level hourly earnings for *Biotechnology Occupations* are \$19.62; this is more than the living wage for a single adult in San Diego County, which is \$15.99 per hour (Exhibit 2b).⁶

Exhibit 2b: Average Hourly Earnings⁷ for *Biotechnology Occupations* in San Diego County⁸



⁵ EMSI 2020.04; QCEW, Non-QCEW, Self-Employed.

⁶ "California Family Needs Calculator (formerly the Self-Sufficiency Standard)," Insight: Center for Community Economic Development, last updated 2018. insightcced.org/2018-self-sufficiency-standard.

⁷ 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.

⁸ EMSI 2020.04; 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.⁹ There are eight TOP codes and 13 CIP codes related to *Biotechnology Occupations* (Exhibit 3).

Exhibit 3: Related TOP and CIP Codes for *Biotechnology Occupations*

<i>Biotechnology Occupations</i>
TOP 0101.00: Agriculture Technology and Sciences, General
TOP 0104.00: Viticulture, Enology, and Wine Business
TOP 0113.00: Food Processing and Related Technologies
TOP 0430.00: Biotechnology and Biomedical Technology
TOP 0934.70: Electron Microscopy
TOP 0954.00: Chemical Technology
TOP 0955.00: Laboratory Science Technology
TOP 1920.00: Ocean Technology
CIP 01.0102: Agribusiness/Agricultural Business Operations
CIP 01.0309: Viticulture and Enology
CIP 01.0401: Agricultural and Food Products Processing
CIP 01.1002: Food Technology and Processing
CIP 12.0510: Wine Steward/Sommelier
CIP 15.0401: Biomedical Technology/Technician
CIP 15.0404: Instrumentation Technology/Technician
CIP 15.0499: Electromechanical and Instrumentation and Maintenance Technologies/Technicians, Other
CIP 26.1104: Computational Biology
CIP 30.3201: Marine Sciences
CIP 41.0101: Biology Technician/Biotechnology Laboratory Technician
CIP 41.0301: Chemical Technology/Technician
CIP 41.9999: Science Technologies/Technicians, Other

⁹ 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).

According to TOP data, six community colleges supply the region with awards for this occupation: Cuyamaca College, MiraCosta College, San Diego City College, San Diego Mesa College, San Diego Miramar College, and Southwestern College. According to CIP data, no non-community-college institution supplies the region with awards. (Exhibit 4).

**Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions
(Program Year 2014-15 through PY2018-19 Average)**

TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY16-17 to PY18-19)	Other Educational Institutions 3-Yr Annual Average Awards (PY14-15 to PY16-17)	3-Yr Total Average Supply (PY14-15 to PY18-19)
0104.00	Viticulture, Enology, and Wine Business	0	0	0
	• Cuyamaca	0	0	
	• MiraCosta	0	0	
0430.00	Biotechnology and Biomedical Technology	0	0	117
	• MiraCosta	59	0	
	• San Diego City	0	0	
	• San Diego Mesa	1	0	
	• San Diego Miramar	48	0	
	• Southwestern	9	0	
			Total	117

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply¹⁰ suggests that there is a **supply gap** for these occupations in San Diego County, with **492** annual openings and **117** awards. Comparatively, there are **3,760** annual openings in California and **1,363** awards, demonstrating that there is a supply gap across the state¹¹ (Exhibit 5).

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

	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or Oversupply
San Diego	492	117	375
California	3,760	1,363	2,397

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.

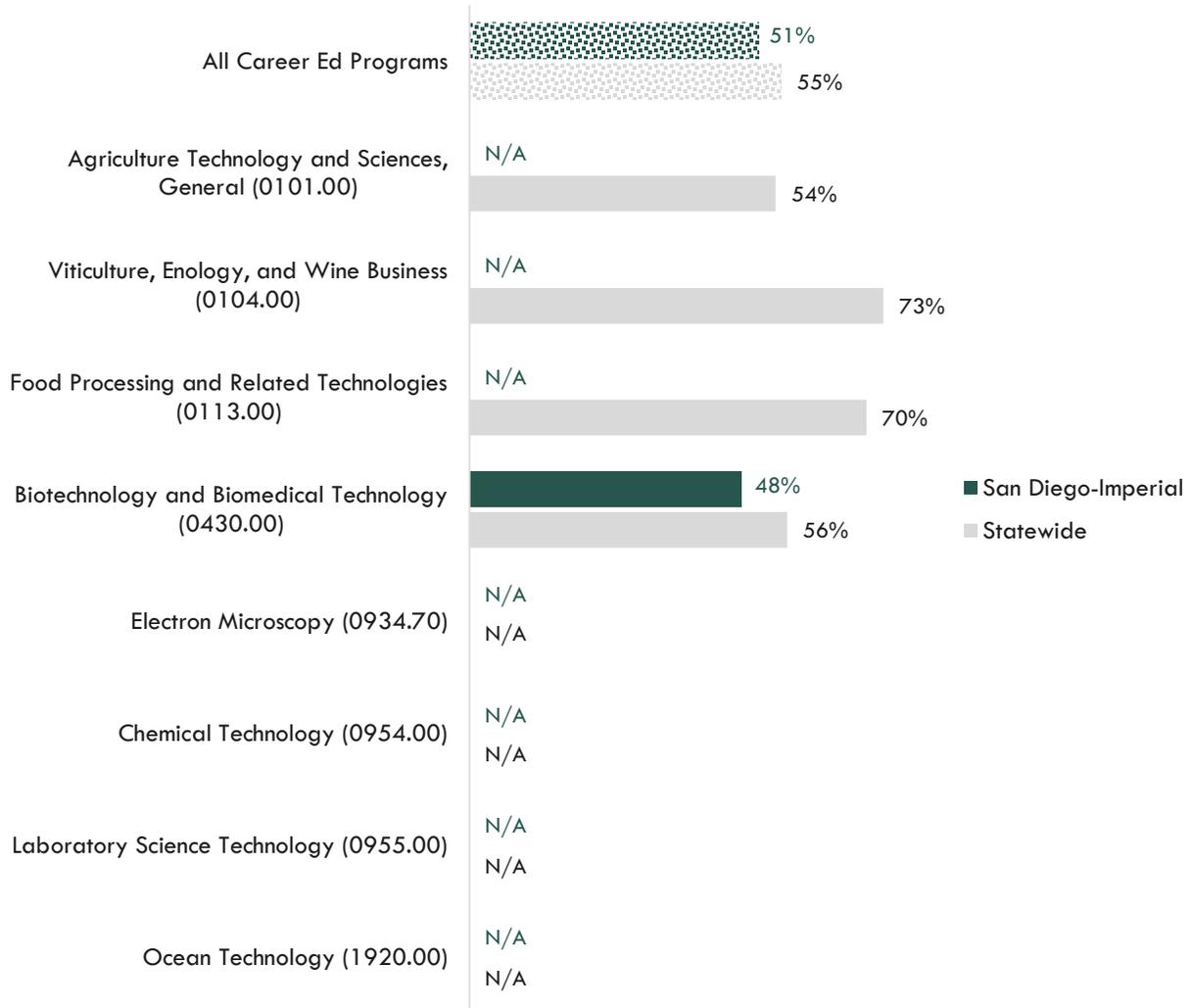
¹⁰ Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

¹¹ "Supply and Demand," Centers of Excellence for Labor Market Research, coecc.net/Supply-and-Demand.aspx.

Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 48 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *Biotechnology Occupations*, compared to 54 to 73 percent statewide and 55 percent of students in Career Education programs in general across the state (Exhibit 6a).

Exhibit 6a: Proportion of Students Who Earned a Living Wage, PY2017-18¹²

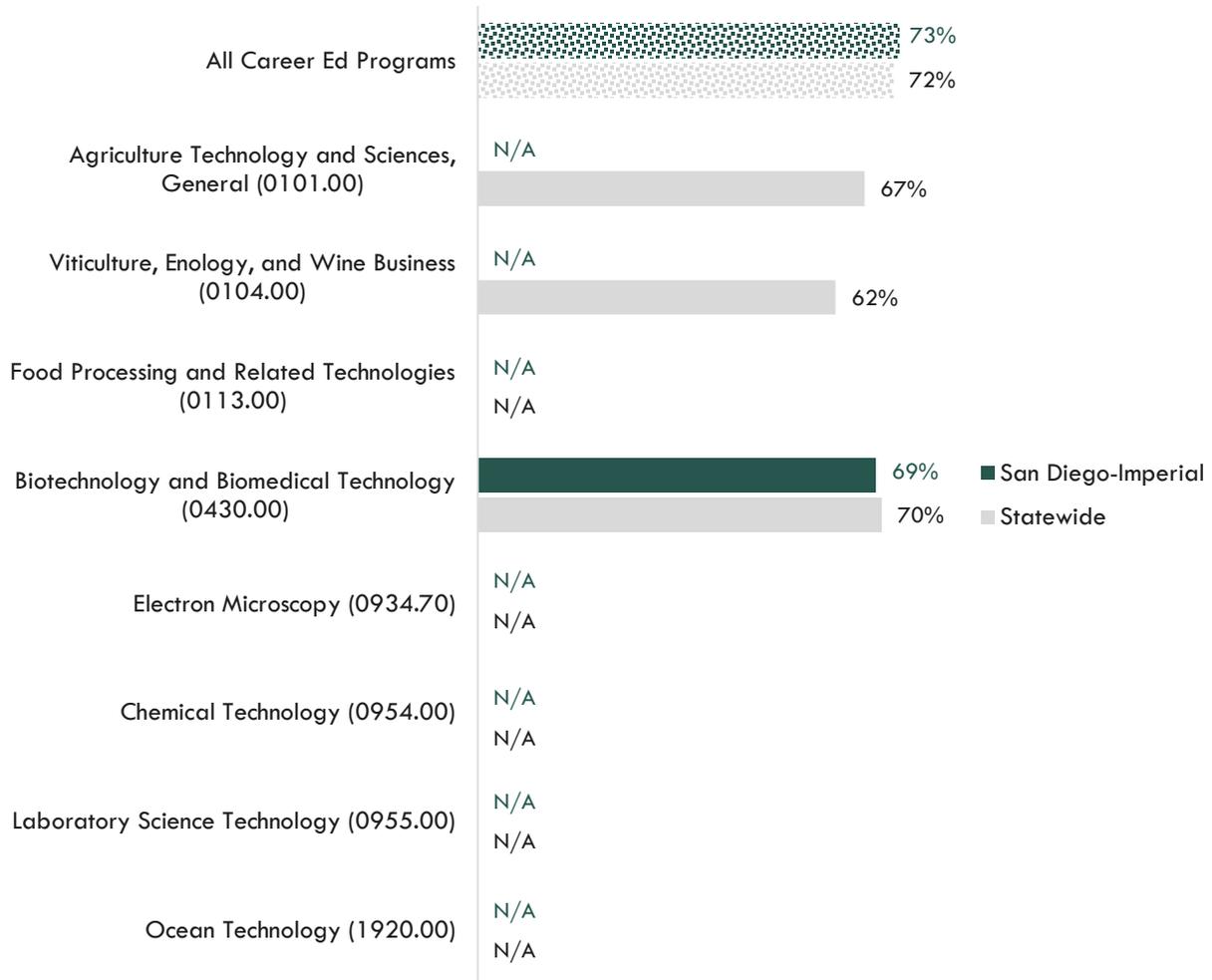


"N/A" indicates insufficient data

¹² Among completers and skills builders who exited, the proportion of students who attained a living wage.

According to the California Community Colleges LaunchBoard, 69 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 *Biotechnology Occupations*, compared to 62 to 70 percent statewide and 72 percent of students in Career Education programs in general across the state (Exhibit 6b).

**Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study
(Biotechnology Occupations, PY2016-17)¹³**



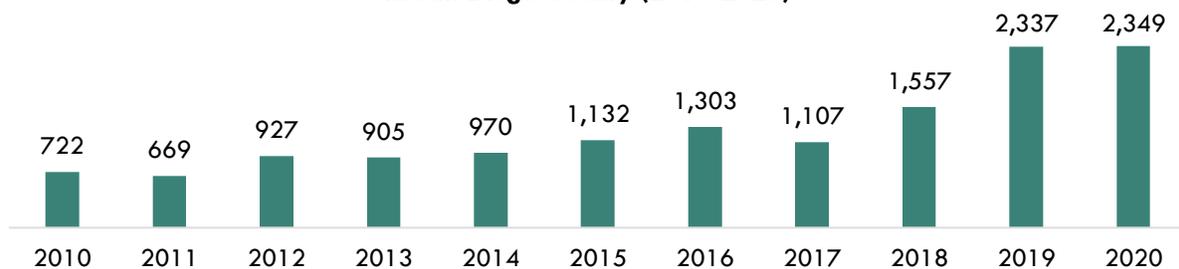
"N/A" indicates insufficient data

¹³ 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. calpassplus.org/LaunchBoard/SWP.aspx

Online Job Postings

This report analyzes not only historical and projected data (traditional labor market information or LMI), 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 2010 and 2020, there was an average of 1,271 online job postings per year in San Diego County for *Biotechnology Occupations* (Exhibit 7). Please note that online job postings do not equal labor market demand; demand is represented by annual job openings (Exhibit 1b). Employers may post a position multiple times for various reasons, such as increasing the pool of applicants, for example.

Exhibit 7: Number of Online Job Postings for *Biotechnology Occupations* in San Diego County (2010-2020)¹⁴



Top Employers

Between January 1, 2018 and December 31, 2020, the top five employers in San Diego County for these occupations were [University of California San Diego](#), [Biophase Solutions](#), [Illumina](#), [BioLegend](#) and [Gilead Sciences](#) (Exhibit 8).

Exhibit 8: Top Employers in San Diego County for *Biotechnology Occupations*¹⁵

Top Employers	
<ul style="list-style-type: none"> • University of California San Diego • Biophase Solutions, Inc. • Illumina, Inc. • BioLegend, Inc. • Gilead Sciences, Inc. 	<ul style="list-style-type: none"> • AveXis, Inc. • Simply Biotech • Ionis Pharmaceuticals, Inc. • Scripps Research • Pacira Pharmaceuticals

¹⁴ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2020.

¹⁵ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Education, Skills and Certifications

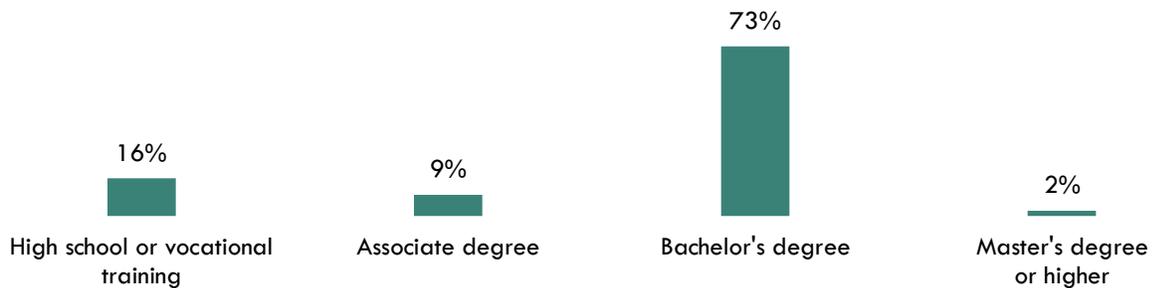
Aside from “Biological Technicians,” *Biotechnology Occupations* have a national educational attainment of an [associate degree](#) (Exhibit 9a).

Exhibit 9a: National Educational Attainment for *Biotechnology Occupations* ¹⁶

Occupational Title	Typical Entry-Level Education
Biological Technicians	Bachelor's degree
Agricultural and Food Science Technicians	Associate degree
Chemical Technicians	Associate degree
Life, Physical, and Social Science Technicians, All Other	Associate degree

Based on online job postings between January 1, 2018 and December 31, 2020 in San Diego County, the top listed educational requirement for *Biotechnology Occupations* is a [bachelor's degree](#) (Exhibit 9b).¹⁷

Exhibit 9b: Educational Requirements for *Biotechnology Occupations* in San Diego County¹⁸



¹⁶ EMSI 2020.04; QCEW, Non-QCEW, Self-Employed.

¹⁷ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” 2018-2020.

¹⁸ “Educational Attainment for Workers 25 Years and Older by Detailed Occupation,” Bureau of Labor Statistics, last modified September 4, 2019. bls.gov/emp/tables/educational-attainment.htm.

Exhibit 10 lists the top specialized, soft and software skills that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 10: Top Skills for *Biotechnology Occupations* in San Diego County¹⁹

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Quality Assurance and Control • Experiments • Molecular Biology • Biology • Biochemistry • Chemistry • Quality Management • Data Analysis • Cell Culturing • Good Manufacturing Practices • DNA • Biotechnology • Flow Cytometry • Enzyme-Linked Immunosorbent Assay • Biochemical and Cell-Based Assays 	<ul style="list-style-type: none"> • Research • Communication Skills • Detail-Oriented • Organizational Skills • Teamwork / Collaboration • Troubleshooting • Problem Solving • Writing • Written Communication • Computer Literacy • Multi-Tasking • Physical Abilities • Planning • Verbal / Oral Communication • Time Management 	<ul style="list-style-type: none"> • Microsoft Excel • Microsoft Word • Microsoft PowerPoint • Word Processing • Microsoft Outlook • Microsoft Access • Enterprise Resource Planning • SAP • Adobe Acrobat • Microsoft SharePoint • Microsoft Visio • Python • Adobe Photoshop • Salesforce • Systems Analysis

¹⁹ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Exhibit 11 lists the top certifications that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 11: Top Certifications for *Biotechnology Occupations* in San Diego County²⁰

Top Certifications in Online Job Postings

1. Security Clearance
2. American Society For Quality (ASQ) Certification
3. OSHA Safety 10-Hour Training
4. Certified Quality Auditor (CQA)
5. Certified Quality Engineer (CQE)
6. Six Sigma Certification
7. Certified Quality Technician (CQT)
8. Certified HIPAA Professional (CHP)
9. Certified Pharmacy Technician (CPhT)
10. American Society For Clinical Pathology (ASCP) Certification
11. Six Sigma Green Belt Certification
12. Registered Nurse
13. Certified Outpatient Coding (COC)
14. Six Sigma Black Belt Certification
15. Project Management Certification

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²⁰ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

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.

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.