

**Program Endorsement Brief: 0430.00/Biotechnology and Biomedical Technology
Biomanufacturing**

Biotechnology Laboratory Assistant

Los Angeles/Orange County Center of Excellence, September 2020

Summary Analysis

Program Endorsement:	Endorsed: All Criteria Met	<input type="checkbox"/>	Endorsed: Some Criteria Met	<input checked="" type="checkbox"/>	Not Endorsed	<input type="checkbox"/>
Program Endorsement Criteria						
Supply Gap:	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
Living Wage: (Entry-Level, 25th)	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>		
Education:	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
Emerging Occupation(s)						
Emerging Occupation:	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		

Based on the available data, there appears to be a supply gap for biotechnology occupations in the region. **Therefore, the COE endorses this proposed program.** Reasons include:

Demand:

- **Supply Gap Criteria** - Over the next five years, there are projected to be **4,033 jobs available annually** in the region due to replacements, **which is more than the 182 awards conferred annually** by educational institutions in the region.
 - However, the occupations *calibration technologists and technicians and engineering technologists and technicians, except drafters, all other (17-3098)* and *life, physical, and social science technicians, all other (19-4099)* include various emerging occupations. Since these occupations do not solely represent the emerging occupations related to biotechnology, **the number of annual job openings for this occupational group is overstated.**
- **Living Wage Criteria** - Within Los Angeles County, **29% of the annual job openings** for these biotechnology occupations have **entry-level wages above the county's living wage** (\$15.04/hour).¹
 - Experienced workers can expect wages well above the living wage in Los Angeles County.
- **Education Criteria** - Within the LA/OC region, **72% of the annual job openings** for biotechnology occupations **typically require a high school diploma.**
 - However, the national-level educational attainment data indicates **between 32.9% and 53.5% of workers in the field have completed some college or an associate degree.**

¹ Living wage data was pulled from California Family Needs Calculator on 9/21/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

Supply:

- There are **9 community colleges** in the region that issued awards related to biotechnology technology, conferring an average of **104 awards annually** between 2016 and 2019.
- Between 2014 and 2017, there was an average of **78 awards conferred annually** in related training programs by non-community college institutions throughout the region.

Introduction

The Los Angeles/Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to biotechnology occupations:

- **Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other (17-3098): ***
 - Engineering Technicians, Except Drafters All Other (17-3029):** All engineering technicians, except drafters, not listed separately.
 - Manufacturing Production Technicians (17-3029.09):** Set up, test, and adjust manufacturing machinery or equipment, using any combination of electrical, electronic, mechanical, hydraulic, pneumatic, or computer technologies.
- **Biological Technicians (19-4021):** Assist biological and medical scientists in laboratories. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.
- **Chemical Technicians (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 (19-4099):** All life, physical, and social science technicians not listed separately.
 - Quality Control Analysts (19-4099.01):** Conduct tests to determine the quality of raw materials, bulk intermediate and finished products. May conduct stability sample tests.
- **Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061):** Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.

*On March 31, 2020, the Occupational Employment Statistics (OES) program within the Bureau of Labor Statistics (BLS) released their May 2019 data set, which included updates to the

occupational structure.² Occupational updates included title changes, SOC code changes, and new occupational codes that are a combination of old occupational codes. The occupation, *engineering technicians, except drafters all other* (17-3029), is now referred to as *calibration technologists and technicians and engineering technologists and technicians, except drafters, all other* (17-3098). Occupational projections and wage data utilize the new occupational codes.

This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations.

Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.³ Although the occupation, *biological technicians*, typically requires a high school diploma, it is considered middle-skill because it requires additional training provided by community college training programs, and approximately one-third of workers in the field have completed some college or an associate degree. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for biotechnology-related occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to decrease by 7% through 2024. Despite this, there will be more than 4,000 job openings per year through 2024 due to replacements. It is important to note that the occupations, *calibration technologists and technicians and engineering technologists and technicians, except drafters, all other* (17-3098) and *life, physical, and social science technicians, all other* (19-4099), include various emerging occupations and do not solely represent the emerging occupations, *manufacturing production technicians* (17-3029.09) or *quality control analysts* (19-4099.01).

This report includes employment projection data by Emsi which uses EDD information. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy, during the projection period, will be at approximately full employment. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.

² Bureau of Labor Statistics (BLS). March 31, 2020. *Occupational Employment Statistics (OES)*. Retrieved from <https://www.bls.gov/oes/home.htm>

³ The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties⁴

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	23,506	21,481	(2,025)	(9%)	2,702
Orange	11,155	10,708	(447)	(4%)	1,331
Total	34,662	32,189	(2,473)	(7%)	4,033

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these occupations related to biotechnology in Los Angeles County as they relate to the county’s living wage. Orange County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

Los Angeles County—29% of the annual openings for these occupations have entry-level wages above the living wage for one adult (\$15.04 in Los Angeles County).⁵ Typical entry-level hourly wages are in a range between \$14.47 and \$22.95 and experienced workers can expect to earn wages between \$26.11 and \$39.61. Los Angeles County’s average wages are below the average statewide wage of \$24.87 for these occupations.

Orange County—27% of the annual openings for these occupations have entry-level wages above the living wage for one adult (\$17.36 in Orange County). Typical entry-level hourly wages are in a range between \$14.68 and \$23.47. Experienced workers can expect to earn wages between \$26.45 and \$39.89, which are higher than the living wage estimate. Orange County’s average wages are also below the average statewide wage of \$24.87 for these occupations.

Job Postings—The following data displays (Exhibits 2 through 5) show real-time job posting information obtained from employer job advertisements in Los Angeles/Orange County over the last twelve months, August 2019 to July 2020. During this timeframe there were 6,617 job postings for biotechnology occupations in the region.

⁴ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

⁵ Living wage data was pulled from California Family Needs Calculator on 9/21/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

Exhibit 2: Job posting count by occupation

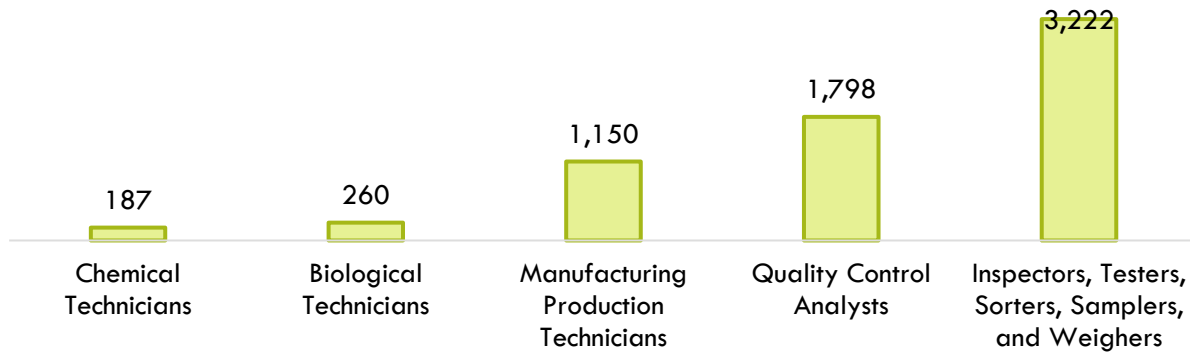


Exhibit 3: Most frequently used job titles for biotechnology occupations

Job Titles	Job Ads
Quality Inspector	226
Quality Control Inspector	203
Quality Assurance Specialist	177
Quality Assurance Technician	140
Quality Control Technician	122

Exhibit 4: In-demand skills from job postings for biotechnology occupations

Skills	Job Ads
Quality Assurance and Control	3,455
Quality Management	1,202
Good Manufacturing Practices (GMP)	841
Micrometers	640
Scheduling	586
Calipers	563

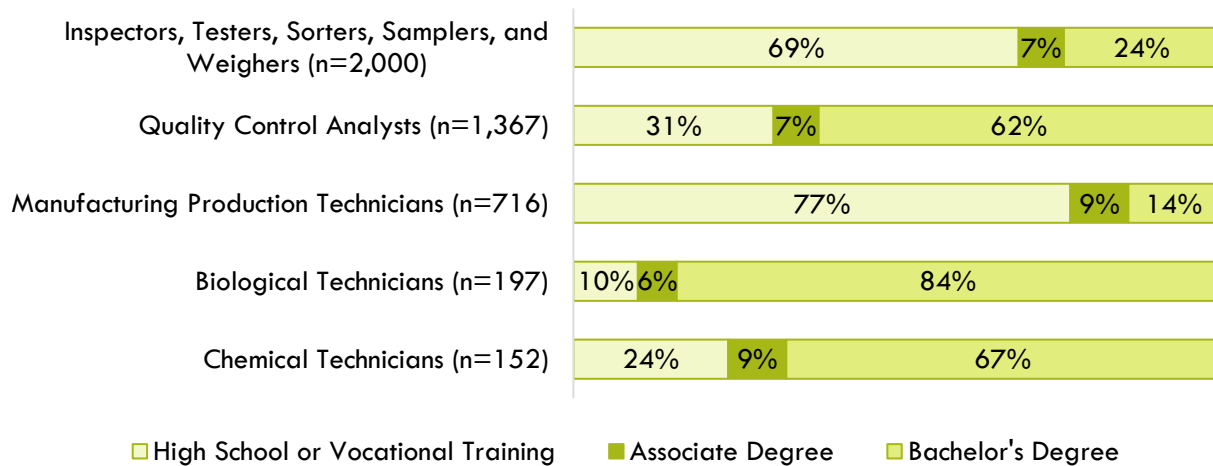
Exhibit 5: Employers posting the most job advertisements for biotechnology occupations

Employers	Job Ads
Gilead Sciences	75
Integrated Resources Incorporated	62
Kelly	56
B. Braun Medical Incorporated	48
The University of California, Los Angeles (UCLA)	36
All Other Employers	6,340
Total	6,617

It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.

Educational Attainment—The Bureau of Labor Statistics (BLS) lists a high school diploma as the typical entry-level education for *inspectors, testers, sorters, samplers, and weighers*; an associate degree as the typical entry-level education for *chemical technicians, calibration technologists and technicians and engineering technologists and technicians, except drafters, all other, and life, physical, and social science technicians, all other*; and a bachelor’s degree as the typical entry-level education for *biological technicians*. The national-level educational attainment data indicates between 32.6% and 53.5% of workers in the field have completed some college or an associate degree. Exhibit 6 displays the 67% of biotechnology job postings specifying a minimum education requirement in Los Angeles/Orange County.

Exhibit 6: Advertised education requirements for biotechnology occupations



Educational Supply

Community College Supply—Exhibit 7 shows the annual and three-year average number of awards conferred by community colleges in the related TOP codes: Biotechnology and Biomedical Technology (0430.00) and Laboratory Science Technology (0955.00). The colleges with the most completions in the region are Pasadena, Citrus, LA Trade-Tech, and Irvine. During 2019, there were four other related program recommendation requests from regional community colleges.

Exhibit 7: Regional community college awards (certificates and degrees), 2016-2019

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
0430.00	Biotechnology and Biomedical Technology	Citrus	18	16	19	18
		LA Mission	-	14	21	12
		LA Trade-Tech	3	5	2	3
		Pasadena	16	19	18	18
		LA Subtotal	37	54	60	50
		Fullerton	4	3	18	8
		Irvine	8	13	25	15
		Santa Ana	13	13	11	12
		Santiago Canyon	-	-	11	4
		OC Subtotal	25	29	65	40
Supply Subtotal/Average			62	83	125	90
0955.00	Laboratory Science Technology	LA Trade-Tech	21	14	-	12
		Mt. San Antonio	2	2	2	2
		LA Subtotal	23	16	2	14
Supply Subtotal/Average			23	16	2	14
Supply Total/Average			85	99	127	104

Exhibit 8 displays strong workforce program outcome metrics for the biotechnology and biomedical technology programs in the region. There are insufficient data to display these metrics for the laboratory science program.

Exhibit 8: Strong workforce program metrics for regional biotechnology and biomedical technology programs

Strong Workforce Program Metrics (2017-18, unless noted otherwise)	Los Angeles/Orange County	California
Unduplicated count of enrolled students (2018-19)	578	2,299
Median annual earnings	\$43,640	\$41,336
Median change in earnings	36%	36%
Students who attained the living wage	61%	56%
Job closely related to field of study (2016-17)	71%	70%

Non-Community College Supply—It is important to consider the supply from non-community college institutions in the region that provide training programs for biotechnology occupations. Exhibit 9 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Code: Biomedical Technology/Technician (15.0401). Due to different data collection periods, the most recent three-year period of available data is from 2014 to 2017. Between 2014 and 2017, non-community colleges in the region conferred an average of 78 awards annually in related training programs.

Exhibit 9: Regional non-community college awards, 2014-2017

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
15.0401	Biomedical Technology/Technician	DeVry University	17	8	19	15
		Southern California Institute of Technology	61	62	68	64
Supply Total/Average			78	70	87	78

Appendix A: Occupational demand and wage data by county

Exhibit 10. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	16,480	14,412	(2,068)	(13%)	1,929	\$14.47	\$19.04	\$26.11
Life, Physical, and Social Science Technicians, All Other (19-4099)	2,147	2,206	59	3%	271	\$18.81	\$25.59	\$32.12
Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other (17-3098)	2,121	2,090	(31)	(1%)	209	\$22.95	\$29.55	\$39.61
Biological Technicians (19-4021)	1,426	1,471	45	3%	161	\$17.72	\$22.78	\$29.18
Chemical Technicians (19-4031)	1,332	1,302	(30)	(2%)	132	\$17.43	\$23.06	\$31.74
Total	23,506	21,481	(2,025)	(9%)	2,702			

Exhibit 11. Orange County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	8,054	7,465	(589)	(7%)	967	\$14.68	\$19.31	\$26.45
Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other (17-3098)	1,089	1,121	32	3%	114	\$23.47	\$29.92	\$39.89
Life, Physical, and Social Science Technicians, All Other (19-4099)	886	956	70	8%	124	\$17.98	\$24.44	\$30.66
Chemical Technicians (19-4031)	616	642	26	4%	68	\$17.60	\$23.28	\$32.05
Biological Technicians (19-4021)	510	523	13	3%	57	\$17.27	\$22.21	\$28.45
Total	11,155	10,708	(447)	(4%)	1,331			

Exhibit 12. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	24,533	21,877	(2,656)	(11%)	2,897
Calibration Technologists and Technicians and Engineering Technologists and Technicians, Except Drafters, All Other (17-3098)	3,210	3,212	2	0%	323
Life, Physical, and Social Science Technicians, All Other (19-4099)	3,033	3,162	129	4%	395
Chemical Technicians (19-4031)	1,948	1,944	(4)	(0%)	201
Biological Technicians (19-4021)	1,936	1,994	58	3%	218
Total	34,662	32,189	(2,473)	(7%)	4,033

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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