

**Program Endorsement Brief: 0430.00/Biotechnology and Biomedical Technology
Biotechnology AS Transfer Degree**

Orange County Center of Excellence, August 2021

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)			
	Yes <input type="checkbox"/>	No	<input checked="" type="checkbox"/>

The 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 five middle-skill occupations: *biological technicians (19-4021)*; *chemical technicians (19-4031)*; *life, physical, and social science technicians, all other (19-4099)*; *clinical laboratory technologists and technicians (29-2018)*; and *inspectors, testers, sorters, samplers, and weighers (51-9061)*. Middle-skill occupations typically require some postsecondary education, but less than a bachelor’s degree.¹ Although two of the occupations (biological technicians and clinical laboratory technologists and technicians) in this report typically require a bachelor’s degree, they are considered middle-skill because approximately one-third of workers in the field have completed some college or an associate degree as their highest level of education. 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.

Based on the available data there appears to be a supply gap for these biotechnology occupations in the region. Though the majority of annual openings for these occupations typically require a high school diploma or equivalent, one-third of current workers in the field have completed some college or an associate degree as their highest level of education. However, the majority of annual openings for the occupations in this report have entry-level hourly earnings that are below the living wage in Orange County. **Therefore, due to some of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

Demand:

- **Supply Gap Criteria** – Over the next five years, there is projected to be **4,218 jobs available annually** in the region due to retirements and workers leaving the field,

¹ 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.

which is more than the 255 awards conferred annually by educational institutions in the region.

- However, *the life, physical, and social science technicians, all other (19-4099) SOC code includes a variety of technician positions and not solely those related to biotechnology and life sciences.* Since the SOC code does not solely represent biotechnology positions, *the number of annual job openings is overstated.*
- Over the past 12 months, there were **15,686 online job postings related to these biotechnology occupations.** The highest number of job postings were for laboratory technician, quality inspector, and quality assurance technician.
- **Living Wage Criteria** –Within Orange County, *the majority (66%) of annual job openings for these biotechnology occupations have entry-level wages below the county's living wage (\$17.36/hour).*²
- **Educational Criteria** –Within the LA/OC region, *58% of the annual job openings for occupations related to biotechnology typically require a high school diploma.*
 - However, the national-level educational attainment data indicates **between 29.4% and 39.2% of workers in the field have completed some college or an associate degree as their highest level of education.**

Supply:

- There are **11 community colleges** in the LA/OC region that issue awards related to biotechnology, conferring an average of **170 awards annually** between 2017 and 2020.
- Between 2016 and 2019, there was an average of **85 awards conferred annually** in related training programs by non-community college institutions, all of which were generated by **six individual four-year colleges throughout** the region.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for these five biotechnology occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to decrease by 5% through 2024. However, there will be more than 4,210 job openings per year through 2024 due to retirements and workers leaving the field. It is important to note that the life, physical, and social science technicians, all other (19-4099) SOC code includes a variety of emerging occupations and not solely those related to biotechnology. Therefore, the data in Exhibit 1 is overstated for this occupation.

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

² Living wage data was pulled from California Family Needs Calculator on 07/28/2021. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

occupational employment. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties³

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	31,012	28,960	(2,052)	(7%)	2,868
Orange	13,526	13,259	(267)	(2%)	1,350
Total	44,538	42,220	(2,318)	(5%)	4,218

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these biotechnology occupations in Orange County as they relate to the county’s living wage. Los Angeles 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.

Orange County—The majority (66%) of annual openings for these biotechnology occupations have entry-level wages below the living wage for one adult (\$17.36 in Orange County). Typical entry-level hourly wages are in a range between \$15.47 and \$21.67. Experienced workers can expect to earn wages between \$27.11 and \$43.45, which are higher than the living wage estimate. Orange County’s average wages are below the average statewide wage of \$26.33 for these occupations.

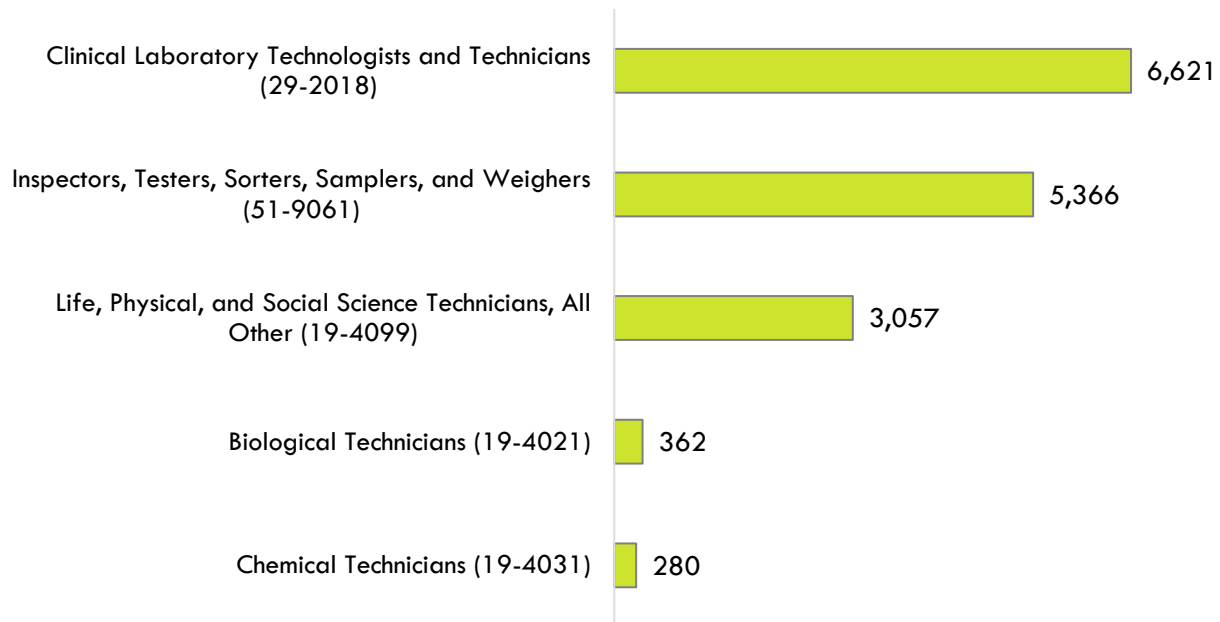
Los Angeles County—All occupations have entry-level wages above the living wage for one adult (\$15.04 in Los Angeles County). Typical entry-level hourly wages are in a range between \$15.27 and \$20.76. Experienced workers can expect to earn wages between \$26.82 and \$41.64, which are higher than the living wage estimate. Los Angeles County’s average wages are below the average statewide wage of \$26.33 for these occupations.

Job Postings

There were 15,686 online job postings related to these biotechnology occupations listed in the past 12 months. Exhibit 2 shows the number of job postings by occupation. The highest number of job postings were for clinical laboratory technologists and technicians (42%), followed by inspectors, testers, samplers, and weighers (34%). The most frequently posted job titles were laboratory technician, quality technician, quality assurance technician, quality control inspector, and laboratory assistant. The top skills requested by employers were quality assurance and control, quality management, chemistry, data entry, and good manufacturing practices (GMP). The top three employers, by number of job postings, in the region were University of California, Anthem Blue Cross, and Healthcare Travelers.

³ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Exhibit 2: Job Postings by Occupation (n=15,686)



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 the following typical entry-level education for these middle-skill biotechnology occupations:

- **Bachelor's degree:** *biological technicians; clinical laboratory technologists and technicians*
- **Associate degree:** *chemical technicians; life, physical, and social science technicians, all other*
- **High school diploma or equivalent:** *inspectors, testers, sorters, samplers, and weighers*

In the LA/OC region, the majority of annual job openings (58%) typically require a high school diploma or equivalent. However, the national-level educational attainment data indicates between 29.4% and 39.2% of workers in the field have completed some college or an associate degree as their highest level of education. Of the 66% of job postings listing a minimum education requirement in Los Angeles/Orange County, 56% (5,827) requested a high school diploma or vocational training, 35% (3,661) requested a bachelor's degree and 8% (879) requested an associate degree.

Educational Supply

Community College Supply—Exhibit 3 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Biotechnology and Biomedical Technology (0430.00), Chemical Technology (0954.00), Laboratory Science Technology (0955.00), Industrial Quality Control (0956.80), and Medical Laboratory Technology (1205.00). Over the past three years, community colleges throughout the region conferred an average of

170 awards annually. The colleges with the most completions in the region are Irvine, LA Mission, and Saddleback. Over the past 12 months, there were 10 other related program recommendation requests from regional community colleges.

Exhibit 3: Regional community college awards (certificates and degrees), 2017-2020

TOP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
0430.00	Biotechnology and Biomedical Technology	Citrus	16	19	8	14
		East LA	0	0	5	2
		LA Mission	14	21	37	24
		LA Trade	5	2	7	5
		Pasadena	19	18	24	20
		LA Subtotal	54	60	81	65
		Fullerton	3	18	18	13
		Irvine	13	25	33	24
		Santa Ana	13	11	10	11
		Santiago Canyon	0	11	8	6
		OC Subtotal	29	65	69	54
Supply Subtotal/Average			83	125	150	119
0954.00	Chemical Technology	East LA	0	0	2	1
		LA Trade	0	8	2	3
		LA Subtotal	0	8	4	4
Supply Subtotal/Average			0	8	4	4
0955.00	Laboratory Science Technology	LA Trade	14	0	0	5
		Mt San Antonio	2	2	1	2
		LA Subtotal	16	2	1	6
Supply Subtotal/Average			16	2	1	6
0956.80	Industrial Quality Control	Santiago Canyon	0	2	0	1
		OC Subtotal	0	2	0	1
Supply Subtotal/Average			0	2	0	1
1205.00	Medical Laboratory Technology	Mt San Antonio	17	19	11	16
		LA Subtotal	17	19	11	16
		Saddleback	24	18	29	24
		OC Subtotal	24	18	29	24
Supply Subtotal/Average			24	18	29	24
Supply Total/Average			140	174	195	170

Non-Community College Supply—For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for these biotechnology occupations. Exhibit 4 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: Quality Control Technology/Technician (15.0702) and

Microbiology, General (26.0502). Due to different data collection periods, the most recent three-year period of available data is from 2016 to 2019. Between 2016 and 2019, four-year colleges in the region conferred an average of 85 awards annually in related training programs.

Exhibit 4: Regional non-community college awards, 2016-2019

CIP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
15.0702	Quality Control Technology/ Technician	California State University-Dominguez Hills	30	24	30	28
		California State University-Northridge	0	0	1	0
Subtotal/Average			30	24	31	28
26.0502	Microbiology, General	California Institute of Technology	0	1	1	1
		California State Polytechnic University-Pomona	1	0	0	0
		California State University-Long Beach	18	22	22	21
		California State University-Los Angeles	24	44	38	35
Subtotal/Average			43	67	61	57
Supply Total/Average			73	91	92	85

Appendix A: Occupational demand and wage data by county

Exhibit 5. 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)
Biological Technicians (19-4021)	582	622	40	7%	68	\$17.79	\$22.54	\$28.57
Chemical Technicians (19-4031)	690	724	34	5%	69	\$16.97	\$21.89	\$31.15
Life, Physical, and Social Science Technicians, All Other (19-4099)	1,059	1,160	102	10%	142	\$19.00	\$25.73	\$33.55
Clinical Laboratory Technologists and Technicians (29-2018)	3,107	3,426	320	10%	245	\$21.67	\$29.33	\$43.45

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)	8,089	7,327	(762)	(9%)	827	\$15.47	\$19.67	\$27.11
Total	13,526	13,259	(267)	(2%)	1,350			

Exhibit 4. Los Angeles 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)
Biological Technicians (19-4021)	1,734	1,825	91	5%	196	\$17.86	\$22.62	\$28.68
Chemical Technicians (19-4031)	1,505	1,508	3	0%	138	\$17.03	\$21.96	\$31.25
Life, Physical, and Social Science Technicians, All Other (19-4099)	2,634	2,808	174	7%	337	\$20.01	\$27.12	\$35.40
Clinical Laboratory Technologists and Technicians (29-2018)	8,584	8,715	131	2%	553	\$20.76	\$28.10	\$41.64
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	16,555	14,105	(2,450)	(15%)	1,645	\$15.27	\$19.43	\$26.82
Total	31,012	28,960	(2,052)	(7%)	2,868			

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Biological Technicians (19-4021)	2,316	2,446	131	6%	264
Chemical Technicians (19-4031)	2,195	2,233	37	2%	207
Life, Physical, and Social Science Technicians, All Other (19-4099)	3,693	3,968	275	7%	478
Clinical Laboratory Technologists and Technicians (29-2018)	11,690	12,141	450	4%	798
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	24,644	21,432	(3,212)	(13%)	2,472
Total	44,538	42,220	(2,318)	(5%)	4,218

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)

For more information, please contact:

Jacob Poore, Interim Director
 Center of Excellence, Orange County
poore.jacob@rsccd.edu

August 2021

