

**Program Endorsement Brief: 0430.00/Biotechnology and Biomedical Technology  
Biological Technology - Stem Cell Culture & Computational Biology**  
Los Angeles/Orange County Center of Excellence, April 2021

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**Summary Analysis**

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

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 five middle-skill occupations: *chemical technicians (19-4031)*; *life, physical, and social science technicians, all other (19-4099)*; *clinical laboratory technologists and technicians (29-2018)*; *medical equipment repairers (49-9062)*; and *inspectors, testers, sorters, samplers, and weighers (51-9061)*. Middle-skill occupations are those that typically require some postsecondary education, but less than a bachelor's degree, and are highlighted in this report to show which opportunities are immediately accessible to community college-level award earners.<sup>1</sup> The occupation, *clinical laboratory technologists and technicians* typically requires a bachelor's degree for entry, but is considered middle-skill because approximately 39% of incumbent workers in the field have attained a community college education as their highest level of education.

However, the field of biotechnology is comprised of many occupations that typically require workers to obtain a bachelor's degree or higher. Therefore, two above middle-skill occupations are included in this report to illuminate a pathway for students who choose to continue their education beyond the community college level. The above middle-skill occupations in this report are *bioengineers and biomedical engineers (17-2031)* and *biological technicians (19-4021)*.

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. While demand data for above middle-skill occupations are included in this report,

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<sup>1</sup> 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.

the program endorsement only takes into account the middle-skill occupations when considering the local supply and demand.

Based on the available data, there appears to be a supply gap for the five middle-skill occupations in the region. However, the entry-level wages for the majority of job openings are lower than the living wage in both Los Angeles and Orange counties. **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 **4,047 middle-skill jobs available annually** in the region due to retirements and workers leaving the field, **which is more than the 184 awards conferred annually** by educational institutions in the region.
- **Living Wage Criteria** –In Los Angeles County, the majority (60%) of annual job openings for the five middle-skill occupations have entry-level wages **below** the county’s living wage (\$15.04/hour).<sup>2</sup>
- **Educational Criteria** –Within the LA/OC region, **61% of the annual job openings** for occupations related to biological technology **typically require a high school diploma or an associate degree.**
  - However, the national-level educational attainment data indicates **between 11.4% and 46.2% of workers in the field have completed some college or an associate degree.**

#### **Supply:**

- There are **nine community colleges** in the LA/OC region that issue awards related to the occupations of interest, conferring an average of **106 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.

### **Occupational Demand**

Exhibit 1 shows the five-year occupational demand projections for the five middle-skill occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to decrease by 6% through 2024. However, there will be nearly 4,050 job openings per year through 2024 due to retirements and workers leaving the field.

*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*

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<sup>2</sup> Living wage data was pulled from California Family Needs Calculator on 3/31/2021. 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: Middle-skill occupational demand in Los Angeles and Orange Counties<sup>3</sup>**

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	30,327	28,370	(1,957)	(6%)	2,751
Orange	13,516	13,019	(497)	(4%)	1,294
<b>Total</b>	<b>43,842</b>	<b>41,391</b>	<b>(2,453)</b>	<b>(6%)</b>	<b>4,047</b>

Exhibit 2 shows the five-year occupational demand projections for the two above middle-skill occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 4% through 2024. There will be nearly 300 job openings per year through 2024 due to retirements and workers leaving the field.

**Exhibit 2: Above middle-skill occupational demand in Los Angeles and Orange Counties**

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	1,960	2,027	66	3%	200
Orange	782	813	32	4%	77
<b>Total</b>	<b>2,742</b>	<b>2,840</b>	<b>98</b>	<b>4%</b>	<b>277</b>

Despite the projected decline in employment levels for the middle-skill occupational group, on average there will be nearly fifteen times more job openings per year than the above middle-skill cluster.

### Wages

The labor market endorsement in this report considers the entry-level hourly wages for the five middle-skill occupations of interest in Los Angeles/Orange County as they relate to each county's living wage. Detailed wage information, by county, is included in Appendix A.

**Los Angeles County:** The majority (60%) of annual openings for these occupations have entry-level wages **below** the living wage for one adult (\$15.04 in Los Angeles County). Typical entry-level hourly wages are in a range between \$14.45 and \$36.37. Experienced workers can expect to earn wages between \$26.03 and \$63.11, which are higher than the living wage estimate.

**Orange County:** The majority (63%) of annual openings for these 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 \$14.72 and \$37.32. Experienced workers can expect to earn wages between \$26.47 and \$64.76, which are higher than the living wage estimate.

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

### Job Postings

There were 7,317 online job postings related to all seven of these occupations listed in the past 12 months. The highest number of job postings were for laboratory technician, telemetry, and laboratory assistant. The top skills were quality assurance and control, phlebotomy, and chemistry. The top employers, by number of job postings, in the region were University of California, Healthcare Travelers, and Rn Travel Healthcare.

*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

In the LA/OC region, the majority of annual job openings (61%) typically require a high school diploma or an associate degree. However, national-level educational attainment data indicates between 11.4% and 46.2% of workers in the field have completed some college or an associate degree. Of the 67% of job postings listing a minimum education requirement in Los Angeles/Orange County, 62% (3,056) requested high school or vocational training, 11.2% (550) requested an associate degree, and 26.8% (1,323) requested a bachelor's degree.

### Educational Supply

**Community College Supply**—Exhibit 3 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); Chemical Technology (0954.00); and Laboratory Science Technology (0955.00). The colleges with the most completions in the region are Citrus, LA Trade-Tech, and Pasadena. Over the past 12 months, there were two other related program recommendation requests from regional community colleges.

**Exhibit 3: 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	3	5	2	3
		Pasadena	16	19	18	18
		<b>LA Subtotal</b>	<b>37</b>	<b>54</b>	<b>60</b>	<b>50</b>
		Fullerton	4	3	18	8
		Irvine	8	13	25	15
		Santa Ana	13	13	11	12
		Santiago Canyon	-	-	11	4
		<b>OC Subtotal</b>	<b>25</b>	<b>29</b>	<b>65</b>	<b>40</b>
<b>Supply Subtotal/Average</b>		<b>62</b>	<b>83</b>	<b>125</b>	<b>90</b>	

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
0954.00	Chemical Technology	LA Trade	-	-	8	3
		<b>LA Subtotal</b>	<b>-</b>	<b>-</b>	<b>8</b>	<b>3</b>
	<b>Supply Subtotal/Average</b>		<b>-</b>	<b>-</b>	<b>8</b>	<b>3</b>
0955.00	Laboratory Science Technology	LA Trade	21	14	-	12
		Mt San Antonio	2	2	2	2
	<b>LA Subtotal</b>		<b>23</b>	<b>16</b>	<b>2</b>	<b>14</b>
<b>Supply Subtotal/Average</b>		<b>23</b>	<b>16</b>	<b>2</b>	<b>14</b>	
<b>Supply Total/Average</b>		<b>85</b>	<b>99</b>	<b>135</b>	<b>106</b>	

**Non-Community College Supply**—It is important to consider the supply from non-community college institutions in the region that provide training programs for these 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) Code, 15.0401/Biomedical Technology/Technician.

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 college educational institutions in the region conferred an average of 78 awards annually in related training programs.

**Exhibit 4: 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-California	17	8	19	15
		Southern California Institute of Technology	61	62	68	64
<b>Supply Total/Average</b>		<b>78</b>	<b>70</b>	<b>87</b>	<b>78</b>	

Appendix A: Occupational demand and wage data by county

Exhibit 5. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Bioengineers and Biomedical Engineers (17-2031)	298	303	5	2%	19	\$36.37	\$47.05	\$63.11
Biological Technicians (19-4021)	1,662	1,724	61	4%	181	\$17.73	\$22.80	\$29.20
<b>Above Middle-Skill Subtotal</b>	<b>1,960</b>	<b>2,027</b>	<b>66</b>	<b>3%</b>	<b>200</b>			
Chemical Technicians (19-4031)	1,374	1,357	(17)	(1%)	121	\$17.43	\$23.07	\$31.75
Life, Physical, and Social Science Technicians, All Other (19-4099)	2,361	2,396	35	1%	273	\$18.79	\$25.57	\$32.12
Clinical Laboratory Technologists and Technicians (29-2018)	8,563	8,841	278	3%	561	\$19.30	\$26.42	\$40.35
Medical Equipment Repairers (49-9062)	1,565	1,547	(18)	(1%)	149	\$19.18	\$27.13	\$36.63
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	16,464	14,229	(2,235)	(14%)	1,647	\$14.45	\$19.00	\$26.03
<b>Middle-Skill Subtotal</b>	<b>30,327</b>	<b>28,370</b>	<b>(1,957)</b>	<b>(6%)</b>	<b>2,751</b>			
<b>Total</b>	<b>32,287</b>	<b>30,397</b>	<b>(1,890)</b>	<b>(6%)</b>	<b>2,952</b>			

**Exhibit 6. Orange County**

<b>Occupation (SOC)</b>	<b>2019 Jobs</b>	<b>2024 Jobs</b>	<b>5-Yr Change</b>	<b>5-Yr % Change</b>	<b>Annual Openings</b>	<b>Entry-Level Hourly Earnings (25th Percentile)</b>	<b>Median Hourly Earnings</b>	<b>Experienced Hourly Earnings (75th Percentile)</b>
Bioengineers and Biomedical Engineers (17-2031)	224	234	10	4%	16	\$37.32	\$48.27	\$64.76
Biological Technicians (19-4021)	558	579	22	4%	61	\$17.22	\$22.14	\$28.36
<b>Above Middle-Skill Subtotal</b>	<b>782</b>	<b>813</b>	<b>32</b>	<b>4%</b>	<b>77</b>			
Chemical Technicians (19-4031)	622	640	19	3%	59	\$17.59	\$23.27	\$32.04
Life, Physical, and Social Science Technicians, All Other (19-4099)	936	985	49	5%	116	\$17.94	\$24.38	\$30.60
Clinical Laboratory Technologists and Technicians (29-2018)	3,085	3,310	225	7%	223	\$20.30	\$27.78	\$42.41
Medical Equipment Repairers (49-9062)	805	796	(9)	(1%)	75	\$21.59	\$30.50	\$41.16
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	8,068	7,288	(781)	(10%)	821	\$14.72	\$19.35	\$26.47
<b>Middle-Skill Subtotal</b>	<b>13,516</b>	<b>13,019</b>	<b>(497)</b>	<b>(4%)</b>	<b>1,294</b>			
<b>Total</b>	<b>14,297</b>	<b>13,833</b>	<b>(465)</b>	<b>(3%)</b>	<b>1,371</b>			

**Exhibit 7. Los Angeles and Orange Counties**

<b>Occupation (SOC)</b>	<b>2019 Jobs</b>	<b>2024 Jobs</b>	<b>5-Yr Change</b>	<b>5-Yr % Change</b>	<b>Annual Openings</b>	<b>Typical Entry Level Education</b>
Bioengineers and Biomedical Engineers (17-2031)	522	537	15	3%	35	Bachelor's degree
Biological Technicians (19-4021)	2,220	2,303	83	4%	242	Bachelor's degree
<b>Above Middle-Skill Subtotal</b>	<b>2,742</b>	<b>2,840</b>	<b>98</b>	<b>4%</b>	<b>277</b>	
Chemical Technicians (19-4031)	1,996	1,998	2	0%	180	Associate degree
Life, Physical, and Social Science Technicians, All Other (19-4099)	3,296	3,381	84	3%	390	Associate degree
Clinical Laboratory Technologists and Technicians (29-2018)	11,648	12,152	504	4%	784	Bachelor's degree
Medical Equipment Repairers (49-9062)	2,370	2,343	(27)	(1%)	224	Associate degree
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	24,532	21,517	(3,016)	(12%)	2,469	High school diploma
<b>Middle-Skill Subtotal</b>	<b>43,842</b>	<b>41,391</b>	<b>(2,453)</b>	<b>(6%)</b>	<b>4,047</b>	
<b>Total</b>	<b>46,584</b>	<b>44,230</b>	<b>(2,355)</b>	<b>(5%)</b>	<b>4,323</b>	



## 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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