

## Program Endorsement Brief: 0430.00 – Biotechnology and Biomedical Technology Biomanufacturing (Bachelor's Degree)

Los Angeles Center of Excellence, October 2022

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### Summary Analysis

The Los Angeles Center of Excellence for Labor Market Research (LA COE) prepared this report to provide regional labor market supply and demand data related to two above middle-skill occupations:

- *Quality control systems managers* (11-3051.01), classified under *industrial production managers* (11-3051)
- *Biological technicians* (19-4021)

Middle-skill occupations are those that typically require some postsecondary education, but less than a bachelor's degree.<sup>1</sup> However, since this report is for a proposed California Community College Baccalaureate Degree Program (BDP), two above middle-skill occupations were studied in this report. 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 or other local educational institutions that align with the relevant occupations.

Based on the available data, there appears to be a regional supply gap for the two occupations in this report. In addition to the majority of job openings having entry-level wages above the self-sufficiency standard wage in both Los Angeles and Orange counties, nearly one-third or more of incumbent workers have completed at least some college or an associate degree. Under the typical regional program recommendation process set forth for community colleges, this program meets all three major criteria for labor market endorsement – a supply gap exists, the occupations pay above a living wage, and the typical entry-level education requirements for both occupations is appropriate for this BDP. Detailed data for each criterion appear below:

#### Demand:

- **Supply Gap Criteria** – Over the next five years, **780 job openings are projected to be available annually** in the region due to replacement needs, **which is more than the 65 awards conferred annually** by educational institutions in the region.
- **Living Wage Criteria** – In Los Angeles County, the majority (71%) of annual job openings for the two occupations in this report have entry-level wages **above** the self-sufficiency standard wage (\$18.10/hour).<sup>2</sup>

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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.

<sup>2</sup> Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California. For more information, visit: <http://selfsufficiencystandard.org/california>.

- **Educational Criteria** – Within the LA/OC region, **all of the annual job openings** for the two occupations of interest **typically require a bachelor’s degree**.
  - National-level educational attainment data indicates between **29% and 37% of workers in the field have completed some college or an associate degree**.

**Supply:**

- Between 2017 and 2020, there was an average of **65 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 two occupations in this report. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to decrease by 7% through 2025. However, there will be 780 job openings per year through 2025 due to retirements and workers leaving the field.

**Exhibit 1: Occupational demand in Los Angeles and Orange Counties<sup>3</sup>**

Geography	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Annual Openings
Los Angeles	7,247	6,687	(560)	(8%)	551
Orange	3,049	2,926	(123)	(4%)	229
<b>Total</b>	<b>10,296</b>	<b>9,613</b>	<b>(683)</b>	<b>(7%)</b>	<b>780</b>

**Wages**

The labor market endorsement in this report considers the hourly wages for the two occupations in this report in Los Angeles County, as they relate to the county’s self-sufficiency standard 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** — The majority (71%) of annual openings for these occupations have entry-level wages **above** the living wage for one adult (\$18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between \$17.24 and \$37.14. Experienced workers can expect to earn wages between \$28.98 and \$64.78, which are above the self-sufficiency standard wage estimate.

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<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.

**Exhibit 2: Hourly Earnings for Occupations in Los Angeles County**

Occupation	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Industrial Production Managers (11-3051)	\$37.14	\$48.17	\$64.78
Biological Technicians (19-4021)	\$17.24	\$22.37	\$28.98

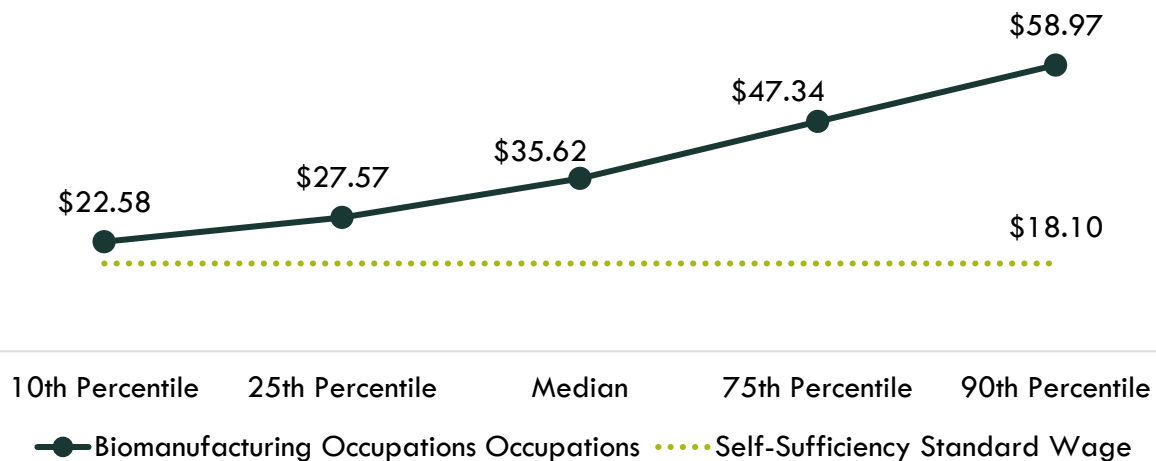
**Orange County** — The majority (76%) of annual openings for these occupations have entry-level wages **above** the living wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages are in a range between \$18.19 and \$38.58. Experienced workers can expect to earn wages between \$29.90 and \$66.98, which are above the self-sufficiency standard wage estimate.

**Exhibit 3: Hourly Earnings for Occupations in Orange County**

Occupation	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Industrial Production Managers (11-3051)	\$38.58	\$49.89	\$66.98
Biological Technicians (19-4021)	\$18.19	\$23.08	\$29.90

On average, the entry-level earnings for the occupations in this report are \$22.58; this is above the self-sufficiency standard wage estimate for one single adult in Los Angeles County (\$18.10). Exhibit 4 shows the average wages for the occupations in this report, from entry-level to experienced workers.

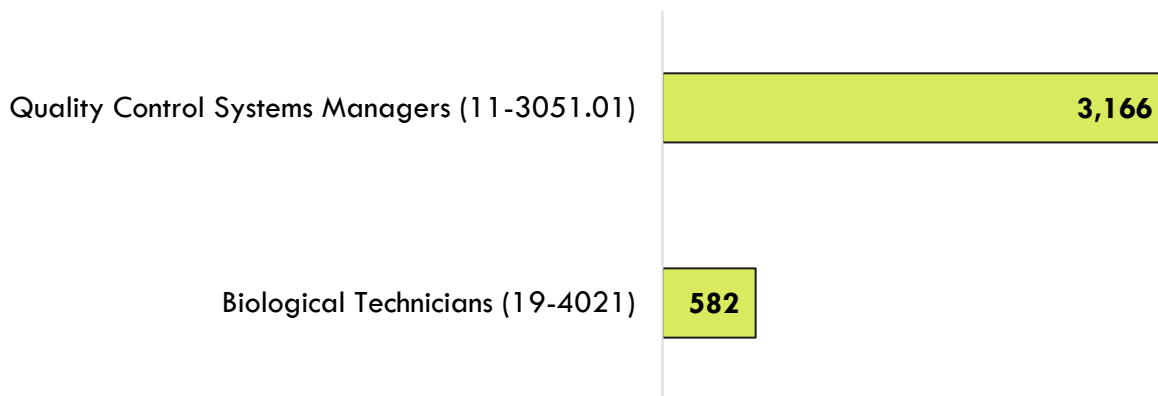
**Exhibit 4: Average Hourly Earnings for Biomanufacturing Occupations in LA/OC**



### Job Postings

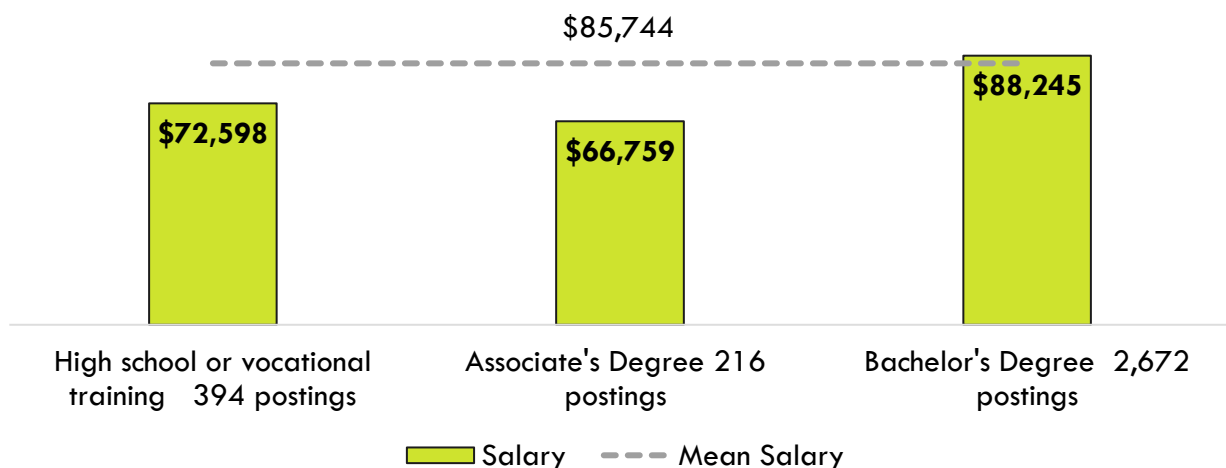
Over the past 12 months, there have been 3,748 online job postings related to the two occupations of interest. Exhibit 5 displays the number of job postings by occupation. The majority of job postings (84%) were for *quality control systems managers*. The highest number of job postings were for quality assurance managers, quality managers, quality assurance supervisors, quality control managers, and research associates. The top skills were quality assurance and control, quality management, good manufacturing practices (GMP), project management, and chemistry. The top employers, by number of job postings, in the region were Gilead Sciences, Thermo Fisher Scientific, Inc., Danaher Corporation, Grifols, and Takeda Pharmaceutical Company.

**Exhibit 5: Job postings by occupation (last 12 months)**



**Advertised Salary by Education** — The mean advertised salary for the occupations in this report is \$85,744. The employers seeking candidates with a bachelor's degree are advertising salaries that are nearly \$16k higher than those seeking candidates with a high school diploma, and nearly \$22k higher than those seeking candidates with an associate degree. Exhibit 6 display the advertised salary by education level from the job postings in this analysis.

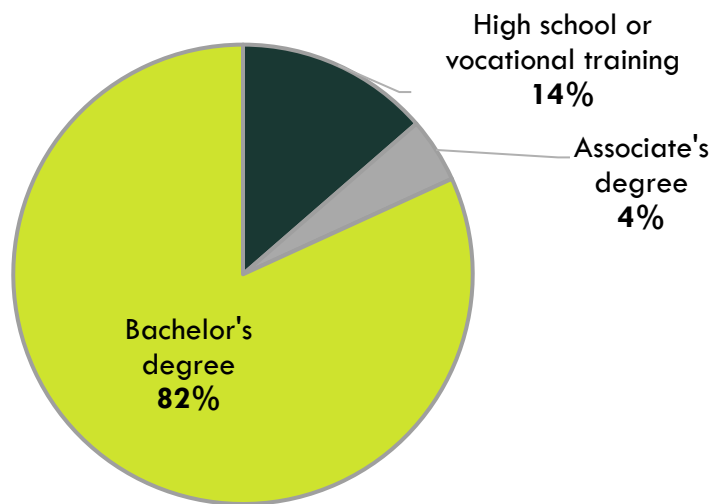
**Exhibit 6: Advertised salary by education**



### Educational Attainment

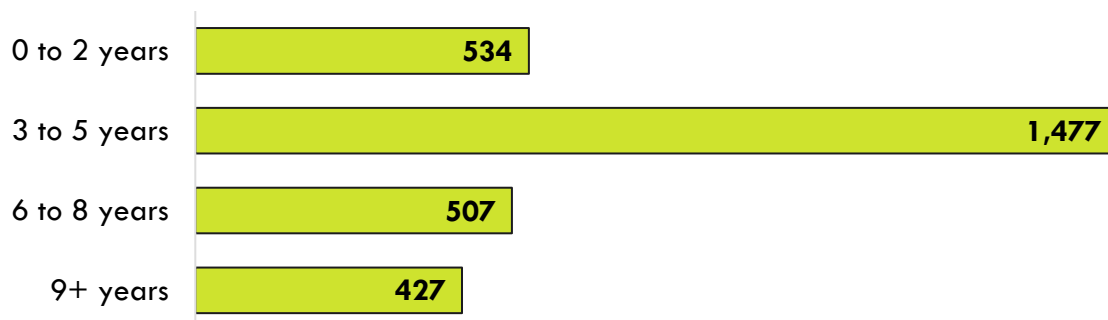
The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for *industrial production managers* (11-3051) and *biological technicians* (19-4021). In the LA/OC region, all of annual job openings (100%) typically require a bachelor's degree. National-level educational attainment data indicates between 29% and 37% of workers in the two occupations in this report have completed some college or an associate degree, while 41% to 46% have completed a bachelor's degree or higher. Employers posting job ads for the two occupations of interest show a preference for candidates with a bachelor's degree, with 82% of job ads seeking candidate with this level of education. Exhibit 7 displays the minimum advertised education requirements from employer job postings.

**Exhibit 7: Minimum education requirements from job postings**



**Experience** – Fifty percent of employers are seeking candidates with three to five years of experience for these roles. While 32% of jobs ads are seeking candidates with six or more years of experience for these jobs, the majority of the opportunities (68%) are targeting jobs seekers with five years of experience or less, and 18% of these job ads approximate entry-level positions in the field, requiring minimal to no experience (see Exhibit 8)

**Exhibit 8: Experience requirements from job postings**



## Educational Supply

**Non-Community College Supply** — For a comprehensive regional supply analysis, it is important to consider the supply from non-community college institutions in the region that may provide training programs for the two occupations of interest. Exhibit 9 shows the annual and three-year average number of postsecondary awards and bachelor’s-level awards conferred by these institutions across two programs. Between 2017 and 2020, non-community college institutions in the region conferred an average of 65 awards.

**Exhibit 9: Regional non-community college bachelor’s awards, 2017-2020**

CIP Code	Program	Institution	2017-18 Awards	2018-19 Awards	2019-20 Awards	3-Year Average
15.0401	Biomedical Technology/Technician	DeVry University-CA	9	5	2	5
		Southern California Institute of Technology	62	63	46	57
15.0702	Quality Control Technology/Technician	CSU-Dominguez Hills	5	3	1	3
<b>Supply Total/Average</b>			<b>76</b>	<b>71</b>	<b>49</b>	<b>65</b>

## Appendix A: Occupational demand and wage data by county

**Exhibit 10. Los Angeles County**

Occupation (SOC)	2021 Jobs	2026 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)
Industrial Production Managers (11-3051)	6,075	5,450	(625)	(10%)	389	\$37.14	\$48.17	\$64.78
Biological Technicians (19-4021)	1,172	1,237	65	6%	162	\$17.24	\$22.37	\$28.98
<b>Total</b>	<b>7,247</b>	<b>6,687</b>	<b>(560)</b>	<b>(8%)</b>	<b>551</b>	<b>-</b>	<b>-</b>	<b>-</b>

**Exhibit 11. Orange County**

Occupation (SOC)	2021 Jobs	2026 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)
Industrial Production Managers (11-3051)	2,644	2,500	(144)	(5%)	173	\$38.58	\$49.89	\$66.98
Biological Technicians (19-4021)	405	426	21	5%	56	\$18.19	\$23.08	\$29.90
<b>Total</b>	<b>3,049</b>	<b>2,926</b>	<b>(123)</b>	<b>(4%)</b>	<b>229</b>	<b>-</b>	<b>-</b>	<b>-</b>

**Exhibit 12. Los Angeles and Orange Counties**

<b>Occupation (SOC)</b>	<b>2021 Jobs</b>	<b>2026 Jobs</b>	<b>5-Yr Change</b>	<b>5-Yr % Change</b>	<b>Annual Openings</b>	<b>Typical Entry Level Education</b>
Industrial Production Managers (11-3051)	8,719	7,949	(770)	(9%)	562	Bachelor's Degree
Biological Technicians (19-4021)	1,577	1,664	87	6%	218	Bachelor's Degree
<b>Total</b>	<b>10,296</b>	<b>9,613</b>	<b>(683)</b>	<b>(7%)</b>	<b>780</b>	<b>-</b>

**Appendix B: Sources**

- O\*NET Online
- Labor Insight/Jobs (Burning Glass)
- Lightcast (formerly Emsi)
- Bureau of Labor Statistics (BLS)
- California Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- Self-Sufficiency Standard at the Center for Women's Welfare, University of Washington
- Chancellor's Office Curriculum Inventory (COCI 2.0)

## Appendix C: Additional Job Postings related to Biotechnology within the Manufacturing industry

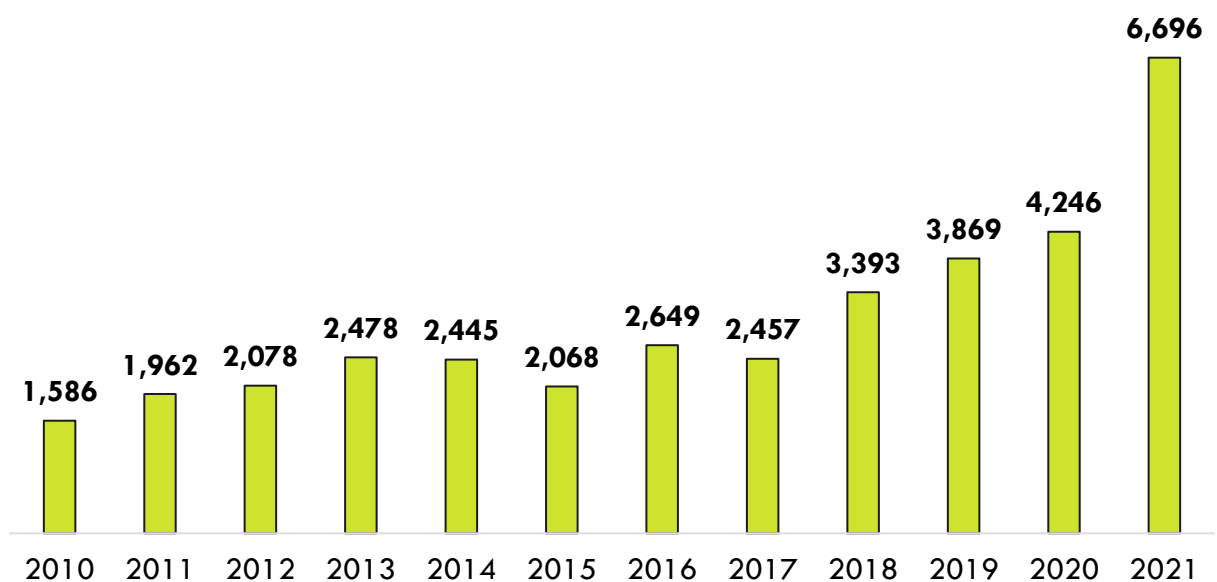
In addition to the job posting section related to the two occupations of interest on pages four and five of this report, an additional query of regional job posting data specific to biomanufacturing was conducted using the following criteria:

1. Job postings limited to Los Angeles County
2. Job postings limited to Biotech jobs within the Manufacturing industry
3. Job postings from the 12-month timeframe – Oct. 1, 2021 to Sep. 30, 2022.

The results of this specialized query yielded 13,232 job postings. While each individual job posting might not be precisely relevant to the proposed program, the overall findings from this biomanufacturing job posting search are undoubtedly important to the field as a whole and can be used to tailor the proposed program to the specific needs of regional employers.

In order to put this query in perspective, it is useful to view historical job posting data first. Online job postings may provide additional insights about recent changes in the labor that are not yet captured by traditional LMI. Between 2010 and 2021, there was an average of 2,994 annual online job postings in Los Angeles County related to biomanufacturing. From 2020 to 2021 alone, biomanufacturing job postings increased by 58%, much faster than the overall job posting rate increase of 25% during this same timeframe. Exhibit 13 contains the number of job postings from each year, but please note that online job postings are not equal to labor market demand because employers may post a position multiple times and for various reasons. Thus, online job postings are used as a proxy for demand, and should be considered supplemental to traditional labor market information.

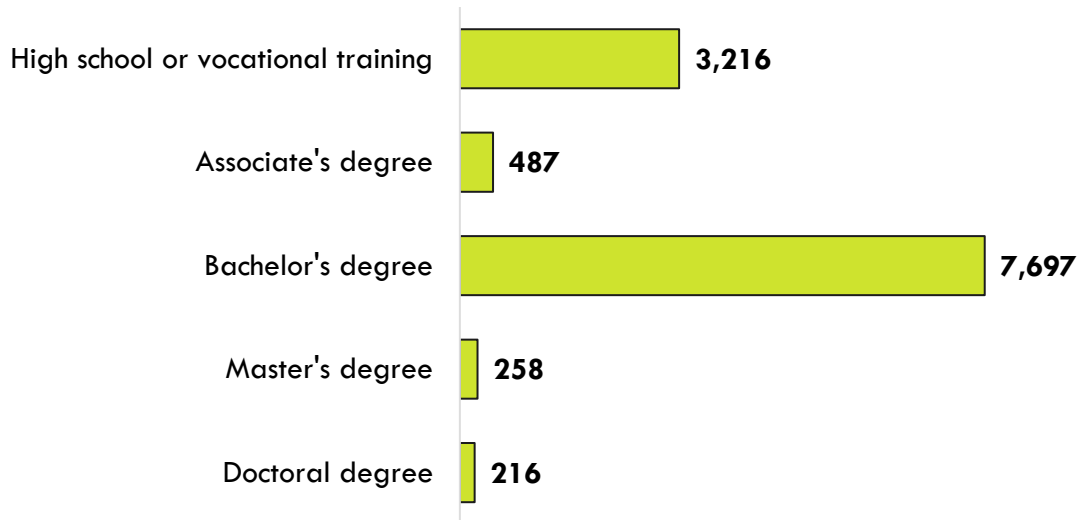
**Exhibit 13: Biomanufacturing job postings in LA County, 2010-2021**





As mentioned previously, the 13,232 job postings from the period of Oct. 1, 2021 to Sep. 30, 2022 are the subject of each subsequent analysis. Overall, employers posting these job ads show a strong preference for candidates with a bachelor's degree, accounting for 58% of all postings. Exhibit 14 displays the minimum advertised education from these postings.

**Exhibit 14: Minimum advertised education requirement for biomanufacturing job postings**



The job postings are seeking a diverse set of roles for this industry. The table below displays the number of job postings by the twenty occupations with the most job ads. The occupations most relevant to the proposed program appear in Exhibit 15 and are highlighted in yellow, and are further analyzed in terms of minimum education requirements below.

**Exhibit 15: Occupations with the most job postings**

O*NET Code	Occupation	Job Postings
15-1132.00	Software Developers, Applications	678
15-1199.02	Computer Systems Engineers/Architects	540
11-9199.00	Managers, All Other	480
19-4099.01	Quality Control Analysts	443
17-3029.09	Manufacturing Production Technicians	353
11-9041.00	Architectural and Engineering Managers	248
17-2141.00	Mechanical Engineers	239
41-4012.00	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	233
51-9061.00	Inspectors, Testers, Sorters, Samplers, and Weighers	233
13-1111.00	Management Analysts	219
15-2031.00	Operations Research Analysts	216
11-2022.00	Sales Managers	207
53-7051.00	Industrial Truck and Tractor Operators	200
19-2031.00	Chemists	199
53-7062.00	Laborers and Freight, Stock, and Material Movers, Hand	187
51-9199.00	Production Workers, All Other	185
17-2199.04	Manufacturing Engineers	174
29-2012.00	Medical and Clinical Laboratory Technicians	170
13-1081.00	Logisticians	170
17-2071.00	Electrical Engineers	167
11-3051.01	Quality Control Systems Managers	163

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