CENTER OF EXCELLENCE
FOR LABOR MARKET RESEARCH

Labor Market Analysis for Program Recommendation Semiconductor Engineering Occupations Foothill College

Prepared by the Bay Region Center of Excellence for Labor Market Research

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Recommendation

Based on all available data, there appears to be an "undersupply" of Semiconductor Engineering workers compared to the demand for this cluster of occupations in the Bay Region and in the Silicon Valley Sub-Region (Santa Clara County). There is a projected annual gap of about 929 students in the Bay Region and 396 students in the Silicon Valley Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0945.00 - Industrial Systems Technology and Maintenance programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Foothill College and in the region.

This report profiles Semiconductor Engineering Occupations in the 12 county Bay Region and in the Silicon Valley Sub-Region for New certificate or degree development (for credit) at Foothill College.

- **Industrial Production Managers (11-3051):** Plan, direct, or coordinate the work activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications.
  Typical Entry-Level Educational: Bachelor's degree
  Typical On-the-Job Training: None
  Percentage of individuals 25+ with an associate degree, certificate, or some post-secondary coursework as their highest level of education attainment: 30%

- **Industrial Engineering Technologists and Technicians (17-3026):** Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.
  Typical Entry-Level Educational: Associate's degree
  Typical On-the-Job Training: None
  Percentage of individuals 25+ with an associate degree, certificate, or some postsecondary coursework as their highest level of education attainment: 50%

- **Semiconductor Processing Technicians (51-9141):** Perform any or all of the following functions in the manufacture of electronic semiconductors: load semiconductor material into furnace; saw formed ingots into segments; load individual segment into crystal growing chamber and monitor controls; locate crystal axis in ingot using x-ray equipment and saw ingots into wafers; and clean, polish, and load wafers into series of special purpose furnaces, chemical baths, and equipment used to form circuitry and change conductive

properties.

Typical Entry-Level Educational: High school diploma or equivalent

Typical On-the-Job Training: Moderate-term on-the-job training

Percentage of individuals 25+ with an associate degree, certificate, or some postsecondary coursework as their highest level of education attainment: 27%

Occupational Demand

Table 1. Employment Outlook for Semiconductor Engineering Occupations in the Bay Region

Occupation	2023 Jobs	2028 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Wage	Median Hourly Wage
Industrial Production Managers	6,889	7,343	454	7%	2,844	569	$55	$75
Industrial Engineering Technologists and Technicians	1,629	1,838	209	13%	988	198	$30	$36
Semiconductor Processing Technicians	2,223	2,340	117	5%	1,336	267	$22	$23
Total	**10,741**	**11,521**	**780**	**7%**	**5,168**	**1,034**	**$44**	**$58**

Source: Lightcast 2024.3

The Bay Region includes: Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Semiconductor Engineering Occupations in the Silicon Valley Sub-Region

Occupation	2023 Jobs	2028 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Wage	Median Hourly Wage
Industrial Production Managers	2,380	2,513	133	6%	952	190	$60	$79
Industrial Engineering Technologists and Technicians	636	730	94	15%	400	80	$32	$37
Semiconductor Processing Technicians	1,786	1,866	80	4%	1,055	211	$22	$23
Total	**4,802**	**5,109**	**307**	**6%**	**2,407**	**481**	**$42**	**$53**

Source: Lightcast 2024.3

Silicon Valley Sub-Region includes: Santa Clara County

Job Postings in the Bay Region and Silicon Valley Sub-Region

Table 3. Number of Job Postings by Occupation for the latest 12 months

Occupation	Bay Region	Silicon Valley
Industrial Production Managers	3,272	866
Industrial Engineering Technologists and Technicians	1,771	436
Semiconductor Processing Technicians	157	87

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Table 4a. Top Job Titles in Job Postings for Semiconductor Engineering Occupations in the Bay Region

Title	Bay	Title	Bay
Manufacturing Technicians	595	Quality Assurance Leads	60
Quality Assurance Managers	199	Directors of Quality	54
Quality Managers	128	Quality Assurance Supervisors	51
Production Technicians	121	Semiconductor Engineers	46
Quality Control Managers	107	Clinical Quality Assurance Managers	40
Manufacturing Managers	105	Quality Control Supervisors	40
Directors of Quality Assurance	85	Directors of Manufacturing	36
Production Managers	76	Manufacturing Associates	33
Process Technicians	69	Bottling Supervisors	31

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Table 4b. Top Job Titles in Job Posting for Semiconductor Engineering Occupations in the Silicon Valley Sub-Region

Title	Silicon Valley	Title	Silicon Valley
Manufacturing Technicians	148	Production Managers	19
Quality Managers	56	Quality Control Managers	19
Manufacturing Managers	46	Directors of Quality	15
Process Technicians	34	Directors of Quality Assurance	15
Quality Assurance Managers	34	Engineering Technicians	15
Quality Assurance Leads	32	Program Managers	15
Semiconductor Engineers	28	Directors of Manufacturing	13
Quality Control Supervisors	21	Manufacturing Operators	13
Production Technicians	20	Manufacturing Equipment Technicians	12

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Industry Concentration

Table 5. Industries Hiring for Semiconductor Engineering Occupations in the Bay Region

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2023)	Jobs in Industry (2028)	% Change (2023-28)	% Occupation Group in Industry (2023)
Semiconductor and Related Device Manufacturing	1,952	2,030	4%	18%
Electronic Computer Manufacturing	709	798	12%	7%

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2023)	Jobs in Industry (2028)	% Change (2023-28)	% Occupation Group in Industry (2023)
Automobile and Light Duty Motor Vehicle Manufacturing	502	605	20%	5%
Other Electronic Component Manufacturing	364	348	-4%	3%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	345	394	14%	3%
Printed Circuit Assembly (Electronic Assembly) Manufacturing	330	353	7%	3%
Pharmaceutical Preparation Manufacturing	299	255	-15%	3%
Bare Printed Circuit Board Manufacturing	239	199	-17%	2%
Semiconductor Machinery Manufacturing	224	241	8%	2%
Research and Development in Biotechnology (except Nanobiotechnology)	220	265	20%	2%

Source: Lightcast 2024.4

Table 6. Top Employers Posting Semiconductor Engineering Occupations in the Bay Region and the Silicon Valley Sub-Region

Employer	Bay	Employer	Silicon Valley
Aerotek	90	Apple	47
Accenture	69	Amazon	36
Randstad	67	Northrop Grumman	24
Gilead Sciences	57	Accenture	21
Fladger Associates	52	Applied Materials	21
Apple	47	Sanmina	21

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Educational Supply

There are three community colleges in the Bay Region issuing 29 awards on average annually (last 3 years ending 2021-23) on TOP 0945.00 - Industrial Systems Technology and Maintenance. In the Silicon Valley Sub-Region, there is one community college that issued 9 awards on average annually (last 3 years) on this TOP code.

There is a four-year institution in the Bay Region issuing 76 bachelor's degrees on average annually (last 3 years ending 2020-22) on CIP 15.0612- Industrial Technology/Technician There is a four-year institution in the Silicon Valley Sub-Region issuing 76 bachelor's degrees on this CIP code.

Table 7a. Community College Awards on TOP 0945.00 - Industrial Systems Technology and Maintenance in the Bay Region

College	Subregion	Associate Degree	High unit Certificate	Low unit Certificate	Total
Laney	East Bay	0	0	2	2
Los Medanos	East Bay	11	6	1	18
San Jose City	Silicon Valley	4	5	0	9
Total	**-**	**15**	**11**	**3**	**29**

Source: Data Mart

Note: The annual average for awards is 2020-21 to 2022-23.

Table 7b. Bachelor's Degree Awards on CIP 15.0612- Industrial Technology/Technician in the Bay Region

College	Subregion	Bachelor's degree	Total
San Jose State University	Silicon Valley	76	76
Total	**-**	**76**	**76**

Source: Data Mart

Note: The annual average for awards is 2019-20 to 2021-22.

Gap Analysis

Based on the data included in this report, there is a labor market gap in the Bay Region with 1,034 annual openings for the Semiconductor Engineering occupational cluster and 105 annual (3-year average) awards for an annual undersupply of 929 students. In the Silicon Valley Sub-Region, there is also a gap with 481 annual openings and 85 annual (3-year average) awards for an annual undersupply of 396 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0945.00 - Industrial Systems Technology and Maintenance

Metric Outcomes	Bay All CTE Program	Foothill College All CTE Program	State 0945.00	Bay 0945.00	Silicon Valley 0945.00	Foothill College0945.00
Students with a Job Closely Related to Their Field of Study	74%	88%	74%	79%	71%	NA
Median Annual Earnings for SWP Exiting Students	$53,090	$73,174	$49,735	$61,436	$71,804	NA
Median Change in Earnings for SWP Exiting Students	24%	42%	35%	43%	34%	NA
Exiting Students Who Attained the Living Wage	54%	66%	66%	61%	72%	NA

Source: Launchboard Strong Workforce Program Median of 2018 to 2021.

Skills, Certifications and Education

Table 9. Top Skills in Job Postings for Semiconductor Engineering Occupations in the Bay Region

Skill	Posting	Skill	Posting
Continuous Improvement Process	1,100	Corrective And Preventive Action (CAPA)	507
Good Manufacturing Practices	999	Pharmaceuticals	494
Auditing	997	Manufacturing Operations	430
Quality Management	881	Biotechnology	428
Quality Management Systems	789	Product Quality (QA/QC)	380
Project Management	760	Key Performance Indicators (KPIs)	379
Manufacturing Processes	624	Lean Manufacturing	367
Process Improvement	577	Automation	355
Supply Chain	551	Workflow Management	337
New Product Development	511	Risk Management	332

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Table 10. Certifications in Job Postings for Semiconductor Engineering Occupations in the Bay Region

Certification	Posting	Certification	Posting
Automotive Service Excellence (ASE) Certification	49	Six Sigma Certification	37
American Society for Quality (ASQ) Certified	48	Hazard Analysis and Critical Control Point (HACCP) Certification	30
Project Management Professional Certification	40	Forklift Certification	29

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Table 11. Education Requirements for Semiconductor Engineering Occupations in the Bay Region

Education Level	Job Postings	% of Total
High school or GED	981	19%
Associate degree	535	10%
Bachelor's degree & higher	3,758	71%

Source: Lightcast 2024.4; "Job Posting Analytics." Jan. 2024 - Dec. 2024

Note: 30% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample.

Methodology

Occupations for this report were identified by use of job descriptions and skills listed in O*Net. Labor demand data is sourced from Lightcast occupation and job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CCCCO Data Mart and CTE Launchboard.

Sources

O*Net Online
Lightcast
CTE LaunchBoard www.calpassplus.org
Statewide CTE Outcomes Survey
Employment Development Department Unemployment Insurance Dataset
CCCCO Data Mart

Contacts

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