



Engineering Technology

July 2018

Research Summary

The Los Angeles/Orange County Center of Excellence (COE) compiled this report to provide regional labor market supply and demand data related to **engineering technology**.

The following list summarizes key findings from this data brief:

- The number of jobs for engineering technology-related occupations is expected to decrease by 4% through 2022. However, there will be over 900 annual job openings due to replacement need (e.g. retirements).
- The entry-level hourly wage for all of the occupations in this report is **above** the MIT Living Wage¹ estimate for the county – \$13.54 per hour for a single adult.
- In 2017, there were **3,008 employer job ads** for engineering technology-related occupations.
- Of the job postings that posted a minimum education requirement, over half listed a high school diploma or vocational training. Approximately 55% of the current workforce has some postsecondary coursework and/or training.
- Between 2014 and 2017, community colleges in the county conferred an average of 378 awards (associate degrees and certificates) in a related training program.

¹ MIT Living Wage Calculator. <http://livingwage.mit.edu/>

Occupation Codes and Descriptions

Currently, there are seven occupations in the standard occupational classification (SOC) system and 14 emerging occupations in the O*NET database of occupations² related to engineering technology. The occupation titles, descriptions, and reported job titles are included in Exhibit 1.

Exhibit 1 – Occupations, description, and sample job titles

SOC Code	Title	Description	Sample of Reported Job Titles
17-3021	Aerospace Engineering and Operations Technicians	Operate, install, calibrate, and maintain integrated computer/communications systems, consoles, simulators, and other data acquisition, test, and measurement instruments and equipment, which are used to launch, track, position, and evaluate air and space vehicles. May record and interpret test data.	Avionics Technician, Avionics Test Technician, Calibration Technician, Communication Technician, Electronics Technician, Engineering Technician, Instrumentation Technician, Spacecraft Systems Engineer, Systems Test Technician, Test Technician
17-3022	Civil Engineering Technicians	Apply theory and principles of civil engineering in planning, designing, and overseeing construction and maintenance of structures and facilities under the direction of engineering staff or physical scientists.	Civil Designer, Civil Engineering Assistant, Civil Engineering Designer, Civil Engineering Technician, Design Technician, Engineer Technician, Engineering Assistant, Engineering Specialist, Engineering Technician, Transportation Engineering Technician
17-3023	Electrical and Electronic Engineering Technicians	Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, calibrate, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions.	<p>17-3023.01 - Electronics Engineering Technicians Digital Tech (Digital Technician), Electrical Technician, Electronics Engineering Technician, Electronics Technician, Engineering Technician (Engineering Tech), Failure Analysis Technician (FA Technician), Refurbish Technician (Refurb Tech), Senior Electronics Technician, Technician, Test Technician</p> <p>17-3023.03 - Electrical Engineering Technicians Electrical Engineering Technician, Electrical Technician, Engineering Assistant, Engineering Technician, Generation Technician, Instrument and Controls Technician (I & C Technician), Relay Tester, Results Technician, Test Specialist, Test Technician</p>

² New and emerging occupations (N&E) are incorporated into the O*NET-SOC classification system based on the evolving nature of workforce requirements stemming from changes in technology, society, law, and business practices. Incorporating N&E occupations into the O*NET system makes O*NET information more beneficial and responsive.

<https://www.onetcenter.org/reports/NewEmerging.html>

17-3024	Electro-Mechanical Technicians	Operate, test, maintain, or calibrate unmanned, automated, servo-mechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment at worksites, such as oil rigs, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.	Electro-Mechanic, Electro-Mechanical Technician (E/M Technician), Electronic Technician, Engineering Technician, Laboratory Technician (Lab Technician), Maintenance Technician, Mechanical Technician, Product Test Specialist, Test Technician, Tester
17-3026	Industrial Engineering Technicians	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.	Engineering Technician, Industrial Engineering Analyst, Industrial Engineering Technician, Manufacturing Technician, Methods Engineer, Process Documentation and Methods Analyst, Process Engineer, Process Technician, Production Staff Worker, Quality Control Engineering Technician (QC Engineering Technician)
17-3027	Mechanical Engineering Technicians	Apply theory and principles of mechanical engineering to modify, develop, test, or calibrate machinery and equipment under direction of engineering staff or physical scientists.	Design Engineer, Designer, Engineering Lab Technician, Engineering Technical Analyst, Engineering Technician, Equipment Engineer, Lab Technician, Mechanical Designer, Process Technician, Research and Development Technician
17-3029	Engineering Technicians, Except Drafters, All Other	There are 12 emerging occupations associated with this occupation.	17-3029.01 - Non-Destructive Testing Specialists 17-3029.02 - Electrical Engineering Technologists 17-3029.03 - Electromechanical Engineering Technologists 17-3029.04 - Electronics Engineering Technologists 17-3029.05 - Industrial Engineering Technologists 17-3029.06 - Manufacturing Engineering Technologists 17-3029.07 - Mechanical Engineering Technologists 17-3029.08 - Photonics Technicians 17-3029.09 - Manufacturing Production Technicians 17-3029.10 - Fuel Cell Technicians 17-3029.11 - Nanotechnology Engineering Technologists 17-3029.12 - Nanotechnology Engineering Technicians

Source: O*NET Online

Current and Future Employment

In Los Angeles County, the number of jobs for occupations related to engineering technology is expected to decrease by 4% over the next five years. More than 900 job opportunities will be available annually for this occupation group through 2022 due to replacement need (e.g., retirements). Exhibit 2 contains detailed employment projections data for this occupation group.

Exhibit 2 – Five-year projections for engineering technology-related occupations

SOC	Occupation	2017 Jobs	2022 Jobs	2017 - 2022 Change	2017 - 2022 % Change	Annual Openings
17-3023	Electrical and Electronics Engineering Technicians	3,796	3,671	(125)	(3%)	321
17-3029	Engineering Technicians, Except Drafters, All Other	1,997	1,947	(50)	(3%)	168
17-3022	Civil Engineering Technicians	1,923	1,849	(74)	(4%)	160
17-3027	Mechanical Engineering Technicians	1,246	1,171	(75)	(6%)	103
17-3026	Industrial Engineering Technicians	974	966	(8)	(1%)	82
17-3021	Aerospace Engineering and Operations Technicians	682	626	(56)	(8%)	56
17-3024	Electro-Mechanical Technicians	301	290	(11)	(4%)	25
	Total	10,919	10,520	(399)	(4%)	916

Source: EMSI 2018.2 – QCEW, non-QCEW, Self-Employed.

Earnings

In Los Angeles County, the entry-level average wage for engineering technology occupations is between \$15.62 and \$24.00 per hour, which is above the MIT Living Wage estimate of \$13.54 per hour for a single adult. The average annual earnings for the occupations in the region is between \$57,003 and \$79,119 per year, assuming full-time employment.

Exhibit 3 contains hourly wages and annual average earnings for the occupations studied in this report. Entry-level hourly earnings is represented by the 10th percentile of wages, median hourly earnings is represented by the 50th percentile of wages, and experienced hourly earnings is represented by the 90th percentile of wages, demonstrating various levels of employment.

Exhibit 3 – Earnings for engineering technology-related occupations

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings	Average Annual Earnings
17-3021	Aerospace Engineering and Operations Technicians	\$24.00	\$34.06	\$43.36	\$69,645
17-3022	Civil Engineering Technicians	\$22.24	\$39.46	\$51.34	\$79,119
17-3026	Industrial Engineering Technicians	\$19.67	\$33.58	\$50.32	\$71,560

17-3027	Mechanical Engineering Technicians	\$19.08	\$31.73	\$42.66	\$64,684
17-3029	Engineering Technicians, Except Drafters, All Other	\$18.51	\$33.84	\$49.18	\$70,840
17-3023	Electrical and Electronics Engineering Technicians	\$18.06	\$31.16	\$45.57	\$65,343
17-3024	Electro-Mechanical Technicians	\$15.62	\$24.94	\$44.77	\$57,003

Source: EMSI 2018.2 – QCEW, non-QCEW, Self-Employed.

Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is employing workers, and what they are looking for in potential candidates. To identify job postings related to engineering technology, the SOC codes in Exhibit 1 were used.

Top Titles

The most common job titles for engineering technology-related jobs are listed in Exhibit 4. Maintenance technician was mentioned in 14% of all relevant job postings (420 out of 3,008 postings).

Exhibit 4 –Job titles (n=3,008)

Title	Job Postings, Full Year 2017
Maintenance Technician	420
Test Technician	159
Engineering Technician	143
Manufacturing Technician	137
Electronics Technician	127
Mechanical Technician	126
Production Technician	90
Engineer	89
Maintenance Worker	86
Electrical Technician	77
Instrumentation Technician	71

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 5 lists the major employers hiring professionals in the field of engineering technology. Top employers postings job ads included SpaceX, Northrop Grumman, and JT3 LLC. The top worksite cities in the region for these jobs were: Los Angeles, Hawthorne, Torrance, Long Beach, and Santa Clarita.

Exhibit 5 – Top employers (n=1,820)

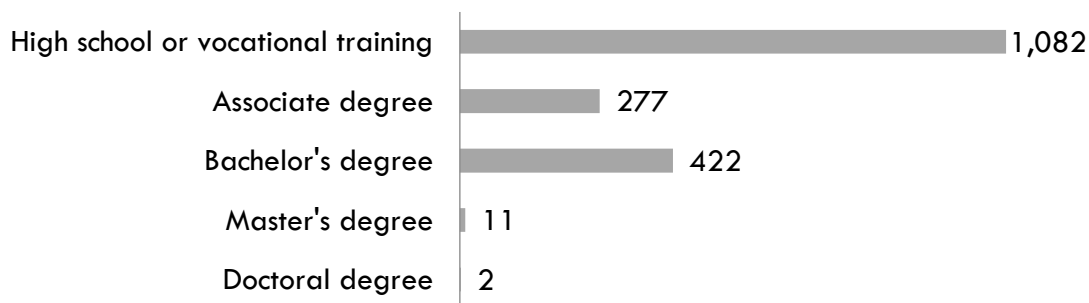
Employer	Job Postings, Full Year 2017
SpaceX	105
Northrop Grumman	66
JT3 LLC	21
Columbus Technologies Services	19
NTS Unitek	19
Thor Solutions	17
FedEx	15
Arconic Inc	14
Army National Guard	14
Lockheed Martin Corporation	13

Source: Labor Insight/Jobs (Burning Glass)

Advertised Education Levels

Exhibit 6 displays the education level requested by employers in online job ads. The majority of employers were looking for a candidate with high school or vocational training. Approximately 40% of job postings did not specify a level of education.

Exhibit 6 – Advertised education requirements for engineering technology-related occupations (n=1,794)



Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 7 shows the typical entry-level education requirement for the occupations of interest, along with the typical on-the-job training, and percentage of workers in the field who hold a community college award or have completed some postsecondary courses. About 55% of the workforce has completed some community college education as their highest level of education.

Exhibit 7 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training	% of Community College Award Holders or Some Postsecondary Coursework
17-3021	Aerospace Engineering and Operations Technicians	Associate degree	None	55%
17-3022	Civil Engineering Technicians	Associate degree	None	55%
17-3023	Electrical and Electronics Engineering Technicians	Associate degree	None	55%
17-3024	Electro-Mechanical Technicians	Associate degree	None	55%
17-3026	Industrial Engineering Technicians	Associate degree	None	55%
17-3027	Mechanical Engineering Technicians	Associate degree	None	55%
17-3029	Engineering Technicians, Except Drafters, All Other	Associate degree	None	55%

Source: EMSI, Bureau of Labor Statistics Employment Projections (Educational Attainment)

In Los Angeles County, 13 community colleges have conferred awards in programs that have historically trained students for the occupations studied in this report. Between 2014 and 2017, there was an average of 378 community college awards conferred annually across four programs. It is important to note that an award is not equivalent to a single person in search of a job opening, since a student may earn more than one award (e.g. an associate degree and a certificate).

Exhibit 8 – CCC Student Awards (by TOP and College)

TOP Code	Program	College	2014-15 Awards	2015-16 Awards	2016-2017 Awards	3-Year Award Average
0924.00	Engineering Technology, General	Cerritos	27	19	6	17
		East LA	2	5	1	3
		Glendale	N/A	N/A	12	12
		Pasadena	89	127	122	113
Subtotal/Average			118	151	141	137
0934.00	Electronics and Electric Technology	East LA	7	21	12	13
		El Camino	2	2	6	3
		Glendale	7	3	9	6
		LA City	1	2	14	6
		LA Pierce	15	33	34	27
		LA Southwest	5	7	3	5
		LA Valley	12	25	23	20
		Long Beach	50	51	44	48
		Mt San Antonio	67	42	36	48
		Pasadena	19	3	27	16
Rio Hondo	N/A	N/A	1	1		
Subtotal/Average			185	189	209	194
0950.00	Aeronautical and Aviation Technology	Long Beach	4	N/A	N/A	4
		Mt San Antonio	8	2	13	8
		West LA	4	4	6	5
Subtotal/Average			16	6	19	14
0956.00	Manufacturing and Industrial Technology	Cerritos	21	4	3	9
		El Camino	2	1	3	2
		LA Valley	9	3	4	5
		Mt San Antonio	18	12	19	16
Subtotal/Average			50	20	29	33
Total			369	366	398	378

Source: California Community Colleges Chancellor’s Office MIS Data Mart

Student Outcomes

The CTE LaunchBoard provides student outcome data on the effectiveness of CTE programs. The following student outcome information was collected from exiters of the Engineering Technology, General Taxonomy of Program (TOP) code (0924.00) in Los Angeles County for the 2015-16 academic year.

- Median earnings in the second fiscal quarter after program completion is \$6,957
- 44% of students are earning a living wage
- 32% of students are employed within six months after completing a program

Electronics and Electric Technology Taxonomy of Program (TOP) code (0934.00)

- Median earnings in the second fiscal quarter after program completion is \$7,432
- 50% of students are earning a living wage
- 70% of students are employed within six months after completing a program

Aeronautical and Aviation Technology Taxonomy of Program (TOP) code (0950.00)

- Median earnings in the second fiscal quarter after program completion is \$9,383
- 45% of students are earning a living wage
- 63% of students are employed within six months after completing a program

Manufacturing and Industrial Technology Taxonomy of Program (TOP) code (0956.00)

- Median earnings in the second fiscal quarter after program completion is \$8,000
- 54% of students are earning a living wage
- 72% of students are employed within six months after completing a program

Source: CTE LaunchBoard

Sources

O*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, CTE LaunchBoard, and Statewide CTE Outcomes Survey

Notes

Data included in this analysis represents the labor market demand for positions most closely related to engineering technology. Standard occupational classification (SOC) codes were chosen based on the national education level required for employment (associate degree and postsecondary certificate) as well as the proportion of current workers who hold a community college award or have had some community college training. This selection process narrows the labor market analysis to the most relevant employment opportunities for students with community college education and/or training.

Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study and should not be used to establish current job openings, because the numbers may include duplicate job postings or postings intended to gather a pool of applicants. Real-time labor market information can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.