

**Educational Program Viability Review (EVPR)**  
**Engineering Technology and Drafting**



5885 Haven Avenue, Rancho Cucamonga, CA 91737-3002 ·

**Manufacturing, Industrial Design and Transportation**  
**Spring 2024**

## **Table of Contents**

Committee Members  
Executive Summary  
Program Viability Review Form  
Educational Program Viability Review (EVPR) Committee  
EVPR Schedule  
Meeting Minutes- November 22, 2022  
Meeting Agenda- January 10, 2023  
Meeting Minutes- October 6, 2023  
Relevant Evidence  
Recommendation  
Impact of Decision  
Data and Appendices

## **Committee Members**

The following Chaffey personnel served on the Educational Program Viability Review (EVPR) Committee to objectively assess the future of the Engineering Technology and Drafting Program:  
\*As there was a change in administrative leadership, the committee composition changed in Fall 2023

### **Fall 2022/Spring 2023**

Curriculum Committee Chair (or designee): Angela Burk Herrick  
Curriculum Committee Faculty: Joanne Eisberg  
Academic Senate President (or designee): Neil Watkins  
Academic Senate Senator: Elizabeth Cannis  
Chief Instructional Officer (CIO): Laura Hope  
Dean: Mike Wangler  
CTE Liaison and/or Articulation Officer: Jonathan Polidano  
Transfer/Career Center Administrator: Ruth Ann Valencia

### **Fall 2023/Spring 2024**

Curriculum Committee Chair (or designee): Angela Burk Herrick  
Curriculum Committee Faculty: Joanne Eisberg  
Academic Senate President (or designee): Nicole DeRose  
Academic Senate Senator: Elizabeth Cannis  
Chief Instructional Officer (CIO): Misty Burruel  
Dean: Yolanda C. Friday  
CTE Liaison and/or Articulation Officer: Jonathan Polidano  
Transfer/Career Center Administrator: Ruth Ann Valencia

## **Executive Summary**

In May of 2022, after a review of department resources and offerings within the Engineering Technology and Drafting department, the Interim Dean of Math and Science, Dr. Garrett Kenehan, initiated the EVPR process on the basis of one quantitative concern: Insufficient Physical Resources (including facilities, equipment and supplies). As the Interim Dean wrote, the program has a clear demonstrated need based on the Labor Marketing Indicators, but does not currently have the resources to sustain or grown the program.

During the first meeting in November 2022, Dean Mike Wangler, who was now leading the process, as Interim Dean Kenehan assumed another position within the district, worked with the committee to provide access to the EPVR One Drive folder, and reviewed existing data and resources. The committee appointed Dean Wangler administrative chair and Professor Cannis as the faculty co-chair. After discussing the goals of the committee, and the data needed to make a recommendation, the committee agreed to make recommendations by the middle of the spring 2023 semester. There was a request for Michael Goss, the Director the IE Center of Excellence, to provide an overview and outlook for Drafting and Engineering Technology in the IE-Desert Region.

The second meeting of the EVPR committee occurred on January 10, 2023, during which Michael Goss, Director of the IE Center of Excellence provided an overview and employment outlook for the program area. The committee members present also discussed existing program maps and other data/research needs in preparation for the next meeting.

The third meeting of the EVPR committee occurred on October 6, 2023 with the inclusion of Dean Yolanda Friday, as the program had now been moved under MIT. The October meeting concluded with the idea that the program would be recommended for Vitalization, based on the Labor Market data provided.

## Educational Program Viability Review Proposal

Proposed Program:    Engineering Technology/Drafting	
Presented By:            Garrett Kenehan	Date:            May 17, 2022

Refer to AP 4021 for guidelines in completion of this request form. Submit completed form to the Office of Instruction and Institutional Effectiveness.

**1. What prompts the need for a viability review of this program?**

**a. Quantitative** (check all that apply; supporting evidence must be attached)

- Enrollment decline over the past five years.
- Courses are offered too infrequently for students to complete the program within a reasonable time frame.
- Projected industry demand for the program has decreased.
- Low success and/or retention rates of students over past five years.
- Low term-to-term persistence (significantly below the college average or disciplinary norms) for those students in courses in the program over a sustained period of time.
- The program is not cost-effective relative to disciplinary norms and compared to similar programs at comparable institutions.
- A decline in program completion rates over the past five years.
- Low success rates of students on industry, state, and national licensing exams.
- Low student satisfaction as demonstrated through surveys with statistically significant results.
- Challenges with transfer rates or curricular articulation.
- Insufficient physical resources (including facilities, equipment and supplies).
- Changes in labor market demand and/or technology. (Analysis of demand for the program through the use of labor market information may result in curriculum modifications such as adding options for higher demand specialties).
- Lack of available qualified program personnel.
- Accrediting agency recommendations.
- Failure to meet licensure requirements, state mandates, certification standards or accreditation requirements.
- Other (Explain): \_\_\_\_\_

# Chaffey College

---

---

## Educational Program Viability Review (EPVR) Committee

---

---

**PROGRAM:** Engineering Technology/Drafting

*EPVR Committee to be assembled within 30 faculty contract service days of the original recommendation.*

Date EPVR Proposal Submitted: 5/17/2022

Committee to be assembled by: 9/21/2022

### EPVR COMMITTEE MEMBERS:

*The proposal shall be submitted to the Chief Instructional Officer and the Faculty Senate President who will jointly assemble the EPVR committee.*

**Curriculum Committee Chair** (or designee): Angela Burk-Herrick

**Curriculum Committee Faculty:** Joann Eisberg

**Faculty Senate President** (or designee): Neil Watkins

**Faculty Senate Senator:**  
(ideally from the area or as designated by the Academic Senate President or Curriculum Chair, respectively) Elizabeth Cannis

**Chief Instructional Officer (CIO):** Laura Hope

**Dean of the school most closely aligned with the program proposal:** Mike Wangler

**CTE Liaison and/or Articulation Officer:**  
(whichever is most relevant to the proposed program) Jonathan Polidano

**Transfer/Career Center Administrator:** Ruth Ann Valencia

### COMMITTEE CO-CHAIRS:

*The dean (or dean designee with the CIO approval) and one faculty member shall be selected by the committee members as the co-chairs of the EPVR Committee.*

**Dean** (or designee): \_\_\_\_\_

**Faculty Member:** \_\_\_\_\_

## **EVPR Schedule**

The EPVR meetings were scheduled to commence in the Fall of 2022 and conclude in Spring 2023, but had to be rescheduled in the fall due to staffing changes and Academic and Career Community realignment. At the first meeting, which occurred on November 22, 2022 existing data available was reviewed and a goal established to recommend one of the four existing possible outcomes. The committee also developed a list of data needed to make a recommendation. The second meeting occurred on January 10, 2023 and was a COE overview provided by Michael Goss, Director of the IE Center of Excellence. The third meeting occurred October 6, 2023 and the committee agreed to conclude the process by recommending the revitalization of the program.

## **Meeting Minutes**

**November 22, 2022**

### Summary Notes

Educational Program Viability Review (EPVR) Committee

Drafting and Engineering Technology

Attendees: Angela Burk-Herrick, Elizabeth Cannis, Joann Eisberg, John Polidano, Ruth Ann Valencia, Mike Wangler, Neil Watkins

During the first meeting in November 2022, Dean Mike Wangler, who was now leading the process, as Interim Dean Kenehan assumed another position within the district, worked with the committee to provide access to the EPVR One Drive folder, and reviewed existing data and resources. The committee appointed Dean Wangler administrative chair and Professor Cannis as the faculty co-chair. After discussing the goals of the committee, and the data needed to make a recommendation, the committee agreed to make recommendations by the middle of the spring 2023 semester. There was a request for Michael Goss, the Director the IE Center of Excellence, to provide an overview and outlook for Drafting and Engineering Technology in the IE-Desert Region.

**January 10, 2023**

### Summary Notes

Educational Program Viability Review (EPVR) Committee

Drafting and Engineering Technology

Attendees: Angela Burk-Herrick, Elizabeth Cannis, Joann Eisberg, John Polidano, Ruth Ann Valencia, Mike Wangler, Neil Watkins

Meeting Notes: Michael Goss from the Center of Excellence (COE) for Labor Market Research provided an overview of the Labor Market Reports for Drafting Technology and Engineering Technology. Both reports indicate strong employment projections for the Inland Empire, as well as median wages above the self-sustainability standard for the region. The COE recommends the continuation and expansion of these programs for colleges within the IE-Desert Region (see attached reports). Mike Wangler also provided a summary of the Labor Market Reports for Drafting Technology and Engineering Technology for the Los Angeles-Orange County Region. These reports also show strong employment projections and median wages above the self-sustainability standard for the LA-OC Region and align with the IE-Desert Region recommendations for the continuation and expansion of these programs for colleges across southern California (see attached reports).

**October 6, 2023**

Summary Notes

Educational Program Viability Review (EPVR) Committee

Drafting and Engineering Technology

Attendees:

Curriculum Committee Chair (or designee): Angela Burk Herrick

Curriculum Committee Faculty:

Faculty Senate President (or designee): Nicole DeRose

Faculty Senate Senator:

Chief Instructional Officer (CIO): Misty Burrue

Dean STEM: Michael Wangler

Dean BTH/MIT: Yolanda C. Friday

CTE Liaison and/or Articulation Officer: Jonathan Polidano

Transfer/Career Center Administrator: RuthAnn Valencia

The Engineering Technology/Drafting EVPR committee held its initial meeting on November 22, 2022 with the members listed above minus Professor DeRose and Dean Friday. With the transition of academic structures in the district, the EVPR committee has transitioned with the oversight of this review from Dean Wangler to Dean Friday as of Fall 2023.

The meeting began with a recap of previous meetings and a general discussion of how to move forward with next steps. Dean Wangler agreed to provide Dean Friday with access to the EngTech/Drafting EVPR One Drive access so that she may have previous notes and documentation of meetings. The committee focused on the need to set up proper “off ramps” for the program, focus on certificates offered and how the program is aligned with industry. In addition, the committee discussed the impacts of course modification versus program initiation.

Based on the findings of the review, the committee settled on three overarching recommendations with specific actions attached to each.

- 1) Using industry partners in advisory committees as a primary source for input on curriculum offered in the Engineering Tech/Drafting program.
  - Advisory committee will be developed among current industry partners that utilize Engineering Technology and or Drafting in their businesses.
  - Department faculty will also source new members based on department needs and potential for partnership.
  - Industry partners will be asked to “start fresh” with imagining a curriculum without previously viewing old curriculum
- 2) Work with department faculty in “reworking” curriculum based on advisory feedback
  - Develop a clear understanding of program expectations, industry standards, and equipment/lab needs.
  - Before modifications or new curriculum is introduced, advisory committee must review and provide feedback on proper industry alignment.



- Focus on examining from the program level down to the course level.
  - Reimagine Certificate and Transfer Pathways for students
  - Do a regional assessment of EngTech/Drafting programs from Norco College, Mount San Jacinto College, and Victor Valley College
- 3) Work closely with Curriculum Committee for needed modifications or program initiation.

## **Relevant Evidence**

The following documents were considered while discussion the viability of the Engineering Technology/Drafting program:

- Enrollment Data
- Labor Market Reports
- Program Viability Budgets

\*A copy of each of the sources can be accessed in the appendix

## **Recommendation**

A unanimous decision was reached for the recommendation of Program Revitalization for the Engineering Technology/Drafting program. The recommendation was based on the examination of data, feedback from institutional stakeholders, and perceived impact on students. Driving factors for the recommendation was the Labor Market data showing great potential for growth in the industry, realization of the lack of resources for the program, and the need to realign the program with current industry standards.

## **Impact of Decision**

The committee determined that the decision to revitalize would be of no negative impact to district students, as newly created curriculum would better position students to be more marketable for employment within the industry.

## Data and Appendices

### Enrollment Data Engineering Tech/Drafting

Term	Course number	Course Title	Enrolled
Fall 2021	DRAFT-20	Computer-Aided Draft & Design	16
	DRAFT-20	Computer-Aided Draft & Design	16
	DRAFT-21	Mechanical Design I	12
	DRAFT-41	Mechanical Design II	1
	DRAFT-50	Architectural Design I	10
	DRAFT-51	Architectural Design II	10
	EGTECH-10	Intro to Engineering Design	17
	EGTECH-10	Intro to Engineering Design	10
	EGTECH-30	Intro to Additive Mfg	8
Spring 2022	DRAFT-20	Computer-Aided Draft & Design	16
	DRAFT-20	Computer-Aided Draft & Design	5
	DRAFT-21	Mechanical Design I	13
	DRAFT-41	Mechanical Design II	3
	DRAFT-50	Architectural Design I	11
	EGTECH-10	Intro to Engineering Design	17

	EGTECH-10	Intro to Engineering Design	12
Fall 2022	DRAFT-20	Computer-Aided Draft & Design	21
	DRAFT-20	Computer-Aided Draft & Design	15
	DRAFT-21	Mechanical Design I	17
	DRAFT-41	Mechanical Design II	6
	DRAFT-50	Architectural Design I	8
	DRAFT-51	Architectural Design II	11
	EGTECH-10	Intro to Engineering Design	20
	EGTECH-10	Intro to Engineering Design	19
	EGTECH-12	Principles of Engineering	15
	EGTECH-30	Intro to Additive Mfg	22
Spring 2023	DRAFT-20	Computer-Aided Draft & Design	23
	DRAFT-20	Computer-Aided Draft & Design	1
	DRAFT-21	Mechanical Design I	16
	DRAFT-41	Mechanical Design II	3
	DRAFT-50	Architectural Design I	18

	EGTECH-10	Intro to Engineering Design	24
	EGTECH-10	Intro to Engineering Design	14
Fall 2023	DRAFT-20	Computer-Aided Draft & Design	20
	DRAFT-20	Computer-Aided Draft & Design	28
	DRAFT-21	Mechanical Design I	7
	DRAFT-41	Mechanical Design II	6
	DRAFT-50	Architectural Design I	5
	DRAFT-51	Architectural Design II	12
	EGTECH-10	Intro to Engineering Design	22
	EGTECH-10	Intro to Engineering Design	17
	EGTECH-12	Principles of Engineering	14
	EGTECH-30	Intro to Additive Mfg	23
Spring 2024	DRAFT-20	Computer-Aided Draft & Design	19
	DRAFT-21	Mechanical Design I	20
	DRAFT-41	Mechanical Design II	5
	DRAFT-43	ADV CAD	19
	DRAFT-50	Architectural Design I	11

Spring 2024	DRAFT-53	Architec. Applications	12
	DRAFT-78	Adv. Mechanical Design	5
	EGTECH-10	Intro to Engineering Design	19
	EGTECH-10	Intro to Engineering Design	15
	EGTECH-10	Intro to Engineering Design	29
	EGTECH-16	CIM-CNC	19

# Engineering Technology

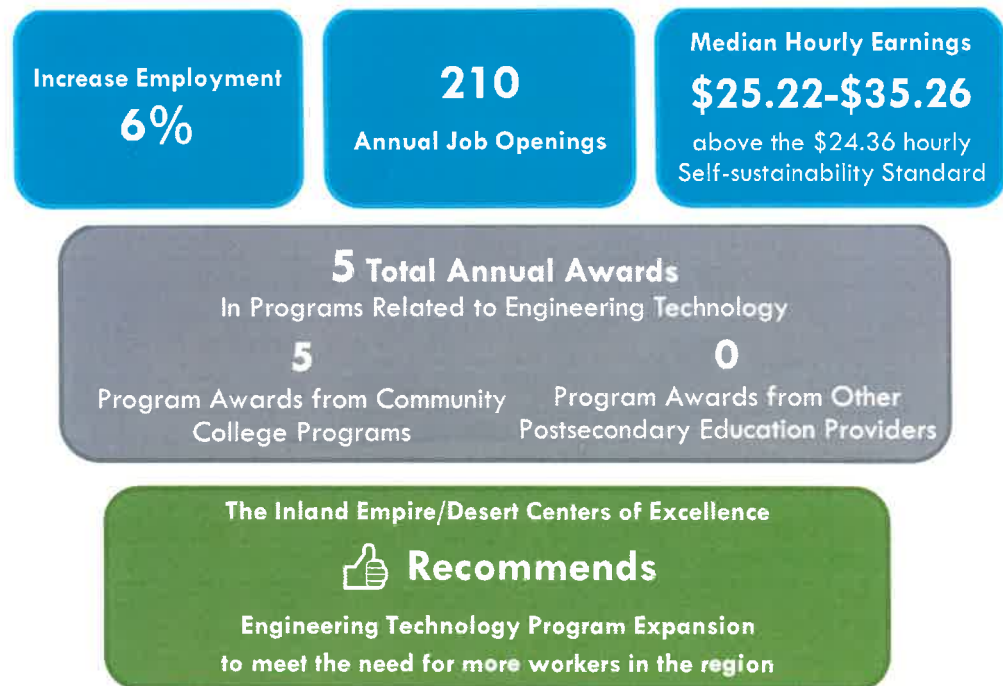
*Inland Empire/Desert Region (Riverside and San Bernardino counties)*

*This workforce demand report uses state and federal job projection data developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.*

## Summary



Over the next five years (2020-2025), engineering technology employment is projected to



## Introduction

This report provides labor market occupational demand and wage research and postsecondary programs outcomes related to engineering technology. California Community College engineering technology, general (requires trigonometry) (TOP 0924.00) programs prepare students for employment through the instruction of the technical support of engineering, including the use of civil and mechanical engineering principles, physical sciences, basic physics, mathematics, surveying, materials testing, hydraulics and pneumatics, and the preparation of plans, specifications, and engineering reports (Taxonomy of Programs, 2012). The knowledge, skills, and abilities trained by engineering technology programs lead to four distinct occupations, collectively referred to as the engineering technology occupational group in this report. The occupations included in the engineering technology occupational group are:

- Civil Engineering Technologists and Technicians (SOC 17-3022)
- Electrical and Electronic Engineering Technologists and Technicians (17-3023)
- Industrial Engineering Technologists and Technicians (17-3026)
- Mechanical Engineering Technologists and Technicians (17-3027)

## Job Counts and Projections

In 2020, there were 1,971 total engineering technology jobs in the region. Employment for the engineering technology occupational group is projected to increase by 6% through 2025; 210 job openings are projected annually. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers aged 55 years and greater in the region.

*Exhibit 1: Five-year projections for the engineering technology occupational group, 2020-2025*

Occupation	2020 Jobs	2025 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Electrical and Electronic Engineering Technologists and Technicians	896	932	4%	456	91	30%
Civil Engineering Technologists and Technicians	677	724	7%	368	74	26%
Industrial Engineering Technologists and Technicians	227	245	8%	127	25	29%
Mechanical Engineering Technologists and Technicians	171	187	9%	98	20	29%
<b>Total</b>	<b>1,971</b>	<b>2,087</b>	<b>6%</b>	<b>1,049</b>	<b>210</b>	<b>28%</b>

Source: Emsi 2022.1



Exhibit 2 shows the number of job advertisements (ads) posted during the last 12 months and the statewide average time filling each occupation. Over the past 12 months, there were 59 job ads posted for the engineering technology occupational group in the region. The job ad search was expanded to include all ads posted in California to ensure that actionable job information is presented.

Over the previous 12 months, there were 808 job ads posted for the engineering technology occupational group in California. On average, employers throughout the state fill online job ads for the engineering technology occupational group in 36 days.

*Exhibit 2: Job ads and time to fill*

Occupation	Job Ads	Statewide Average Time to Fill (Days)
Electrical and Electronic Engineering Technologists and Technicians	482	36
Mechanical Engineering Technologists and Technicians	162	34
Civil Engineering Technologists and Technicians	128	39
Industrial Engineering Technologists and Technicians	36	34
<b>Total</b>	<b>808</b>	<b>36</b>

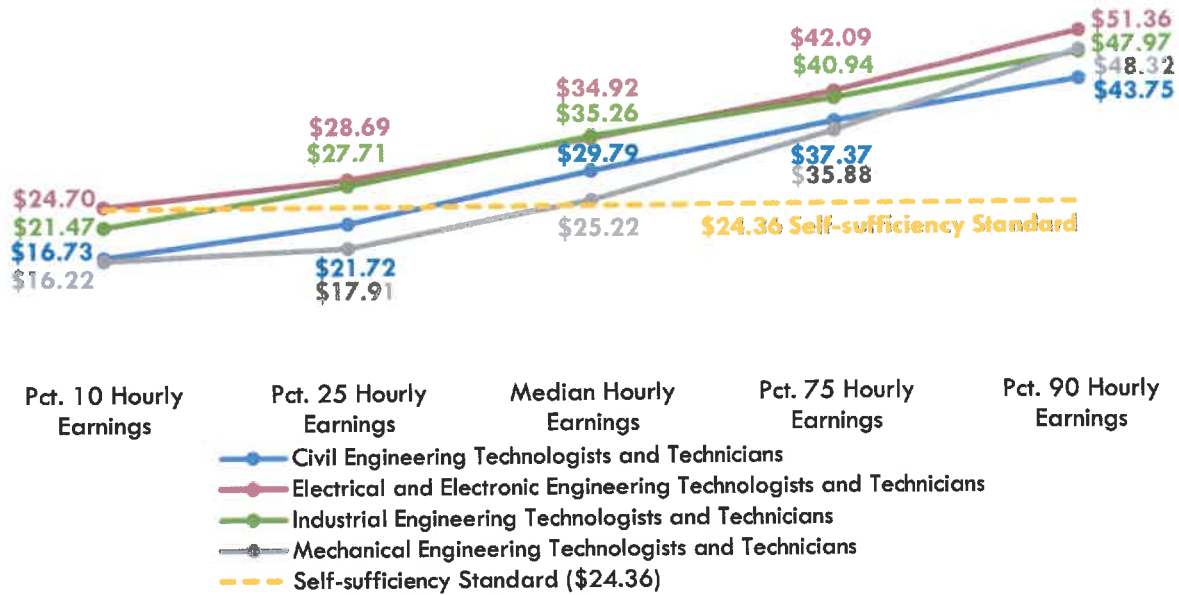
Source: Burning Glass – Labor Insights

## Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide self-sustainable income. The University of Washington estimates that a self-sufficient hourly rate for a single adult with one school-age child is \$24.36 per hour or \$51,452 annually in Riverside County; \$23.73 per hour or \$50,119 annually in San Bernardino County (Pearce, 2021). For this study, the higher hourly earnings requirement in Riverside County is adopted as the self-sufficiency standard for the two-county region.

Exhibit 3 displays the hourly earnings for the engineering technology occupational group. The median hourly earnings for the engineering technology occupations are above the regional self-sufficiency standard, indicating that at least 50% of workers in this occupational group earn a self-sustainable wage. The hourly earnings for electrical and electronic engineering technologists and technicians exceed the self-sufficiency standard at the 10<sup>th</sup> percentile, indicating that at least 90% of workers in this occupation earn a self-sustainable wage.

Exhibit 3: Hourly earnings by percentile for the engineering technology occupational group



Source: Emsi 2022.1

Benefits information, typically provided by the occupational guides developed by the California Labor Market Information Division, is unavailable for civil engineering technologists and technicians and mechanical engineering technologists and technicians. Benefits for electrical and electronic engineering technologists and technicians and industrial engineering technologists and technicians generally include medical, dental, vision, retirement, and life insurance plans (Detailed Occupational Guides, 2022).

### Advertised Salary from Online Job Ads

Exhibit 4 displays online job ad salary data for the engineering technology occupational group over the last 12 months. Online job ad salary information reveals that employers are willing to pay the engineering technology occupational group between \$53,000 and \$62,000 annually, above the region's \$51,452 annual (\$24.36 hourly) self-sufficiency standard. Consider the salary information with caution since only 56% (452 out of 808) of online job ads for these occupations provided salary information. The salary figures are prorated to reflect full-time, annual wage status.

Exhibit 4: Advertised salary information

Occupation	Number of job ads	Real-Time Salary Information				Average Annual Salary
		Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	
Electrical and Electronic Engineering Technologists and Technicians	268	2%	45%	44%	9%	\$56,000

Occupation	Number of job ads	Real-Time Salary Information				Average Annual Salary
		Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	
Mechanical Engineering Technologists and Technicians	104	1%	47%	46%	6%	\$53,000
Civil Engineering Technologists and Technicians	66	1%	15%	70%	14%	\$62,000
Industrial Engineering Technologists and Technicians	14	7%	22%	57%	14%	\$57,000

Source: Burning Glass – Labor Insights

## Employers, Skills, Education, and Work Experience

Exhibit 5 displays the employers that posted the most job ads during the last 12 months. Displaying employer names provides insight into where students may find employment after completing a program. Peak Technical Services posted the most job ads for the engineering technology occupational group in California. Anheuser-Busch Companies posted the most online job ads for the engineering technology occupational group in the Inland Empire/Desert Region.

Exhibit 5: Employers posting the most job ads for the engineering technology occupational group

Occupation	Top Employers
Electrical and Electronic Engineering Technologists and Technicians (n=911)	<ul style="list-style-type: none"> <li>Peak Technical Services</li> <li>Tesla</li> <li>Moore &amp; Associates</li> <li>Anheuser-Busch Companies</li> <li>ABM Industries</li> </ul>
Mechanical Engineering Technologists and Technicians (n=162)	<ul style="list-style-type: none"> <li>National Computing Group</li> <li>Kennedy Jenks Consultants</li> <li>AMRO Fabricating Corporation</li> <li>Ryzen Solutions</li> </ul>
Civil Engineering Technologists and Technicians (n=128)	<ul style="list-style-type: none"> <li>BSK Associates</li> <li>Kier &amp; Wright</li> <li>Leidos</li> <li>Pavement Engineering Incorporated</li> <li>Mead Hunt Incorporated</li> <li>Eastern Municipal Water District</li> <li>El Dorado County</li> </ul>
Industrial Engineering Technologists and Technicians (n=36)	<ul style="list-style-type: none"> <li>Jabil, Inc.</li> <li>Integrated Resources Inc.</li> <li>ASK Consulting</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 6 lists a sample of specialized, employability, and software and programming skills employers seek when looking for workers to fill positions in the engineering technology occupational group. Specialized skills are occupation-specific skills that employers request for industry or job competency. Employability skills are

foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job ads may be utilized to guide curriculum development.

*Exhibit 6: Sample of in-demand skills from employer job ads*

Occupation	Specialized skills	Employability skills
Electrical and Electronic Engineering Technologists and Technicians (n=473)	<ul style="list-style-type: none"> <li>• Schematic Diagrams</li> <li>• Test Equipment</li> <li>• Oscilloscopes</li> <li>• Soldering</li> <li>• Calibration</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Detail-Oriented</li> <li>• Communication Skills</li> <li>• Physical Abilities</li> <li>• Planning</li> </ul>
Mechanical Engineering Technologists and Technicians (n=153)	<ul style="list-style-type: none"> <li>• Micrometers</li> <li>• Calipers</li> <li>• Coordinate Measuring Machine (CMM)</li> <li>• Quality Assurance and Control</li> <li>• Repair</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Detail-Oriented</li> <li>• Organizational Skills</li> <li>• Teamwork/Collaboration</li> <li>• Physical Abilities</li> </ul>
Civil Engineering Technologists and Technicians (n=127)	<ul style="list-style-type: none"> <li>• Project Management</li> <li>• Calculation</li> <li>• Land Development</li> <li>• Construction Inspection</li> <li>• Cost Estimation</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Research</li> <li>• Planning</li> <li>• Organizational Skills</li> <li>• Writing</li> </ul>
Industrial Engineering Technologists and Technicians (n=36)	<ul style="list-style-type: none"> <li>• Manufacturing Processes</li> <li>• Test Equipment</li> <li>• Quality Assurance and Control</li> <li>• Machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Organizational Skills</li> <li>• Problem Solving</li> <li>• Communication Skills</li> <li>• Detail-Oriented</li> </ul>

Source: Burning Glass – Labor Insights

Exhibit 7 displays the typical entry-level education, educational attainment, and minimum advertised education requirements for the engineering technology occupational group. According to the Bureau of Labor Statistics, between 51%-63% of incumbent workers in this field hold a community college-level of educational attainment; "some college, no degree," and an "associate degree." Between 10% and 30% of job ads for the engineering technology occupational group sought candidates with an associate degree.

**Exhibit 7: Typical entry-level education, educational attainment, and minimum advertised education requirements**

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Number of Job Ads	Real-Time Minimum Advertised Education Requirement		
				High school or vocational training	Associate degree	Bachelor's degree or higher
Electrical and Electronic Engineering Technologists and Technicians	Associate degree	63%	312	56%	26%	18%
Mechanical Engineering Technologists and Technicians	Associate degree	51%	112	79%	10%	11%
Civil Engineering Technologists and Technicians	Associate degree	51%	90	47%	23%	30%
Industrial Engineering Technologists and Technicians	Associate degree	51%	23	57%	30%	13%

Source: Emsi 2022.1, Burning Glass – Labor Insights

\*Percentage of incumbent workers with a Community College Award or Some Postsecondary Coursework

Exhibit 8 displays the work experience typically required to enter each occupation and the real-time work experience requirements from employer job ads. Between 31% and 54% of employers sought engineering technology workers with zero and two years of previous work experience.

**Exhibit 8: Work experience required and real-time work experience requirements**

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of job ads	0 – 2 years	3 – 5 years	6+ years
Electrical and Electronic Engineering Technologists and Technicians	None	279	54%	39%	7%
Mechanical Engineering Technologists and Technicians	None	92	31%	58%	11%
Civil Engineering Technologists and Technicians	None	104	53%	37%	10%
Industrial Engineering Technologists and Technicians	None	16	50%	38%	12%

Source: Emsi 2022.1, Burning Glass – Labor Insights

## Student Completions and Programs Outcomes

Exhibit 9 displays student completions for engineering technology, general (TOP 0924.00) programs over the last three academic years (2018-21). Over the last three academic years, regional community colleges have

issued five awards annually in engineering technology, general programs. Program completion and student outcome methodologies are found in the appendix.

*Exhibit 9: 2018-21, Annual average community college awards for engineering technology, general programs in the region*

TOP 0924.00 – Engineering Technology, General	Academic Year 2018-19	Academic Year 2019-20	Academic Year 2020-21	Total CC Annual Average Awards, Academic Years 2018-21
<b>Chaffey</b>				<b>4</b>
Associate Degree	6	2	2	3
Certificate 30 < 60 semester units	2	1	0	1
<b>Norco</b>				<b>0</b>
Associate Degree	0	0	1	0
<b>Total</b>	<b>8</b>	<b>3</b>	<b>3</b>	<b>5</b>

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 10. Approximately 72% of engineering technology, general program completers, and skills-builders students attained a living wage.

*Exhibit 10: 0924.00 – Engineering technology, general strong workforce program outcomes*

Strong Workforce Program Metrics: 0924.00 – Engineering Technology, General Academic Year 2018-19, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2019-20)	396	3,988
Completed 9+ career education units in one year (2019-20)	19%	16%
Perkins Economically disadvantaged students (2019-20)	77%	66%
Students who attained a noncredit workforce milestone in a year (2019-20)	-	59%
Students who earned a degree, certificate, or attained apprenticeship (2019-20)	-	221
Transferred to a four-year institution (transfers)	26	504
Job closely related to the field of study (2017-18)	62%	67%
Median annual earnings (all exiters)	\$35,520	\$3,492
Median change in earnings (all exiters)	17%	33%
Attained a living wage (completers and skills-builders)	72%	59%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics



## Summary of Findings

The knowledge, skills, and abilities trained by engineering technology (0924.00) programs lead to four distinct occupations, collectively referred to as the engineering technology occupational group. The engineering technology occupational group is expected to have 210 annual job openings and increase employment by 6% over the next five years. The median hourly earnings for the engineering technology occupations are above the regional self-sufficiency standard (\$24.36 per hour), indicating that at least 50% of workers in this occupational group earn a self-sustainable wage.

Community college engineering technology, general (0924.00) programs have issued five awards annually over the last three academic years. Approximately 72% of engineering technology, general program completers and skills-builders students attained a living wage.

The Centers of Excellence recommends expanding programs related to engineering technology to meet the demand for these workers in the region. Colleges considering this program should have a strong partnership with engineering employers and document their demand for workers and the skills needed for students to work in this field shortly after exiting the program.

### Contact

Michael Goss

Paul Vaccher

Centers of Excellence, Inland Empire/Desert Region

[michael.goss@chaffey.edu](mailto:michael.goss@chaffey.edu)

April 2022

## References

Burning Glass Technologies. (2022). *Labor Insights/Jobs*. Retrieved from <https://www.burning-glass.com/>

California Community Colleges Chancellor's Office. LaunchBoard. (2022). *California Community Colleges LaunchBoard*. Retrieved from <https://www.calpassplus.org/Launchboard/Home.aspx>

California Community Colleges Chancellor's Office. LaunchBoard. (2022a). *Strong Workforce Program Metrics Data Element Dictionary*. Pg. 3. Retrieved from <https://www.calpassplus.org/MediaLibrary/calpassplus/launchboard/Documents/SWP-DED.PDF>

California Community Colleges Chancellor's Office. (2022). *Chancellor's Office Curriculum Inventory (COCI), version 3.0*. Retrieved from <https://coci2.cccotechcenter.org/programs>

California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. (2022). *Data Mart*. Retrieved from <https://datamart.cccco.edu/datamart.aspx>

California Community Colleges Chancellor's Office, Curriculum and Instructional Unit, Academic Affairs Division. (2012). *Taxonomy of Programs, 6<sup>th</sup> Edition, Corrected Version*. Retrieved from <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Digital-Innovation-and-Infrastructure/Research/Files/TOPmanual6200909corrected12513.ashx?la=en&hash=94C709CA83C0380828415579395A5F536736C7C1>

Carnevale, A. P., Jayasundera, T., & Repnikov, D. (n.d.). Understanding Online Job Ads Data. Retrieved from <https://cew.georgetown.edu/wp-content/uploads/2014/11/OCLM.Tech.Web.pdf>

Economic Modeling Specialists International (Emsi). (2022). *Datarun 2022.1*. Retrieved from <https://www.economicmodeling.com/>

Labor Market Information Division. Employment Development Department of California. (2022). *Detailed Occupational Guides*. Retrieved from <https://www.labormarketinfo.edd.ca.gov/OccGuides/Search.aspx>

National Center for O\*NET Development. (2022). O\*NET OnLine. Retrieved from <https://www.onetonline.org/>

Pearce, D. University of Washington. (2022). *Self Sufficiency Standard – California*. Retrieved from <http://www.selfsufficiencystandard.org/california>

## Appendix: Occupation definitions, sample job titles, five-year projections, and earnings for engineering technology occupations

### **Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment**

#### **Civil Engineering Technologists and Technicians (17-3022)**

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.

**Sample job titles:** Civil Designer, Civil Engineering Assistant, Civil Engineering Technician, Design Technician, Engineer Technician, Engineering Assistant, Engineering Technician, Transportation Engineering Technician

*Entry-Level Educational Requirement: Associate degree*

*Training Requirement: None*

*Work Experience: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 51%*

#### **Electrical and Electronic Engineering Technologists and Technicians (17-3023)**

Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, adjust, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions.

**Sample job titles:** Communications Technologist, Electrical Engineering Technician, Electrical Technician, Electronics Engineering Technician, Electronics Technician, Engineering Technician (Engineering Tech), Engineering Technologist, System Technologist, Technologist

*Entry-Level Educational Requirement: Associate degree*

*Training Requirement: None*





*Work Experience: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 63%*

### **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.

**Sample job titles:** Business Process Analyst, Engineering Technician, Industrial Engineering Analyst, Industrial Engineering Technician, Manufacturing Coordinator, Manufacturing Technology Analyst, Quality Control Engineering Technician (QC Engineering Technician), Quality Management Coordinator, Quality Technician, Service Technician

*Entry-Level Educational Requirement: Associate degree*

*Training Requirement: None*

*Work Experience: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 51%*

### **Mechanical Engineering Technologists and Technicians (17-3027)**

Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery and equipment under the direction of engineering staff or physical scientists.

**Sample job titles:** Engineering Lab Technician, Engineering Technical Analyst, Engineering Technologist, Laboratory Technician, Maintenance Technician, Mechanical Designer, Mechanical Technician, Process Engineering Technician, Process Technician, Research and Development Technician

*Entry-Level Educational Requirement: Associate degree*

*Training Requirement: None*

*Work Experience: None*

*Incumbent workers with a Community College Award or Some Postsecondary Coursework: 51%*

## Appendix: Methodology

Exhibit 9 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2018 and 2021 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variations that might be present in a single year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from California's Employment Development Department's Unemployment Insurance database records. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2021 a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2021 a).

Job postings data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job postings often do not reveal employers' hiring intentions; it is unknown if employers plan to hire one or multiple workers from a single online job posting or collecting resumes for future hiring needs. A closed job posting may not be the result of a hired worker.

Table 1. 2020 to 2025 job growth, wages, entry-level education, training, and work experience required for the engineering technology occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino Counties combined)

Occupation (SOC)	2020 Jobs	5-Year Change	5-Year % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10 <sup>th</sup> to 90 <sup>th</sup> percentile)	Median Hourly Wage (50 <sup>th</sup> percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Electrical and Electronic Engineering Technologists and Technicians (17-3023)	896	35	4%	91	\$24.70 to \$51.36	\$34.92	\$75,600	Associate degree & None	None
Civil Engineering Technologists and Technicians (17-3022)	677	46	7%	74	\$16.73 to \$43.75	\$29.79	\$62,900	Associate degree & None	None
Industrial Engineering Technologists and Technicians (17-3026)	227	18	8%	25	\$21.47 to \$47.97	\$35.26	\$72,300	Associate degree & None	None
Mechanical Engineering Technologists and Technicians (17-3027)	171	16	9%	20	\$16.22 to \$48.32	\$25.22	\$59,600	Associate degree & None	None
<b>Total</b>	<b>1,971</b>	<b>116</b>	<b>6%</b>	<b>210</b>	-	-	-	-	-

Source: Emsi 2022.1

**Fiscal Year: 2017**

GL Account Number	GL Account Description	Allocated Budget	Actual	%Committed	Available
10-0000-0953-51110-100	Drafting : Academic Contract Inst	\$99,083.00	\$99,083.00	100	\$0.00
10-0000-0953-51210-100	Drafting : Academic Contract N/I	\$6,390.00	\$6,389.00	99.98	\$1.00
10-0000-0953-51310-100	Drafting : Academic P/T Adjunct	\$68,535.00	\$68,534.26	100	\$0.74
10-0000-0953-51350-100	Drafting : Academic Inst Subs	\$162.00	\$162.00	100	\$0.00
10-0000-0953-52432-100	Drafting : Student Inst	\$2,500.00	\$1,989.38	79.58	\$510.62
10-0000-0953-54200-100	Drafting : Books	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54300-100	Drafting : Instr Supplies	\$679.00	\$678.51	99.93	\$0.49
10-0000-0953-54430-100	Drafting : Computer Software Inst	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54435-100	Drafting : Computer Supplies Inst	\$3,648.00	\$3,647.99	100	\$0.01
10-0000-0953-55210-100	Drafting : Conference	\$0.00	\$0.00	0	\$0.00
10-0000-0953-55220-100	Drafting : Mileage	\$65.00	\$64.48	99.2	\$0.52
10-0000-0953-55230-100	Drafting : Training	\$938.00	\$937.50	99.95	\$0.50
10-0000-0953-55620-100	Drafting : Maintenance	\$75.00	\$75.00	100	\$0.00
10-0000-0953-56410-100	Drafting : New Equip	\$917.00	\$916.92	99.99	\$0.08
	Faculty Costs		\$174,168.26		
	Other Personnel Costs		\$1,989.38		
	Discretionary Costs		\$6,320.40		
	<b>2017 Total Costs</b>		<b>\$182,478.04</b>		

**Fiscal Year: 2018**

GL Account Number	GL Account Description	Allocated Budget	Actual	%Committed	Available
10-0000-0953-51110-100	Drafting : Academic Contract Inst	\$105,239.00	\$105,239.00	100	\$0.00
10-0000-0953-51210-100	Drafting : Academic Contract N/I	\$6,422.00	\$6,422.00	100	\$0.00
10-0000-0953-51310-100	Drafting : Academic P/T Adjunct	\$67,922.00	\$67,922.02	100	-\$0.02
10-0000-0953-51350-100	Drafting : Academic Inst Subs	\$570.00	\$570.00	100	\$0.00
10-0000-0953-52432-100	Drafting : Student Inst	\$8,500.00	\$7,568.50	89.04	\$931.50
10-0000-0953-54200-100	Drafting : Books	\$251.00	\$250.18	99.67	\$0.82
10-0000-0953-54300-100	Drafting : Instr Supplies	\$1,310.00	\$1,309.54	99.96	\$0.46
10-0000-0953-54430-100	Drafting : Computer Software Inst	\$225.00	\$225.00	100	\$0.00
10-0000-0953-54435-100	Drafting : Computer Supplies Inst	\$2,613.00	\$2,603.05	99.62	\$9.95

10-0000-0953-55210-100	Drafting : Conference	\$31.00	\$30.54	98.52	\$0.46
10-0000-0953-55220-100	Drafting : Mileage	\$113.00	\$112.26	99.35	\$0.74
	Faculty Costs		\$180,153.02		
	Other Personnel Costs		\$7,568.50		
	Discretionary Costs		\$4,530.57		
	<b>2018 Total Costs</b>		<b>\$192,252.09</b>		

**Fiscal Year: 2019**

GL Account Number	GL Account Description	Allocated Budget	Actual	%Committed	Available
10-0000-0953-51110-100	Drafting : Academic Contract Inst	\$104,800.00	\$104,800.00	100	\$0.00
10-0000-0953-51210-100	Drafting : Academic Contract N/I	\$7,500.00	\$7,499.60	99.99	\$0.40
10-0000-0953-51310-100	Drafting : Academic P/T Adjunct	\$64,801.00	\$64,800.58	100	\$0.42
10-0000-0953-51350-100	Drafting : Academic Inst Subs	\$351.00	\$351.00	100	\$0.00
10-0000-0953-52432-100	Drafting : Student Inst	\$4,500.00	\$4,487.74	99.73	\$12.26
10-0000-0953-54200-100	Drafting : Books	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54300-100	Drafting : Instr Supplies	\$1,392.00	\$1,343.24	96.5	\$48.76
10-0000-0953-54430-100	Drafting : Computer Software Inst	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54435-100	Drafting : Computer Supplies Inst	\$4,617.00	\$4,147.48	89.83	\$469.52
10-0000-0953-54500-100	Drafting : NI Supplies	\$100.00	\$94.84	94.84	\$5.16
10-0000-0953-55310-100	Drafting : Memberships	\$0.00	\$0.00	0	\$0.00
	Faculty Costs		\$177,451.18		
	Other Personnel Costs		\$4,487.74		
	Discretionary Costs		\$5,585.56		
	<b>2019 Total Costs</b>		<b>\$187,524.48</b>		

**Fiscal Year: 2020**

GL Account Number	GL Account Description	Allocated Budget	Actual	%Committed	Available
10-0000-0953-51110-100	Drafting : Academic Contract Inst	\$109,200.00	\$109,200.00	100	\$0.00
10-0000-0953-51210-100	Drafting : Academic Contract N/I	\$7,995.00	\$7,994.22	99.99	\$0.78
10-0000-0953-51310-100	Drafting : Academic P/T Adjunct	\$73,189.00	\$72,188.67	98.63	\$1,000.33
10-0000-0953-51350-100	Drafting : Academic Inst Subs	\$1,224.00	\$1,224.00	100	\$0.00
10-0000-0953-52432-100	Drafting : Student Inst	\$2,500.00	\$1,099.30	43.97	\$1,400.70

10-0000-0953-54200-100	Drafting : Books	\$200.00	\$0.00	0	\$200.00
10-0000-0953-54300-100	Drafting : Instr Supplies	\$1,309.00	\$1,271.58	97.14	\$37.42
10-0000-0953-54430-100	Drafting : Computer Software Inst	\$2,600.00	\$0.00	0	\$2,600.00
10-0000-0953-54435-100	Drafting : Computer Supplies Inst	\$300.00	\$0.00	0	\$300.00
10-0000-0953-55209-100	Drafting : CONF/TRAVEL EXP-FACULTY	\$97.00	\$96.01	98.98	\$0.99
	Faculty Costs		\$190,606.89		
	Other Personnel Costs		\$1,099.30		
	Discretionary Costs		\$1,367.59		
	<b>2020 Total Costs</b>		<b>\$193,073.78</b>		

**Fiscal Year: 2021**

GL Account Number	GL Account Description	Allocated Budget	Actual	%Committed	Available
10-0000-0953-51110-100	Drafting : Academic Contract Inst	\$111,500.00	\$111,500.00	100	\$0.00
10-0000-0953-51210-100	Drafting : Academic Contract N/I	\$8,000.00	\$7,999.50	99.99	\$0.50
10-0000-0953-51310-100	Drafting : Academic P/T Adjunct	\$80,270.00	\$80,270.00	100	\$0.00
10-0000-0953-52432-100	Drafting : Student Inst	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54200-100	Drafting : Books	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54300-100	Drafting : Instr Supplies	\$2,827.00	\$2,769.65	97.97	\$57.35
10-0000-0953-54430-100	Drafting : Computer Software Inst	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54435-100	Drafting : Computer Supplies Inst	\$5,308.00	\$5,307.11	99.98	\$0.89
10-0000-0953-55310-100	Drafting : Memberships	\$3,200.00	\$3,200.00	100	\$0.00
10-0000-0953-56440-100	Drafting : Computer Equipment Inst	\$1,350.00	\$1,205.71	89.31	\$144.29
	Faculty Costs		\$199,769.50		
	Other Personnel Costs		\$0.00		
	Discretionary Costs		\$12,482.47		
	<b>2021 Total Costs</b>		<b>\$212,251.97</b>		

**Fiscal Year: 2022**

GL Account Number	GL Account Description	Allocated Budget	Actual	%Committed	Available
10-0000-0953-51110-100	Drafting : Academic Contract Inst	\$115,830.00	\$115,829.90	100	\$0.10
10-0000-0953-51210-100	Drafting : Academic Contract N/I	\$7,950.00	\$7,950.00	100	\$0.00
10-0000-0953-51310-100	Drafting : Academic P/T Adjunct	\$91,076.00	\$91,075.56	100	\$0.44

10-0000-0953-52432-100	Drafting : Student Inst	\$1,795.00	\$1,777.50	99.03	\$17.50
10-0000-0953-54200-100	Drafting : Books	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54300-100	Drafting : Instr Supplies	\$3,926.00	\$475.65	12.12	\$3,450.35
10-0000-0953-54430-100	Drafting : Computer Software Inst	\$0.00	\$0.00	0	\$0.00
10-0000-0953-54435-100	Drafting : Computer Supplies Inst	\$0.00	\$0.00	0	\$0.00
10-0000-0953-55620-100	Drafting : Maintenance	\$535.00	\$534.24	99.86	\$0.76
10-0000-0953-56410-100	Drafting : New Equip	\$717.00	\$0.00	0	\$717.00
	Faculty Costs		\$214,855.46		
	Other Personnel Costs		\$1,777.50		
	Discretionary Costs		\$1,009.89		
	<b>2022 Total Costs</b>		<b>\$217,642.85</b>		