LABOR MARKET ANALYSIS

FOR PROGRAM RECOMMENDATION

C·O·E
CENTERS OF EXCELLENCE
FOR LABOR MARKET RESEARCH

ENTERPRISE SOFTWARE ENGINEERING AND DEVELOPMENT
IN THE GREATER SACRAMENTO REGION

North (Greater Sacramento)
Center of Excellence

TABLE
OF CONTENTS

Contents

If, for any reason, this document is not accessible or if you have specific needs for readability, please contact us, and we will do our utmost to accommodate you with a modified version. To make a request, contact Ebony J. Benzing by phone at (916) 563-3215 or by email at Ebony.Benzing@losrios.edu.

SUMMARY

The North/Far North Center of Excellence for Labor Market Research prepared this report to provide a labor market analysis of educational supply and occupational demand for middle-skilled career pathways in the North (Greater Sacramento) subregion. This report aims to determine if demand in the local labor market is unmet by the supply from existing community college programs and other postsecondary training providers.

This report primarily focuses on training that leads to jobs in middle-skilled occupations - jobs that typically require education beyond a high school diploma but less than a Bachelor's degree - but may include higher-skilled occupations for training pathways that lead to a bachelor's degree. Lowered skilled occupations are rarely considered in this type of analysis due to the lessened barriers for entry-level work, such as no formal education and on-the-job training requirements.

Key findings include:

- The North (Greater Sacramento) subregion held 9,060 software engineering and development jobs in 2020. Software engineering and development jobs are projected to increase by 11% over the next five years, adding 1,024 new jobs to the subregion by 2025.

- Over the next five years, software engineering and development jobs are projected to have 892 annual openings in the North (Greater Sacramento) subregion.

- Wage data shows that software engineering and development occupations earn $12 to $29 above the subregion's living wage of $14.53 per hour.

- Awards data analysis shows that North (Greater Sacramento) training providers conferred an average of 18 awards (certificates and associate degrees) in computer software development programs over the last three academic years.

Recommendations include:

- The North/Far North Center of Excellence recommends moving forward with the program.

- The North (Greater Sacramento) Center of Excellence strongly recommends including a transfer pathway in any software engineering and development program.

INTRODUCTION

The North (Greater Sacramento) Center of Excellence (COE) was asked to provide labor market information for a proposed program at a regional community college. This report focuses on the following Standard Occupational Classification (SOC) occupations and codes:

- These middle-skill occupations require more education and training beyond a high school diploma but less than a four-year degree:
  - None

- Students who transfer and earn a four-year degree could pursue the following high-skill occupations:
  - Computer Programmers (15-1251)
  - Software Developers and Software Quality Assurance Analysts and Testers (15-1256)

A review of related programs revealed the following Taxonomy of Programs (TOP) title(s) and code(s) are appropriate for inclusion in this report:

- Computer Software Development (0707.00)

The corresponding Classification of Instructional Program (CIP) title(s) and code(s) are:

- Computer Programming, Vendor/Product Certification (11.0203)

OCCUPATIONAL DEMAND

Exhibit 1 summarizes the five-year projected job growth for middle-skill and high-skill occupations in the North, North/Far North, and California.

Exhibit 1. Employment and projected demand, 2020-2025

Occupation	2020 Jobs	2025 Jobs	2020-2025 Change	2020-2025 % Change	2020-2025 Annual Openings
Computer Programmers	1,000	969	(31)	(3%)	66
Software Developers and Software Quality Assurance Analysts and Testers	8,060	9,115	1,055	13%	826
North (Greater Sacramento)	**9,060**	**10,084**	**1,024**	**11%**	**892**
Computer Programmers	1,151	1,105	(46)	(4%)	75
Software Developers and Software Quality Assurance Analysts and Testers	8,718	9,912	1,194	14%	905
North/Far North	**9,869**	**11,017**	**1,149**	**12%**	**980**
Computer Programmers	23,482	23,185	(297)	(1%)	1,665
Software Developers and Software Quality Assurance Analysts and Testers	242,490	282,657	40,167	17%	26,842
California	**265,972**	**305,841**	**39,870**	**15%**	**28,507**

Exhibit 2 compares the percent change in jobs between 2015 through 2020 and the projected changes through 2025. The rate of change is indexed to the total number of jobs in 2015.
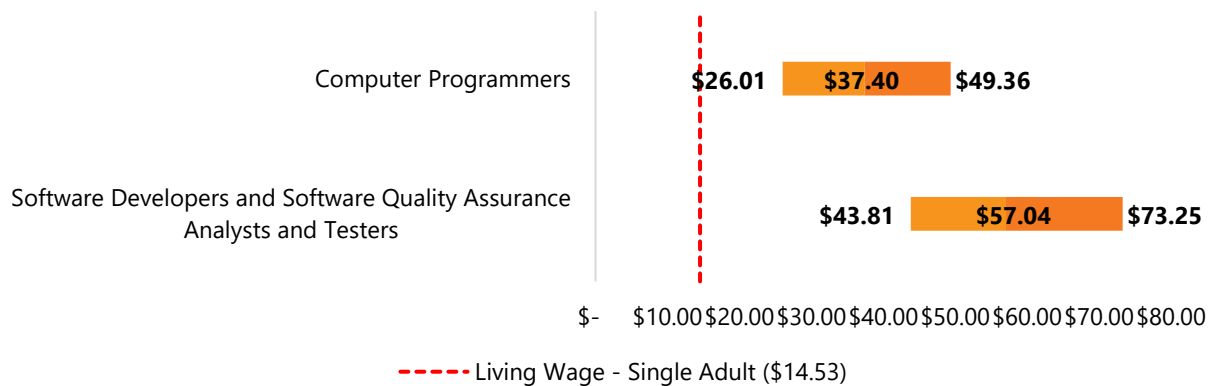
Exhibit 2. Changes in employment, 2015-2025
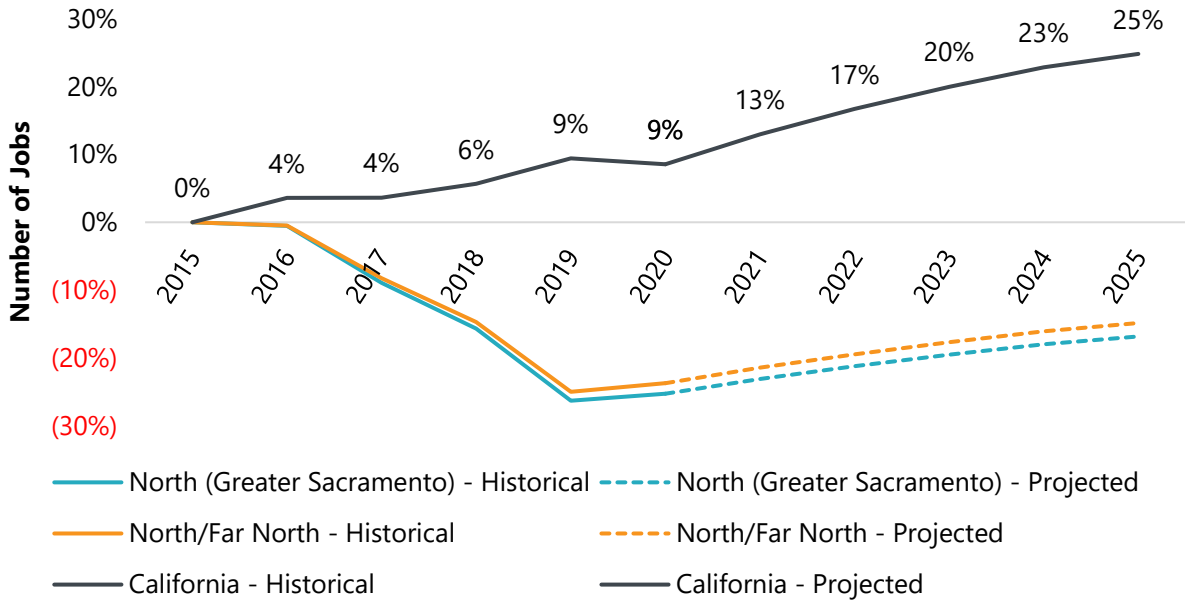
WAGES

Exhibit 3 compares the entry-level, median, and experienced wages for the selected occupations to the North (Greater Sacramento) living wage for a single adult - $14.53 per hour.[1]

Exhibit 3. Comparison of wages by occupation, 2020

---

[1] Living wage is defined as the level of income a single adult with no children must earn to meet basic needs, including food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. The 25th-percentile and 75th-percentile hourly wages are used as proxy for entry-level and experienced-level wages.

JOB POSTINGS

This section analyzes recent data from online job postings (real-time LMI). Online job postings may provide additional insight into recent changes in the labor market that are not captured by historical trends.

The North COE identified 6,782 online job postings for the selected occupations in the Greater Sacramento subregion. Job postings data comes from Burning Glass Labor Insights and represents new listings posted online within the last year, from February 1, 2021, to January 31, 2022.

Occupations and Job Titles

Exhibit 4 details the number of online job postings for the selected occupations.

Exhibit 4. Number of job postings by occupation

Occupation	Job Postings	Share of Job Postings
Software Developers and Software Quality Assurance Analysts and Testers	6,242	92%
Computer Programmers	540	8%
Total Job Postings	**6,782**	**100%**

Exhibit 5 shows the top 10 job titles with the most job postings and the share. All job postings included a job title.

Exhibit 5. Top jobs titles

Job Title	Job Postings	Share of Job Postings
Software Engineer	212	3%
Senior Software Engineer	164	2%
Java Developer	92	1%
.Net Developer	91	1%
C E A	86	1%
Devops Engineer	84	1%

Job Title	Job Postings	Share of Job Postings
Software Developer	78	1%
Full Stack Developer	66	1%
Software Engineer - Remote	56	1%
Full-Stack Software Engineer	35	1%

Employers

Exhibit 6 shows the top 10 employers with the most job postings for the selected occupations. Thirty percent (n = 2,040) of job postings did not include an employer.

Exhibit 6. Employers with the most job postings

Employer	Job Postings	Share of Job Postings
Intel Corporation	285	4%
Deloitte	156	2%
Travelers	133	2%
Accenture	113	2%
Anthem Blue Cross	83	1%
Pearson	65	1%
Guidehouse	50	1%
Pacific Gas and Electric Company	40	1%
Lumen	40	1%
Blue Cross Blue Shield of California	40	1%

Certifications, Skills, and Experience

Exhibit 7 shows the most relevant certifications requested by employers for the selected occupations. Eighty-seven percent (n = 5,921) of job postings did not include certification information.

Exhibit 7. Most in-demand certifications

Certification	Job Postings	Share of Job Postings
Security Clearance	137	2%
IT Infrastructure Library (ITIL) Certification	121	2%
Certified Information Systems Security Professional (CISSP)	52	1%
CompTIA Security+	49	1%
Cisco Certified Network Associate (CCNA)	49	1%
Certified Salesforce Platform Developer	43	1%

Exhibit 8 shows the specialized skills most requested by employers for the selected occupations.

Exhibit 8. Most in-demand specialized skills

Specialized Skill	Number of Skill Mentions
SQL	2,171
Software Engineering	2,061
Software Development	1,966
Java	1,935
JavaScript	1,662
Python	1,261
Git	1,126
.NET	923
Microsoft C#	909

Specialized Skill	Number of Skill Mentions
DevOps	876

Exhibit 9 shows employers' minimum level of education for job postings for the selected occupations. Forty percent (n = 2,685) of job postings did not include a preferred education level.

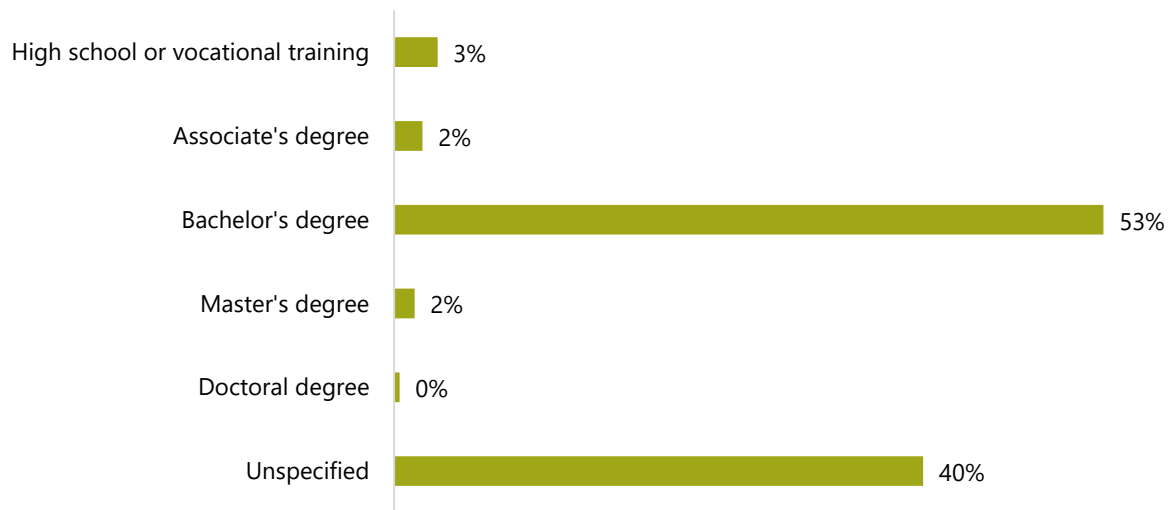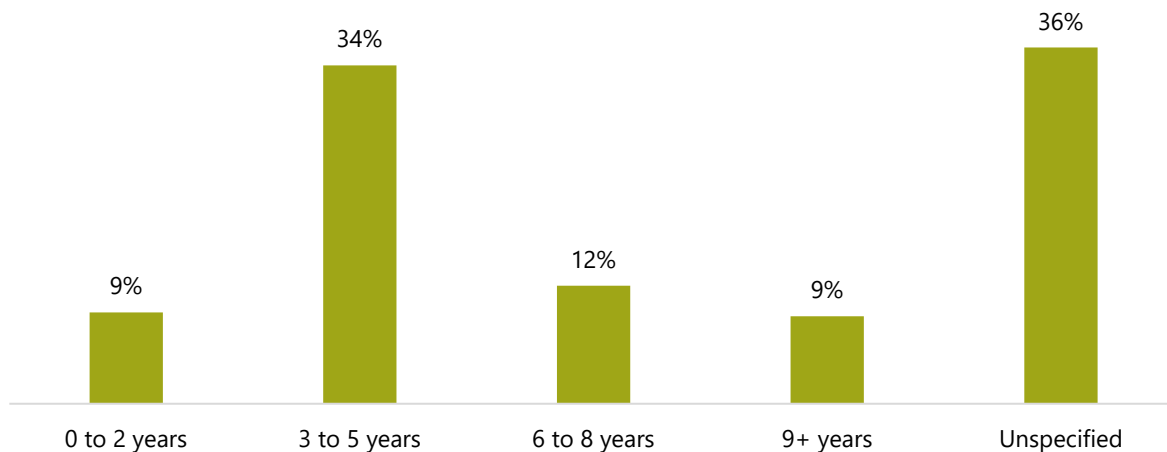**Exhibit 9. Employer-preferred minimum education levels**

Exhibit 10 shows the experience levels required by employers for job postings for the selected occupations. Thirty-six percent (n = 2,437) of job postings did not include a preferred education level.

Exhibit 10. Employer-preferred experience levels

EDUCATION AND TRAINING

The U.S. Census Bureau and Bureau of Labor Statistics collected data on education achieved by workers employed in occupations. Exhibit 11 shows the national-level educational attainment of the current workforce in the selected occupations.

Exhibit 11. National worker educational attainment for selected occupations, 2019
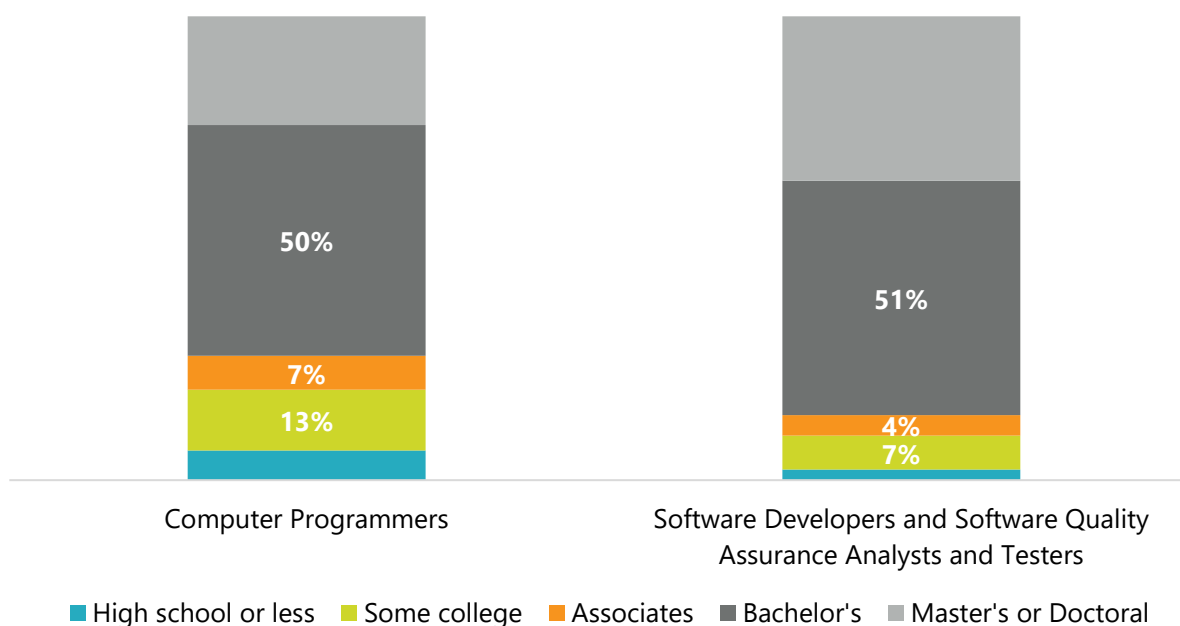
The Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which the BLS publishes projections data. Exhibit 12 shows the skill level and entry-level job requirements for the selected occupations.

Exhibit 12. Typical education, work experience, and on-the-job training requirements

Occupation	Typical Entry-level Education	Work Experience Required	On-the-job Training Required
Computer Programmers	Bachelor's degree	None	None
Software Developers and Software Quality Assurance Analysts and Testers	Bachelor's degree	None	None

EDUCATIONAL SUPPLY

Educational supply for an occupation can be estimated by analyzing the number of awards issued in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. Exhibit 13 shows the TOP and CIP codes for educational programs related to the selected occupations.

Exhibit 13. TOP and CIP codes for training programs related to the selected occupations

TOP Programs and Codes	Aligned CIP Programs and Codes
Computer Software Development (0707.00)	Computer Programming/Programmer, General (11.0201) Computer Programming, Vendor/Product Certification (11.0203)

Community College Supply

Exhibits 14 and 15 compare the average number of certificates and degrees conferred in selected community college programs over the last three academic years.

Exhibit 14. Annual average community college awards by program, 2017-18 through 2019-20

Program - TOP Code	College	Annual Awards 2018-19	Annual Awards 2019-20	Annual Awards 2020-21	3-Yr Annual Awards Average
Computer Software Development (0707.00)	Cosumnes River	1	0	2	1
	Sacramento City	13	13	26	17
	Subtotal	14	13	28	18
	Grand Total	**14**	**13**	**28**	**18**

Exhibit 15. **Annual average community college awards by type, 2017-18 through 2019-20**

Average Number of Awards Issued Per Year

- Associate Degree: 12
- Certificate 16 < 30 semester units: 1
- Certificate 30 < 60 semester units: 5
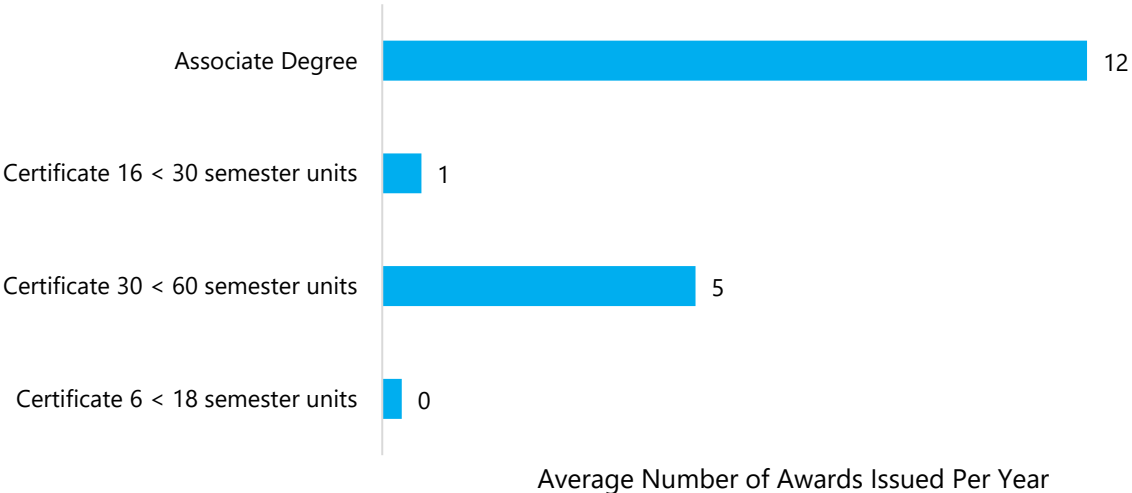- Certificate 6 < 18 semester units: 0

Exhibit 16 summarizes North (Greater Sacramento) Computer Software Development (0707.00) community college programs, active as of February 10, 2022.

Exhibit 16. **North (Greater Sacramento) Computer Software Development Programs**

College	Program Title	Award Offered
Folsom Lake	Mobile Programming	Certificate
Cosumnes River	CIS-Object Oriented Software Development	Certificate
Sacramento City	Computer Science	Certificate A.S. Degree
	iOS App Developer	Certificate

Other Postsecondary Supply

Exhibit 17 compares the average number of degrees that non-community college training providers conferred in the North (Greater Sacramento) subregion over the last three academic years. Please note that non-community college data lags by one year.

There were no awards in related CIP programs.

FINDINGS

- This report focuses on two occupations in the enterprise software engineering and development pathway, including computer programmers and software developers (software quality assurance analysts and testers).

- The North (Greater Sacramento) subregion held 9,060 software engineering and development jobs in 2020. Software engineering and development jobs are projected to increase by 11% over the next five years, adding 1,024 new jobs to the subregion by 2025.

    o Jobs for software developers are responsible for all the job growth over the next five years. Software developer jobs are projected to increase by 13%, while computer programmer jobs will decrease by 3%.

- Software engineering and development jobs will grow slower in the North (Greater Sacramento) subregion than in California.

- Over the next five years, software engineering and development jobs are projected to have 892 annual openings in the North (Greater Sacramento) subregion.

    o More than 90% of these job openings will be for software developers.

- Wage data shows that software engineering and development occupations earn $12 to $29 above the subregion's living wage of $14.53 per hour.

- According to real-time labor market information, there were about 6,782 online job postings for software engineering and development occupations between February 1, 2021, and January 31, 2022.

    o Ninety-two percent of these job postings were for software developers.

    o Employers are looking for software engineering and development job candidates with Bachelor's degrees.

- Between 11% and 20% of incumbent workers in the studied occupations have educational attainment levels consistent with community college offerings (some college or associate degrees). Another 50% of workers in these occupations hold a bachelor's degree.

- Three North (Greater Sacramento) community colleges offer degrees and certificates in software engineering and development programs. Together, these programs conferred an average of 18 awards (certificates and associate degrees) in computer software development programs over the last three academic years (2018-19 through 2020-21).

RECOMMENDATIONS

- Based on a three-year average of annual awards in North (Greater Sacramento) subregion software engineering and development programs and projected yearly openings, the supply gap analysis shows that the region seems to have room for additional training.

    o Together, community colleges and other postsecondary training providers issued an average of 18 awards over the last three years.

    o There are 892 projected annual openings for software engineering and development jobs.

- The North/Far North Center of Excellence recommends moving forward with the program.

- However, community colleges should either offer a transferable degree in software engineering and development or ensure that the program aligns with an existing transfer-oriented pathway. Local employers seem to be looking for software engineering and development job candidates with a bachelor's degree, and the typical entry-level education for these studied occupations is a bachelor's degree. Therefore, the North (Greater Sacramento) Center of Excellence strongly recommends including a transfer pathway in any software engineering and development program.

COE Recommendation		
Move forward with the program	Proceed with caution	Program is not recommended
☒	☐	☐

APPENDIX A. METHODOLOGY AND SOURCES

This report identified Occupations using the Center of Excellence TOP-to-CIP-to-SOC crosswalk and O*Net OnLine. This report's findings were determined using labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi, and jobs posting data from Burning Glass.

Cal-PASS Plus LaunchBoard. California Community Colleges Chancellor's Office.
https://www.calpassplus.org/LaunchBoard/Home.aspx.

Emsi 2021.4; QCEW Employees, Non-QCEW Employees, and Self-Employed.
https://www.economicmodeling.com/. EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors).

Educational Attainment for Workers 25 Years and Older by Detailed Occupation, 2016-2017. Bureau of Labor Statistics. https://www.bls.gov/emp/tables/educational-attainment.htm#.

Integrated Postsecondary Education Data System (IPEDS). National Center for Education Statistics. U.S. Department of Education. https://nces.ed.gov/ipeds/.

"Labor Insight Real-Time Labor Market Information Tool." Burning Glass Technologies.
http://www.burning-glass.com.

Labor Market Information Division. California Employment Development Department.
https://labormarketinfo.edd.ca.gov/.

Management Information Systems (MIS) Data Mart. California Community Colleges Chancellor's Office. https://datamart.cccco.edu/.

Occupational Employment Statistics (OES). Bureau of Labor Statistics.
https://www.bls.gov/oes/home.htm.

O*NET OnLine. U.S. Department of Labor/Employment and Training Administration (DOL ETA).
https://www.onetonline.org/.

Self-Sufficiency Standard Tool for California. The University of Washington.
http://www.selfsufficiencystandard.org/

"Taxonomy of Programs." California Community Colleges Chancellor's Office. June 2012, 6th Edition. https://www.cccco.edu/-/media/CCCCO-Website/About-

Us/Divisions/Educational-Services-and-Support/Academic-Affairs/What-we-do/Curriculum-and-Instruction-Unit/Files/TOPmanual6200909corrected12513pdf.ashx

"TOP-CIP-SOC Crosswalk." Centers of Excellence for Labor Market Research. November 2015 Edition. http://coeccc.net/

C·O·E

CENTERS OF EXCELLENCE
FOR LABOR MARKET RESEARCH

FOR MORE INFORMATION, PLEASE CONTACT:

Ebony J. Benzing, Research Manager

North (Greater Sacramento) Center ofExcellence

Ebony.Benzing@losrios.edu