

Labor Market Analysis for Program Review:

Artificial Intelligence and Machine Learning Occupations in Greater Sacramento

Prepared by the North Far North Center of Excellence
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Executive Summary

The North Far North Center of Excellence for Labor Market Research (NFN COE) prepared this report to provide an analysis of occupational demand and educational supply for selected occupations employed across the seven-county North (Greater Sacramento) region. 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.¹

Note on Scope and Educational Alignment

This report differs from a typical Labor Market Analysis for Program Recommendation in that it focuses primarily on above-middle-skill occupations within the Artificial Intelligence and Machine Learning (AI/ML) cluster. Most of these occupations require bachelor's-level education and are traditionally aligned with four-year institutions.

Accordingly, any community college pathway developed in this area should emphasize transfer preparation and align with the community college mission. Program planning should also consider existing educational supply from regional CSU and UC institutions to ensure that new offerings complement, rather than duplicate, four-year degree pathways while focusing on applied, workforce-relevant skill development.

Key Finding

The AI and Machine Learning (AI/ML) occupational cluster employs nearly 20,000 workers in Greater Sacramento and is projected to grow by 6% over the next five years, generating approximately 1,363 annual job openings. Entry-level wages range from \$34 to \$56 per hour; earnings are well above the regional living wage threshold, indicating strong economic potential.

Job postings show that regional demand is concentrated in applied AI skills, including Python, SQL, cloud platforms, and DevOps tools, while advanced machine learning frameworks appear in a smaller share of postings. AI competencies are embedded across mainstream technology roles rather than limited to specialized research positions. While most employers prefer bachelor's-level education and many positions target mid-career professionals, community colleges contribute significantly to the regional pipeline, awarding an average of 657 computing-related credentials annually.

Recommendation

The North Far North COE recommends that community colleges **exercise caution in developing new or expanding existing AI/ML programs**. Greater Sacramento accounts for approximately 4% of California's AI and machine learning jobs. While demand and wages are strong, most occupations require bachelor's-level preparation and local job postings emphasize applied

¹ Pursuant to California Education Code §78015, labor market information (LMI) is required for all new career education certificate and degree program proposals, and the North Far North Regional Consortium (NFNRC) requires LMI to come from the NFN COE. This report should serve to satisfy those requirements.

implementation skills rather than advanced research training. Any new or modified programs should focus on foundational programming, data analytics, cloud-based AI tools, and AI implementation, aligned with transfer pathways and workforce-ready skill development.

Introduction

The North Far North Center of Excellence (COE) was asked to provide labor market data to support a proposed new career education program or modifications to existing programs at a regional community college (see Appendix A for methodology and data sources).

The proposed Artificial Intelligence (AI) and Machine Learning (ML) program is designed to prepare students for entry-level and mid-level roles in data-driven and AI-enabled occupations within the Greater Sacramento subregion. As AI technologies increasingly shape public administration, healthcare delivery, utilities management, finance, cybersecurity, and software development, regional employers are seeking workers with applied skills in data analytics, machine learning, automation, and cloud-based AI tools.

Unlike traditional single-occupation programs, AI and machine learning function as enabling technologies embedded across multiple industries and occupational categories. Rather than aligning to a single Standard Occupational Classification (SOC) code, AI-related skills are found within a cluster of high-demand roles including:

- Data Scientists
- Software Developers
- Computer Systems Analysts
- Operations Research Analysts
- Business Intelligence Analysts (a sub occupation of Data Scientists)
- Information Security (aka Cybersecurity) Analysts
- Database Administrators
- Computer and Information Research Scientists

As a result, this labor market analysis evaluates demand across a cluster of computing and data-centered occupations, and relevant training programs, that incorporate AI and machine learning skills.

Important Note Regarding Report Structure

This report structure differs from the typical Labor Market Analysis for Program Recommendation in that the analysis focuses primarily on above middle-skill occupations. This report differs from the typical Labor Market Analysis for Program Recommendation in that the analysis primarily focuses on above-middle-skill occupations. Many occupations within the Artificial Intelligence and Machine

Learning (AI/ML) cluster require bachelor's or graduate-level education for entry and are traditionally aligned with four-year higher education institutions.

Because of the educational requirements of the occupations included in this report, any community college program pathway aligned with these occupations should be designed with careful consideration of institutional mission and regional workforce dynamics. In particular, community colleges pursuing AI/ML-focused programming should prioritize transfer-oriented pathways that prepare students for bachelor's-level completion at CSU or UC institutions. Additionally, program development should account for existing educational supply from regional four-year institutions to ensure complementarity rather than duplication.

Accordingly, this analysis evaluates workforce demand within the context of a broader higher education ecosystem and frames recommendations around applied skill development, transfer preparation, and workforce-aligned implementation skill sets consistent with community college offerings.

This report also relies on a skills-based analysis to suggest how Greater Sacramento community colleges may best position themselves when developing AI and Machine Learning programs. Traditional labor market data is also included to determine whether sufficient workforce demand exists to support the development of an AI and Machine Learning program within the Greater Sacramento subregion.

Occupational Mapping

Artificial intelligence and machine learning skills are embedded across a cluster of computing, analytics, and systems occupations. The occupations listed below represent core AI roles as well as technology positions in which AI skills are increasingly integrated into daily job functions. The tiered structure reflects both direct AI development roles and applied AI implementation across industries.

Furthermore, the “Computer Occupations, All Other” classification captures emerging AI and machine learning job titles that are not yet distinctly classified within the SOC system. Given the rapid evolution of AI-related roles, this category provides important insight into specialized and hybrid technical positions within the regional labor market.

Exhibit 1. Tier 1 – Core Artificial Intelligence (AI) and Machine Learning (ML) Occupations

SOC Code	SOC Title	Function
15-1221.00	Computer and Information Research Scientists	Conduct advanced research and innovation in artificial intelligence, machine learning algorithms, and computational systems. Design and improve new and existing AI models. Develop novel machine learning methodologies. Evaluate emerging technologies such as generative AI, natural language processing, and reinforcement learning. While more research-oriented, this occupation drives innovation that underpins applied AI systems.
15-2051.00	Data Scientists	Develop, train, evaluate, and deploy machine learning models to extract insights from structured and unstructured data. Design predictive models, build data pipelines, perform feature engineering, apply statistical and deep learning techniques, and communicate findings through visualization and reporting tools. In applied settings, they support decision-making, automation, risk modeling, forecasting, and AI-driven optimization across public and private sector organizations.

Exhibit 2. Tier 2 – AI-Embedded Tech Roles

SOC Code	SOC Title	Function
15-1211.00	Computer Systems Analysts	Analyze organizational IT systems and recommend AI-enabled solutions to improve operational efficiency and decision-making. Evaluate data infrastructure, assess integration needs for AI tools, translate business requirements into technical specifications, and support the implementation of analytics platforms, automation systems, and AI-enhanced enterprise software.
15-1252.00	Software Developers	Design, develop, and integrate AI and machine learning functionality into software applications and enterprise systems. Implement machine learning models into production environments, build APIs for AI services, deploy cloud-based AI tools, and develop user-facing applications that incorporate predictive analytics, automation, and intelligent decision systems. Increasingly, AI literacy is embedded within mainstream software development roles. ²
15-1299.00	Computer Occupations, All Other	Encompasses emerging and specialized computing roles that do not fit within established SOC classifications, including AI Engineers, Machine Learning Engineers, Data Engineers, and other hybrid technical positions. Workers in this occupation may design, deploy,

² Source: McKinsey & Company, “[Unlocking the Value of AI in Software Development](#),” November 2025.

		maintain, and optimize AI systems, build data pipelines, implement automation tools, and support enterprise-level AI infrastructure. This category reflects the evolving nature of AI-embedded occupations in the labor market.
15-2031.00	Operations Research Analysts	Use mathematical modeling, optimization algorithms, and predictive analytics to improve organizational processes and strategic planning. In AI-related roles, workers develop forecasting models, simulation systems, and decision-support tools that incorporate machine learning outputs to optimize logistics, resource allocation, and risk management.

Exhibit 3. Tier 3 – Applied AI Across Industries

SOC Code	SOC Title	Function
15-1212.00	Information Security Analysts	Protect organizational data and systems using AI-enhanced threat detection, anomaly detection, and automated response systems. Employ machine learning tools to identify cyber threats, monitor network behavior, analyze intrusion patterns, and develop predictive models for risk mitigation. AI increasingly augments cybersecurity operations. ³
15-1242.00	Database Administrators	Design, manage, and maintain the data infrastructure required to support AI and machine learning systems. Ensure data integrity, scalability, and security for large-scale datasets used in analytics and model training. Support data warehousing, cloud storage systems, and structured/unstructured data environments critical to AI workflows.
15-2051.01*	Business Intelligence Analysts*	Develop data dashboards, reports, and analytical tools that translate complex datasets into actionable insights for business and government stakeholders. Business Intelligence Analysts often work with large data warehouses, use SQL and visualization tools, and increasingly integrate predictive analytics and machine learning outputs into reporting platforms to support data-driven decision-making.

*Note: Business Intelligence Analysts are a sub-occupation of Data Scientists. When possible, data specific to the business intelligence analysts will be provided, however demand for the sub-occupation is embedded within the Data Scientists occupation.

Because these occupations are primarily bachelor’s-level roles, it is important to examine how they align with the community college mission.

Alignment to Community College Offerings

All occupations within the AI and Machine Learning cluster are classified as above-middle skill roles, with bachelor’s degrees typically required for entry-level employment. Between 36% and 52% of incumbent workers in these occupations have a bachelor’s degree, while another 16-58% hold advanced graduate degrees. Only 3-34% of incumbent workers have credentials associated with community colleges (some college or an associate degree). On average, 17% of workers currently employed in AI and machine learnings occupations have education credentials associated with community colleges.

³ Source: McKinsey & Company, “[The Cybersecurity Provider’s Next Opportunity: Making AI Safer.](#)” November 2024.

According to federal data, most AI and machine learning occupations require a bachelor's degree as the typical entry-level education requirement. Computer and Information Research Scientists typically require a master's degree.

Exhibit 4. Entry-Level Education and Educational Attainment by Occupation

Occupation	Typical Entry-Level Education	% Some College	% Associate degree	% Bachelor's Degree	% Graduate Degree
Tier 1 – Core AI/ML Occupations					
Computer and Information Research Scientists	Master's degree	1.9	0.9	36	58.3
Data Scientists	Bachelor's degree	6.3	4.1	40	46.6
Tier 2 – AI-Embedded Tech Roles					
Computer Systems Analysts	Bachelor's degree	14	8.2	47.5	24.7
Software Developers	Bachelor's degree	7.4	3.9	51.9	34
Computer Occupations, All Other	Bachelor's degree	19.9	14	39.4	16.4
Operations Research Analysts	Bachelor's degree	11.7	5.8	43.9	33.1
Tier 3 – Applied AI Across Industries					
Information Security Analysts	Bachelor's degree	14.4	9.4	42.6	28.2
Database Administrators	Bachelor's degree	9.6	7.3	48.5	29.6
Business Intelligence Analysts*	Bachelor's degree	6.3	4.1	40	46.6
Average	N/A	10.7%	6.7%	43.7%	33.9%

*Note: Business Intelligence Analysts are a sub-occupation of Data Scientists. When possible, data specific to the business intelligence analysts will be provided, however demand for the sub-occupation is embedded within the Data Scientists occupation.

Demand

Exhibit 5 summarizes five-year projected job growth for the AI and Machine Learning occupational cluster in Greater Sacramento and California. In 2024, the Greater Sacramento region employed nearly 20,000 workers in AI- and ML-related occupations. Employment is projected to grow by 6% over the next five years, adding approximately 1,400 new jobs by 2029. This growth rate aligns with the statewide average of 6%.

Exhibit 5. Current employment and projected occupational demand, 2024-2029

Occupational Group		2024 Jobs	2024-2029 Change	2024-2029 % Change	2024-2029 Annual Openings
Tier 1	Computer and Information Research Scientists	168	13	8%	13
	Data Scientists	2,578	299	12%	211
Tier 2	Computer Systems Analysts	3,250	167	5%	224
	Software Developers	8,198	404	5%	509
	Computer Occupations, All Other	3,710	137	4%	255
	Operations Research Analysts	571	82	14%	54
Tier 3	Information Security Analysts	727	105	14%	63
	Database Administrators	506	25	5%	34
Greater Sacramento		19,707	1,233	6%	1,363
California – Cluster Employment		487,809	31,437	6%	33,595

Exhibit 6 compares employment in the AI and Machine Learning occupational cluster across major economic regions of California, including Greater Sacramento, the Far North, the Bay Area, Central Valley/Mother Lode, Inland Empire/Desert, Los Angeles County, Orange County, San Diego/Imperial, and the South Central Coast. Employment is heavily concentrated in the Bay Area, which reported nearly 262,000 jobs in 2024, followed by Los Angeles County with approximately 84,000 jobs.

Most of California’s projected job growth in the AI and Machine Learning occupational cluster is expected to occur in the Bay Area, Los Angeles County, and the San Diego/Imperial region. Together, these three regions are projected to add nearly 26,000 new jobs—accounting for approximately 82% of statewide growth in the cluster by 2029.

Exhibit 6. Statewide AI and Machine Learning Cluster Employment by CCCC Economic Region, 2024-2029

CCCCO Economic Region	2024 Jobs	2024-2029 Change	2024-2029 % Change	2024-2029 Annual Openings
Greater Sacramento	19,707	1,233	6%	1,363
Far North	2,015	209	10%	162
Bay Area	261,781	20,395	8%	18,670
Central Valley/Motherlode	11,342	1,126	10%	893
Inland Empire/Desert	13,000	1,454	11%	1,052
Los Angeles County	84,183	3,042	4%	5,303
Orange County	37,276	1,216	3%	2,310
San Diego/Imperial	45,166	2,258	5%	2,986
South Central Coast	11,879	466	4%	768
California	487,809	31,437	6%	33,595

The Greater Sacramento region represents a comparatively small share of the state’s AI and machine learning jobs, accounting for approximately 4% of both total employment and annual job openings within the cluster (Exhibit 7).

Exhibit 7. Share of Statewide AI and Machine Learning Employment and Job Openings by Region

CCCCO Economic Region	Share of 2024 Jobs	Share of Annual Openings
Greater Sacramento	4%	4%
Far North	0%	0%
Bay Area	54%	56%
Central Valley/Motherlode	2%	3%
Inland Empire/Desert	3%	3%
Los Angeles County	17%	16%
Orange County	8%	7%
San Diego/Imperial	9%	9%
South Central Coast	2%	2%

Earnings

Exhibit 3 compares the percentile hourly earnings for the selected occupations to the living wage for a single working adult and a working family residing in the county of the community college district that requested this report.^{4,5} Earnings data includes wages from employed and self-employed workers. Also, it's important to note that living wage thresholds vary by county, and in Greater Sacramento, range from \$17 to \$24 per hour for a single working adult.

Requesting College	Living Wage – Working Adult	Living Wage – Working Family
Folsom Lake	\$21.17	\$41.91

AI and Machine Learning occupations have entry-level wages that well exceed Sacramento county's living wage threshold (Exhibit 8). Hourly wages range from \$34 to \$56 per hour.

Exhibit 8. Hourly earnings by occupation

	Occupational Group	Entry-Level	Median	Experienced
Tier 1	Computer and Information Research Scientists	\$56.08	\$77.39	\$103.94
	Data Scientists	\$39.69	\$47.28	\$57.27
Tier 2	Computer Systems Analysts	\$46.34	\$58.26	\$64.14
	Software Developers	\$54.69	\$67.44	\$82.42
	Computer Occupations, All Other	\$34.72	\$50.99	\$68.12
	Operations Research Analysts	\$36.58	\$43.93	\$52.57
Tier 3	Information Security Analysts	\$47.71	\$63.49	\$80.56
	Database Administrators	\$42.29	\$59.76	\$69.45

⁴ A "living wage" is defined as the level of income one working adult with no children must earn to meet basic needs, including food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. Please note that the 25th-percentile and 75th-percentile hourly wages are used as proxies for entry-level and experienced-level wages.

⁵ A "working family" is defined as one working adult and one infant (between the ages of 0 and 2 years).

Job Postings

Skill Analysis Approach

To better understand the specific skills local employers seek in AI- and machine learning-related roles in Greater Sacramento, the COE conducted a skills analysis of regional job postings. Because AI is frequently referenced as a general term across occupations, a traditional keyword search (e.g., “artificial intelligence”) can overstate demand by capturing postings that reference AI without requiring specific AI skill sets.

The analysis used a predefined taxonomy of 317 Global AI skills and limited results to job postings within the AI/ML occupational cluster. Additional filters excluded internships, staffing agency postings, and fully remote positions to focus on direct regional employer demand. This approach helped to ensure that the resulting dataset and analysis reflected local jobs requiring demonstrable AI-related technical skills rather than general marketing or conceptual references. This process resulted in the identification of 1,222 unique online job postings in Greater Sacramento requiring AI/ML-related skills (Exhibit 9).

Exhibit 9. Results of job posting filters

+ Geography Only	+ Occupations	- Staffing Companies & Internships	- Remote Roles (Kept Non-Remote, Hybrid, and Unknown)
6,718 postings	1,948	1,657	1,222

Skills Categorization

AI-related skills vary significantly in technical depth and workforce accessibility. To distinguish between research-oriented AI roles and applied implementation roles, identified skills were grouped into two broad categories:

- **Core AI Skills**, including machine learning frameworks, algorithms, and statistical modeling tools used to design and train models.
- **Applied AI Skills**, including programming languages, cloud platforms, data engineering tools, DevOps technologies, and analytics software used to deploy, integrate, and operationalize AI systems.

Skills were further organized into functional groupings (e.g., Programming Languages, Cloud & Infrastructure, Data Management & Engineering, DevOps & Deployment, Analytics & Visualization) to identify patterns of demand across technical domains.

This categorization allows for a more nuanced understanding of whether regional demand is concentrated in advanced AI model development or in the applied integration and deployment of

AI systems. The following sections summarize the results of the skills analysis as well as key data from online job postings.

Specialized Skill Demand

AI-related terms are widely used in regional job postings within the AI and machine learning occupational cluster. Seventy percent of postings explicitly referenced “Artificial Intelligence,” and more than half (53%) referenced “Machine Learning” (Exhibit 10). Foundational computing skills were also commonly cited, with 45% of postings referencing computer science and 24% mentioning data science. These findings suggest that AI and machine learning concepts are broadly embedded across the AI and machine learning occupational cluster in Greater Sacramento and reinforce the cross-occupational nature of AI-related workforce demand.

Exhibit 10. AI Domain References in Job Postings

Domain	# of Postings	% of Total Postings
Artificial Intelligence	850	70%
Machine Learning	653	53%
Computer Science	548	45%
Data Science	289	24%

Applied AI Skills

Among applied AI skill categories, programming languages are the most frequently requested specialized skills, with Python appearing in 45% of postings (Exhibit 11). DevOps and deployment-related skills—such as scalability, automation, and CI/CD—follow closely, with top skills appearing in 35% of postings. Cloud and infrastructure platforms, including AWS and Microsoft Azure, are also commonly requested (30%), suggesting strong demand for AI deployment and operationalization skill sets.

Analytics and data visualization tools appeared in 22% of postings, while software development skills (17%) and data management and engineering skills (15%) further reinforced the implementation-focused nature of regional demand. Governance-related skills (14%) highlight the importance of policy, compliance, and responsible AI considerations; this skill likely reflects the more regulated and public-sector employers.

Overall, the distribution of skills suggests that employers prioritize applied AI implementation and infrastructure over advanced model development.

Exhibit 11. Applied AI Skill Categories

Applied AI Category	Example Skills	Highest Individual Skill %
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Programming Languages	Python, SQL, Java	45%
DevOps & Deployment	Scalability, Automation, CI/CD	35%
Cloud & Infrastructure	AWS, Microsoft Azure, Docker	30%
Analytics & Visualization	Data Analysis, Power BI, Dashboard	22%
Software & Application Development	Software Development, Software Engineering	17%
Data Management & Engineering	Data Modeling, ETL	15%
Policy & Compliance	Governance	14%

Core AI Skills

Core AI technical skills appear less frequently than applied implementation skills in regional job postings (Exhibit 12). “Generative Artificial Intelligence” is the most commonly referenced core skill, appearing in 23% of postings. Foundational quantitative skills such as statistics (13%) and algorithms (9%) are also present, though at lower levels. Specialized machine learning frameworks, including PyTorch and TensorFlow, appeared in 8% of postings.

Exhibit 12. Core AI & Machine Learning Framework Skills

Core AI Skill	# of Postings	% of Total Postings
Generative Artificial Intelligence	279	23%
Statistics	155	13%
Algorithms	113	9%
PyTorch (Machine Learning Library)	99	8%
TensorFlow	99	8%

Applied vs Core AI Skills

While AI and machine learning skills appeared in a majority of postings, the most frequently requested technical skills related to programming languages, cloud platforms, and deployment infrastructure (Exhibit 13). Core AI skills, including advanced machine learning frameworks such as TensorFlow and PyTorch, appeared in less than 10% of postings.

While advanced AI model development skills are represented in the labor market, they occur in a smaller share of postings compared to programming, cloud, and deployment-related skill sets,

suggesting that Greater Sacramento’s employer demand for AI and machine learning skills is more concentrated in applied AI and AI implementation than in AI model development.

Exhibit 13. Applied vs. Core AI Specialized Skills

Skill Type	Highest % Skill
Applied AI – Programing	45%
Applied AI – DevOps	35%
Applied AI – Cloud	30%
Core AI – Generative AI	23%
Applied AI - Analytics & Visualization	22%
Applied AI - Software Development	17%
Applied AI – Data Management	15%
Applied AI – Policy & Compliance	14%
Core AI – Statistics	13%
Core AI – Algorithms	9%
Core AI – PyTorch	8%
Core AI – TensorFlow	8%

Software Skill Demand

COE performed a similar analysis on software skills related the AI and machine learning occupational cluster (Exhibit 14). Key findings include:

- **Foundational programming skills dominate.** Python (45%) and SQL (32%) are the most frequently requested software skills, appearing more often than any specialized machine learning framework.
- **Cloud-based AI deployment is critical.** AWS (30%) and Azure (28%) appear in nearly one-third of postings, reflecting strong demand for cloud-based AI infrastructure.
- **Machine learning frameworks are less prevalent.** TensorFlow and PyTorch appear in only 9% of postings, indicating that while model development expertise is valued, it is less common than programming and deployment skills.
- **AI Roles Operate Within Mature DevOps Environments.** Docker (13%), Kubernetes (13%), and APIs (19%) indicate that AI work is integrated into production software ecosystems.

Exhibit 14. Most Frequently Requested Skills by Category

Programming Languages	# of Postings	% of Total Postings
Python (Programming Language)	546	45%
SQL (Programming Language)	389	32%
Java (Programming Language)	134	11%
JavaScript (Programming Language)	130	11%
Cloud & Infrastructure	# of Postings	% of Total Postings
Amazon Web Services	364	30%
Microsoft Azure	337	28%
Google Cloud Platform (GCP)	100	8%
Terraform	100	8%
AI & Machine Learning Frameworks	# of Postings	% of Total Postings
Generative Artificial Intelligence	279	23%
PyTorch (Machine Learning Library)	113	9%
TensorFlow	113	9%
Prompt Engineering	47	4%
DevOps & Deployment	# of Postings	% of Total Postings
Application Programming Interface (API)	236	19%
Docker (Software)	162	13%
Kubernetes	161	13%
Github	99	8%
Analytics & Business Intelligence	# of Postings	% of Total Postings
Power BI	166	14%
Dashboard	151	12%
Tableau (Business Intelligence Software)	109	9%
SAS (Software)	57	5%
Data Platforms	# of Postings	% of Total Postings
Snowflake (Data Warehouse)	112	9%

Databricks	75	6%
NoSQL	64	5%
Apache Kafka	57	5%
Software Development	# of Postings	% of Total Postings
React.js (Javascript Library)	71	6%
Linux	68	6%
SAP Applications	66	5%
Enterprise Application Software	60	5%

Across both specialized and software skill datasets, the most frequently requested software skills related to programming, cloud platforms, and system deployment rather than advanced machine learning frameworks (Exhibit 15). This pattern suggests that AI- and machine learning-related jobs in Greater Sacramento more often emphasize implementation, integration, and operationalization of AI systems over AI model development.

Exhibit 15. Applied vs. Core AI Skills (Specialized & Software)

Skill Type	Highest Skill %
Programming	45%
Cloud	30%
DevOps	19-35%
Core AI & ML Frameworks	8-23%

Top Employers & Industries

AI and machine learning job postings are concentrated among a mix of consulting, healthcare, and technology firms (Exhibit 16). Accenture posted the highest number of AI/ML-related openings (77), followed by Blue Shield of California (58), Oracle (56), CVS Health (51), and Lumen Technologies (31).

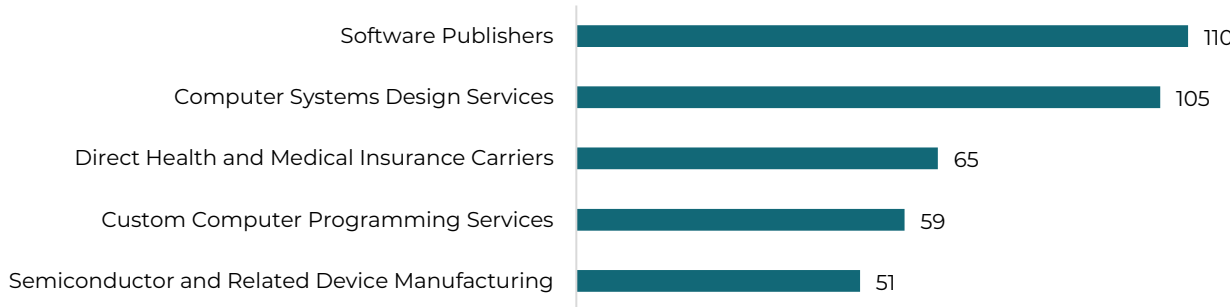
Exhibit 16. Employers with the most job postings

Employer	Number of Job Postings
Accenture	77
Blue Shield of California	58

Employer	Number of Job Postings
Oracle	56
CVS Health	51
Lumen Technologies	31

AI and machine learning jobs postings in Greater Sacramento are concentrated in tech-driven industries (Exhibit 17). Software Publishers account for the largest number of postings (110), followed closely by Computer Systems Design Services (105). Healthcare-related demand is also significant, with Direct Health and Medical Insurance Carriers generating 65 postings. Additional posting activity appeared in Custom Computer Programming Services (59) and Semiconductor and Related Device Manufacturing (51). Overall, the distribution of postings indicates that AI demand is strongest within software and IT services sectors, while also extending into healthcare and advanced manufacturing industries.

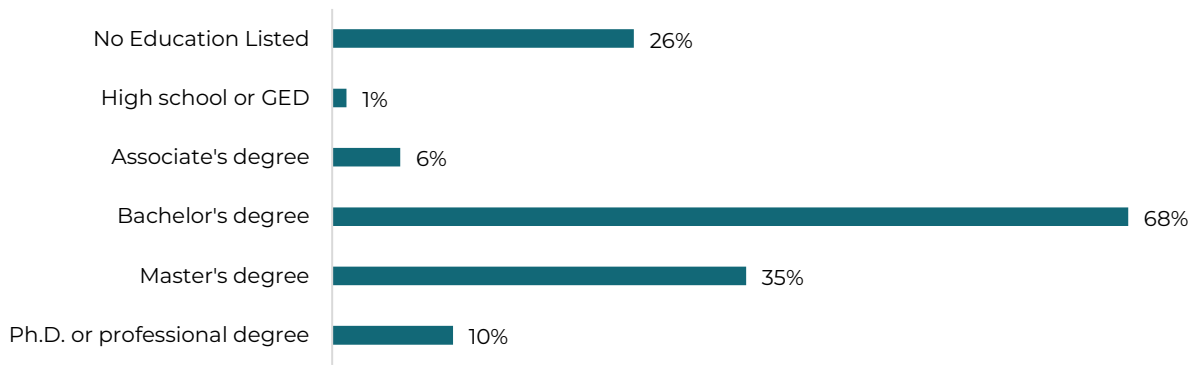
Exhibit 17. Top five industries with the most job postings



Education & Experience

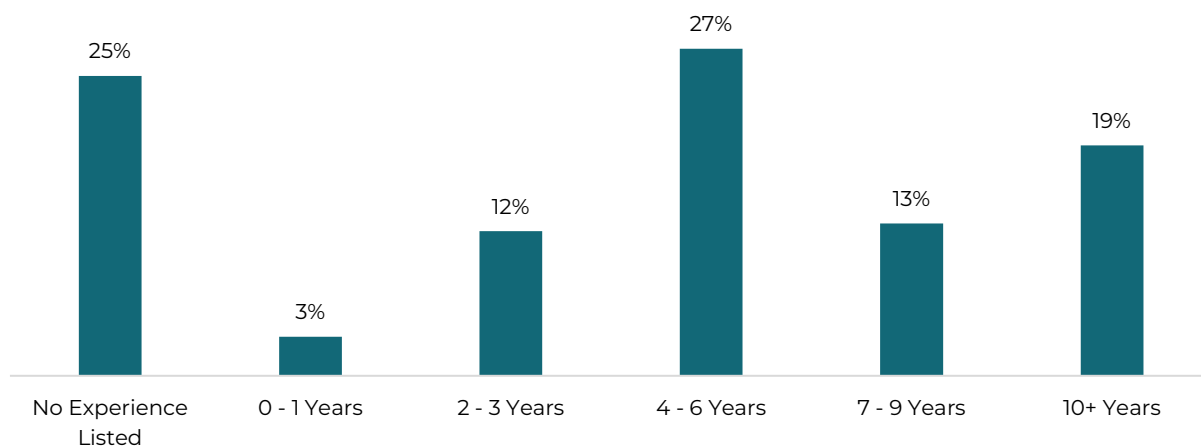
Analysis of employer-preferred education data suggests that most jobs within the AI/ML occupational cluster are aligned with bachelor’s-level preparation or higher (Exhibit 18). Most AI and machine learning job postings in the Greater Sacramento region specified a bachelor’s degree as the preferred minimum education requirement (68%), while more than one-third of postings (35%) requested a master’s degree and 10% indicated a Ph.D. or professional degree. A smaller share of postings listed an associate degree (6%) or high school diploma (1%) as sufficient preparation, while 26% do not specify a required education level.

Exhibit 18. Employer-preferred education levels



Experience requirements for AI and machine learning job postings in the Greater Sacramento region skew toward mid-career professionals (Exhibit 19). The largest share of postings (27%) required 4–6 years of experience, followed by nearly one-fifth (19%) that requested 10 or more years of experience. Only 3% of postings specified 0–1 year of experience.

Exhibit 19. Employer-preferred experience levels



Educational Supply

Educational supply for AI- and machine learning-related occupations can be estimated by analyzing the number of awards conferred in relevant Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP) codes. Because AI is embedded across multiple computing and data science fields, this analysis includes programs in computer science, data science, information systems, and related technology disciplines.

Community college supply

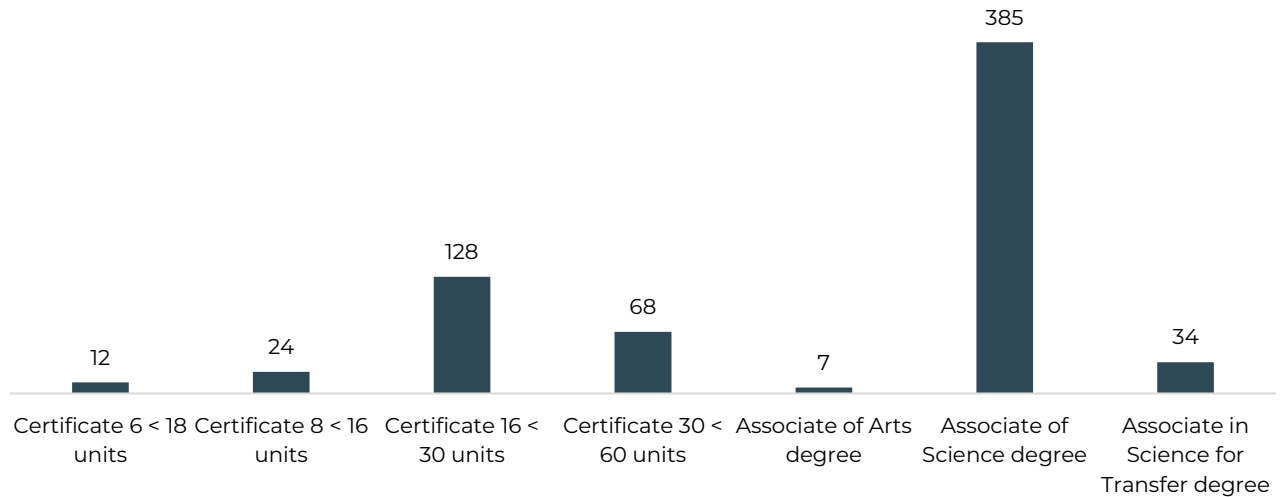
Exhibits 12 and 13 summarize the three-year average of awards (certificates and degrees) conferred by the subregion's community college programs relevant to the occupations studied.

Exhibit 20. Average annual community college awards by TOP program, Greater Sacramento

TOP Program and Code	2022-23 Annual Awards	2023-24 Annual Awards	2024-25 Annual Awards	Three-Year Average Awards
Computer Science (Transfer)-070600	142	163	197	167
Computer Networking-070810	108	91	111	103
Computer Infrastructure and Support-070800	80	113	107	100
Computer Programming-070710	97	90	86	91
Information Technology, General-070100	38	45	54	46
Computer Information Systems-070200	29	38	50	39
Computer Software Development-070700	24	21	64	36
Computer Systems Analysis-070730	19	20	26	22
Software Applications-070210	26	18	11	18
Database Design and Administration-070720	19	17	12	16
Computer Support-070820	16	12	13	14
World Wide Web Administration-070900	7	1	5	4
Other Information Technology-079900	--	--	2	2
Totals	605	629	738	657

Note: Values in the table are rounded to the nearest whole number. However, subtotals and totals are calculated using unrounded values.

Exhibit 21. Average annual community college awards by award type, Greater Sacramento



Although AI and machine learning skills may be embedded across multiple program areas, a review of the Chancellor’s Office Curriculum Inventory (COCI) identified only one active community college program specifically dedicated to artificial intelligence and machine learning: the Artificial Intelligence and Machine Learning certificate program at Folsom Lake College.

Other Postsecondary Supply

In addition to community colleges, four-year institutions and other postsecondary institutions in the Greater Sacramento region offer training pathways aligned with the AI/ML occupational group (Exhibit 22). These programs produced a substantial number of graduates in computer science and related fields. UC Davis and CSU Sacramento alone confer approximately 699 bachelor’s degrees in computer science annually. While not all graduates enter AI-specific roles, these programs represent a significant component of the region’s broader computing workforce pipeline.

Exhibit 22. Average annual awards by institution, program, and award level, 2021-22 through 2023-24

Institution	Program	Award Level	Three-year Average Awards
UC Davis	Computer Science	Bachelor’s	393
CSU Sacramento	Computer Science	Bachelor’s	306
William Jessup	Computer Science	Bachelor’s	6
Asher College	IT Security	Sub-baccalaureate	97
Total			801

Overall Supply

Greater Sacramento's regional education pipeline for AI- and computing-related occupations is primarily concentrated at the bachelor's degree level, with approximately 705 awards conferred annually (Exhibit 23). Community colleges also contribute significantly to the workforce pipeline, awarding an average of 657 credentials per year in related fields. In contrast, other sub-baccalaureate institutions account for a minimal share of completions.

Exhibit 23. Educational supply for AI- and computing-related occupations by award and institution type



Conclusion and Recommendations

Key Findings

Strong and Sustained Regional Demand. The AI and Machine Learning (AI/ML) occupational cluster employs nearly 20,000 workers in Greater Sacramento and is projected to grow by 6% over the next five years, generating approximately 1,363 annual job openings.

High-Wage Occupations Exceed Living Wage Thresholds. Entry-level hourly wages across AI/ML occupations range from approximately \$34 to \$56 per hour—well above Sacramento County's living wage threshold of \$21.17 for a single adult—indicating strong economic potential.

Greater Sacramento's AI Job Demand Is Concentrated in Applied AI Skills. Job postings emphasize applied technical skills such as Python (45%), SQL (32%), cloud platforms (AWS 30%, Azure 28%), and DevOps tools, while advanced machine learning frameworks such as TensorFlow and PyTorch appear in fewer than 10% of postings. This suggests regional demand prioritizes AI implementation over AI model development.

AI Skills Are Embedded Across Mainstream Technology Roles. Seventy percent of postings reference Artificial Intelligence and 53% reference Machine Learning, demonstrating that AI literacy is broadly integrated into software development, data analytics, and systems roles rather than confined to specialized AI positions.

Bachelor's-Level Education Dominates Employer Preferences. Most postings (68%) specify a bachelor's degree as the preferred minimum education level, and many occupations within the cluster are classified as above-middle skill occupations requiring at least bachelor's-level preparation.

Current Postings Target Mid-Career Professionals. Experience requirements skew toward workers with 4–6 years (27%) or more than 10 years (19%) of experience, indicating demand for experienced professionals. This also suggests opportunities for incumbent worker upskilling.

A Substantial Regional Education Pipeline Exists. Four-year institutions in the region confer approximately 705 bachelor's degrees annually in computer science and related fields, while community colleges award an average of 657 computing-related credentials per year, contributing significantly to the regional workforce pipeline.

Community Colleges Play a Strategic Role in AI Workforce Development. Although most AI/ML occupations require bachelor's-level education, local employers emphasize technical skills that community colleges can provide through foundational programming, cloud, data analytics, and AI literacy training, as well as through transfer pathways into CSU and UC programs.

Recommendation

Based on the current analysis, the North Far North COE recommends that **community colleges exercise caution in developing or expanding programs focused on Artificial Intelligence and Machine Learning.** Greater Sacramento accounts for approximately 4% of California's AI jobs. Although regional demand is strong and wages exceed the living wage threshold, most AI/ML roles require bachelor's-level education and emphasize applied technical skills over advanced research-oriented model development.

Any new or modified AI and machine learning program in Greater Sacramento community colleges should prioritize foundational computing skills, data analytics, cloud-based AI tools, and AI implementation skill sets aligned with community college workforce and transfer missions.

North Far North COE also recommends Greater Sacramento community colleges:

- **Develop Applied AI programs or emphases within existing programs.** Examples can include AI & Data Analytics certificates, Applied AI for Cybersecurity, AI-Enhanced Software Development, etc. These certificates could potentially stack into existing programs in computer science, cybersecurity, and information technology.
- **Embed AI literacy across existing computing programs.** Given that AI skills are embedded in mainstream technology occupations, community colleges should ensure that AI tools are integrated into programming courses, add generative AI learning modules, teach API-based model deployment, and incorporate cloud AI services into their curriculum.
- **Focus on workforce-ready tools, including aligning existing curriculum with skills that are in high-demand in the region.** Greater Sacramento community colleges should align their curriculum with local demand for Python, SQL, cloud platforms, ETL & data pipelines, data visualization (Power BI and Tableau), and provide an introduction to machine learning concepts. Greater Sacramento community colleges should avoid overemphasizing deep theoretical AI research, advanced neural network design, and highly specialized academic

AI topics.

- **Support incumbent worker upskilling.** Given the mid-career experience requirements in job postings, Greater Sacramento community colleges should offer short-term AI upskilling certificates and stackable credentials in evening or online format to support incumbent worker upskilling. Greater Sacramento’s healthcare employers (including healthcare insurance companies) are likely strong contenders for partnerships.

New Program Recommendation		
Proceed	Use Caution	Do Not Proceed
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Support for Program Modification	
Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Appendix A. Methodology and Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Occupations were identified by using the Center of Excellence TOP-to-CIP-to-SOC Crosswalk: <http://coecc.net/>. This report's findings were primarily determined with labor market and educational supply data from the Bureau of Labor Statistics (BLS), the economic modeling firm and job postings aggregator Lightcast, and the California Community Colleges Chancellor's Office.

Data Sources

The following table summarizes the data sources used in this study.

Data Type	Source
Labor Market Information and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast's occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and non-QCEW employee classes of worker) and the American Community Survey (self-employed and extended proprietors). For more information, see https://lightcast.io/ .
Living Wage	The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual or family to afford basic expenses. The data assesses the cost of housing, food, childcare, health care, transportation, and taxes. The Chancellor's Office uses wage data to calculate the percentage of students that attained a regional living wage. For more information, https://selfsufficiencystandard.org/California/ .
Typical Education Level and On-the-job Training, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. 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 BLS publishes projections data. For more information, https://www.bls.gov/emp/documentation/education/tech.htm .
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledge areas, work activities, and interests associated with occupations. For more information, https://www.onetonline.org/help/online/ .
Labor Force, Employment and Unemployment Estimates	The California Employment Development Department's Labor Market Information Division is a source of labor market and workforce data. For more information, labormarketinfo.edd.ca.gov .
Educational Supply	<p>The CCCCO Management Information Systems (MIS) Data Mart provides information about students, courses, student services, outcomes, and faculty and staff. For more information, https://datamart.cccco.edu.</p> <p>The Chancellor's Office Curriculum Inventory System (COCI) collects data on courses and programs offered by the California Community Colleges. For more information, https://coci2.ccctechcenter.org/.</p> <p>The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data from providers of postsecondary education, including the number of postsecondary awards earned (completions). For</p>

	more information, https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions .
Student Metrics and Demographics	DataVista, a statewide data system supported by the Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, https://datavista.cccco.edu/ .

Living Wage

Beginning in October 2024, to determine if an occupation meets the living wage threshold, the NFN COE compared the 25th percentile hourly wage of an occupation in the subregion to the living wage for a single adult (no dependents) living in the county where the requesting community college district was located.

This change aligned with the Chancellor's Office methodology for calculating the share of students earning a living wage after leaving the California Community College system, as reported in the Data Vista living wage metric (802S). For details, see the *DataVista Metric Definition Dictionary*.

The NFN COE updated this practice as needed to remain consistent with the Chancellor's Office. The table below summarizes hourly living wages by community college district and county.

2024 Single Adult Living Wage			
Community College District	County	Hourly	Annual
Butte-Glenn	Butte	\$16.77	\$35,416
Feather River	Plumas	\$15.11	\$31,909
Lake Tahoe	El Dorado	\$22.11	\$46,703
Lassen	Lassen	\$14.81	\$31,274
Los Rios	Sacramento	\$21.17	\$44,709
Mendocino-Lake	Mendocino	\$17.06	\$36,039
Redwoods	Humboldt	\$16.59	\$35,046
Shasta-Tehama-Trinity Joint	Shasta	\$16.99	\$35,874
Sierra Joint	Placer	\$23.92	\$50,519
Siskiyou Joint	Siskiyou	\$14.51	\$30,639
Yuba	Sutter	\$17.08	\$36,074
California Minimum Wages			
All industries, except fast food and healthcare (Effective January 2025)		\$16.00	\$33,280

Fast food (Effective April 2024)	\$20.00	\$41,600
Healthcare (Effective October 2024)	\$18.00-\$23.00, depending on facility type	\$37,440-\$47,840

Sources: University of Washington Self Sufficiency Standard and State of California Department of Industrial Relations, "Minimum Wage," https://www.dir.ca.gov/dlse/minimum_wage.htm

For more information, contact:

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Important Disclaimer:

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