



Labor Market Analysis for Program Recommendation Artificial Intelligence Occupations Laney College

Prepared by the San Francisco Bay Center of Excellence for Labor Market Research

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Recommendation

Based on all available data, there appears to be an “undersupply” of Artificial Intelligence workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda, Contra Costa counties). There is a projected annual gap of about 20,644 students in the Bay region and 2,293 students in the East Bay Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0799.00 - Other Information Technology programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Laney College and in the region.

This report profiles Artificial Intelligence Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Laney College.

According to available labor market information, there is no single occupation for “artificial intelligence.” However, the occupations included in this report are ones that have a high number of online job postings when using “artificial intelligence” in a “keyword search.” Furthermore, the occupations in this report require a minimum of a bachelor’s degree (e.g., 97 percent of job postings list a bachelor’s degree or higher). Should regional community colleges recommend a new certificate program, Laney College should consider a target student market of individuals with bachelor’s degrees or incumbent workers in the occupations listed above.

- **Computer and Information Systems Managers (11-3021):** Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Excludes “Computer Occupations” (15-1111 through 15-1199).
Entry-Level Educational Requirement: Bachelor’s degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%
- **Software Developers (15-1252):** Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team.
Entry-Level Educational Requirement: Bachelor’s degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 11%

- **Data Scientists (15-2051):** Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets. Visualize, interpret, and report data findings.

May create dynamic data reports.

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 10%

Occupational Demand

Table 1. Employment Outlook for Artificial Intelligence Occupations in Bay Region

Occupation	2021 Jobs	2026 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer and Information Systems Managers	47,683	53,202	5,519	12%	23,768	4,754	\$79	\$101
Software Developers	136,967	162,457	25,490	19%	74,158	14,832	\$62	\$79
Data Scientists	8,897	10,860	1,963	22%	5,411	1,082	\$60	\$77
Total	193,548	226,519	32,971	17%	103,337	20,668		

Source: Lightcast 2022.3

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

Table 2. Employment Outlook for Artificial Intelligence Occupations in East Bay Sub-region

Occupation	2021 Jobs	2026 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer and Information Systems Managers	8,040	8,325	284	4%	3,262	652	\$70	\$88
Software Developers	17,343	18,777	1,434	8%	7,353	1,471	\$55	\$70
Data Scientists	1,650	1,878	228	14%	848	170	\$53	\$68
Total	27,033	28,980	1,946	7%	11,463	2,293		

Source: Lightcast 2022.3

East Bay Sub-Region includes: Alameda, Contra Costa Counties

Job Postings in Bay Region and East Bay Sub-Region

Table 3. Number of Job Postings by Occupation for latest 12 months (Apr. 2023 - Mar. 2024)

Occupation	Bay Region	East Bay
Software Developers	40,389	6,106
Data Scientists	9,367	1,521
Computer and Information Systems Managers	1,415	292

Source: Lightcast

**Table 4a. Top Job Titles for Artificial Intelligence Occupations for latest 12 months (Apr. 2023 - Mar. 2024)
Bay Region**

Title	Bay	Title	Bay
Software Engineers	3,474	Java Developers	606
Data Scientists	1,408	Infrastructure Software Engineers	602
Machine Learning Engineers	1,060	Software Development Engineers	539
Staff Software Engineers	916	Android Developers	531
Full Stack Software Engineers	903	Platform Software Engineers	516
Data Analysts	850	iOS Developers	509
Principal Software Engineers	840	Software Engineering Managers	501
DevOps Engineers	830	Machine Learning Software Engineers	471
Back End Software Engineers	737	Embedded Software Engineers	445

Source: Lightcast

**Table 4b. Top Job Titles for Artificial Intelligence Occupations for latest 12 months (Apr. 2023 - Mar. 2024)
East Bay Sub-Region**

Title	East Bay	Title	East Bay
Software Engineers	425	.NET Developers	72
iOS Developers	231	Embedded Software Engineers	72
Android Developers	204	Salesforce Developers	69
Data Scientists	174	Full Stack Java Developers	59
Data Analysts	152	Principal Software Engineers	58
Java Developers	131	Data and Analytics Consultants	57
DevOps Engineers	117	Software Development Engineers	57
Software Developers	96	Java Engineers	55
Full Stack Developers	74	Staff Software Engineers	54

Source: Lightcast

Industry Concentration

Table 5. Industries hiring Artificial Intelligence Workers in Bay Region

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2021)	Jobs in Industry (2026)	% Change (2021-26)	% Occupation Group in Industry (2022)
Custom Computer Programming Services	38,251	51,884	36%	21%
Software Publishers	24,032	31,521	31%	13%

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2021)	Jobs in Industry (2026)	% Change (2021-26)	% Occupation Group in Industry (2022)
Computer Systems Design Services	21,169	21,886	3%	10%
Web Search Portals and All Other Information Services	20,600	19,488	-5%	8%
Data Processing, Hosting, and Related Services	8,766	15,815	80%	6%
Electronic Computer Manufacturing	11,111	13,127	18%	5%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	5,367	7,255	35%	3%
Corporate, Subsidiary, and Regional Managing Offices	5,644	5,958	6%	3%
Media Streaming Distribution Services, Social Networks, and Other Media Networks and Content Providers	5,400	5,489	2%	2%
Research and Development in Biotechnology (except Nanobiotechnology)	3,106	4,174	34%	2%

Source: Lightcast 2022.3

Table 6. Top Employers Posting Artificial Intelligence Occupations in Bay Region and East Bay Sub-Region (Apr. 2023 - Mar. 2024)

Employer	Bay	Employer	East Bay
Apple	1,517	Tesla	180
Google	1,085	University of California	178
Meta	763	Lucid Motors	164
Nvidia	685	Kaiser Permanente	156
Walmart	682	Wells Fargo	133
Capital One	660	Workday	127

Source: Lightcast

Educational Supply

There is one (1) community college in the Bay Region issuing 24 awards on average annually (last 3 years ending 2021-22) on TOP 0799.00 - Other Information Technology. In the East Bay Sub-Region, there are no community colleges that issued awards on average annually (last 3 years) on this TOP code.

Table 7. Community College Awards on TOP 0799.00 - Other Information Technology in Bay Region

College	Subregion	Low unit Certificate	Total
Santa Rosa	North Bay	24	24
Total		24	24

Source: Data Mart

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

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 20,668 annual openings for the Artificial Intelligence occupational cluster and 24 annual (3-year average) awards for an annual undersupply of 20,644 students. In the East Bay Sub-Region, there is also a gap with 2,293 annual openings and no annual (3-year average) awards for an annual undersupply of 2,293 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0799.00 - Other Information Technology

Metric Outcomes	Bay All CTE Programs	Laney All CTE Programs	State 0799.00	Bay 0799.00	East Bay 0799.00	Laney 0799.00
Students with a Job Closely Related to Their Field of Study	74%	73%	71%	75%	N/A	N/A
Median Annual Earnings for SWP Exiting Students	\$53,090	\$47,158	\$46,188	\$48,630	\$35,134	N/A
Median Change in Earnings for SWP Exiting Students	24%	15%	13%	19%	16%	N/A
Exiting Students Who Attained the Living Wage	54%	54%	59%	47%	44%	N/A

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

Skills, Certifications and Education

Table 9. Top Skills for Artificial Intelligence Occupations in Bay Region (Apr. 2023 - Mar. 2024)

Skill	Posting	Skill	Posting
Computer Science	18,573	Application Programming Interface (API)	7,645
Software Engineering	17,525	Amazon Web Services	7,472
Python (Programming Language)	15,581	C++ (Programming Language)	7,364
Software Development	11,727	Algorithms	6,870
Java (Programming Language)	10,780	JavaScript (Programming Language)	6,591
Scalability	9,255	Automation	6,471
SQL (Programming Language)	9,013	Data Analysis	5,727
Machine Learning	7,937	Kubernetes	5,271
Debugging	7,883	Data Science	5,102
Agile Methodology	7,670	Microsoft Azure	4,580

Source: Lightcast

Table 10. Certifications for Artificial Intelligence Occupations in Bay Region (Apr. 2023 - Mar. 2024)

Certification	Posting	Certification	Posting
Security Clearance	493	Certified Information Systems Security Professional	141
Valid Driver's License	411	Functional Skills Qualification	131
Enterprise Desktop Administrator (Microsoft Certified IT Professional)	411	DO-178B/C (Software Considerations in Airborne Systems and Equipment Certification)	120
Master of Business Administration (MBA)	361	Oracle Certified Master (OCM)	104
Software Development Engineer in Test	337	Epic EMR Certification	89
Salesforce Certification	237	Microsoft Certified Professional	81
Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)	212	Salesforce Certified Administrator	75
Project Management Professional Certification	147	CompTIA Security+	72
Secret Clearance	144		

Source: Lightcast

Table 11. Education Requirements for Artificial Intelligence Occupations in Bay Region

Education Level	Job Postings	% of Total
High school or GED	600	1%
Associate degree	662	2%
Bachelor's degree & higher	47,409	97%

Source: Lightcast

Note: 40% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample.

Methodology

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

Sources

O*Net Online

Lightcast

CTE LaunchBoard www.calpassplus.org

Launchboard

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor's Office MIS system

Contacts

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