Geospatial Information

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

Summary

Geographic Information Systems

(TOP 2206.10)

Provides training for

- Surveying and Mapping Technicians

- Geological Technicians, Except Hydrologic Technicians
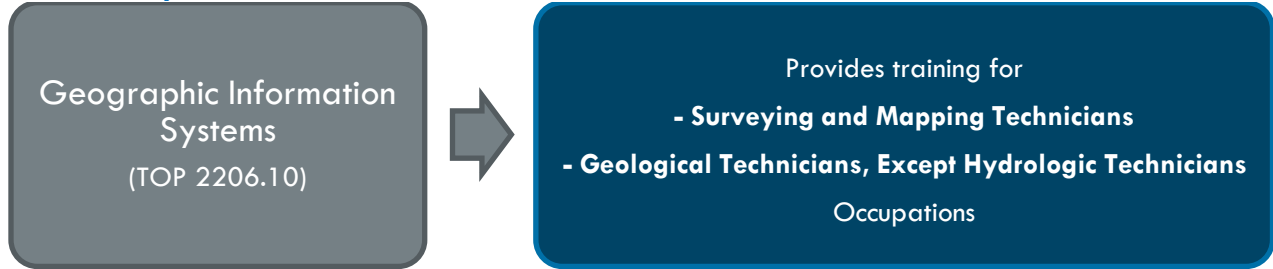
Occupations

Over the next five years (2022-2027), employment for the geospatial information occupational group is projected to:

Increase Employment by
11%

96
Annual Job Openings

Median Hourly Earnings
$23.97-$29.68

35 Total Annual Awards
In Geographic Information Programs

6
Program Awards from Community College Programs

29
Program Awards from Other Postsecondary Education Providers

The Inland Empire/Desert Centers of Excellence

Recommends

**geospatial/geographic information program
to meet the need for more workers in the region**

Introduction

California Community College geographic information systems programs (TOP 2206.10) prepare students for employment through the instruction of computer-based tools for acquiring, editing, storing, analyzing, and visualizing geographically referenced information, with applications in research, education, management, and planning. Includes Global Positioning System (GPS) (Taxonomy of Programs, 2023). The knowledge, skills, and abilities trained by geographic information systems programs lead to employment in the following occupations, further referred to as the geospatial information occupational group:

Established occupations:

- Surveying and Mapping Technicians (SOC 17-3031)
- Geological Technicians, Except Hydrologic Technicians (19-4043)

Emerging occupations:

- Geographic Information Systems Technologists and Technicians (15-1299.02)
- Remote Sensing Technicians (19-4099.03)

Job Demand

In 2022, there were 658 jobs in the geospatial information occupational group in the Inland Empire/Desert Region. Regional employment for this occupational group is projected to increase by 11% through 2027; 96 job openings are projected annually. Exhibit 1 displays the job counts, five-year projected job growth, and job openings in the region.

Exhibit 1. Five-year projections for the geospatial information occupational group, Inland Empire/Desert Region, 2022-2027

Occupation	2022 Jobs	2027 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)
Surveying and Mapping Technicians	481	539	12%	374	75
Geological Technicians, Except Hydrologic Technicians	177	190	7%	108	22
Total	**658**	**729**	**11%**	**482**	**96**

Source: Lightcast 2023.3

An online job ad search for the geospatial information occupational group was conducted to reveal the employers seeking these workers, including the median posting duration, earnings information, and in-demand skills. Exhibit 2 displays the number of job ads posted for the geospatial information occupational group over the last 12 months and the median posting duration. Over the previous 12 months, there were 145 job ads for the geospatial information occupational group in the region.

Exhibit 2. Job ads and posting duration, Inland Empire/Desert Region, October 2022 through September 2023

| Occupation	Job Ads	Median Posting Duration (Days)
Geographic Information Systems Technologists and Technicians	58	32
Surveying and Mapping Technicians	44	26
Geological Technicians, Except Hydrologic Technicians	42	25
Remote Sensing Technicians	1	28

Source: Lightcast 2023.3

Earnings

The living wage for one adult in the Inland Empire (Riverside and San Bernardino Counties) is $14 per hour or $29,120 annually. Exhibit 3 displays the hourly earnings for the geospatial information occupational group. Both occupations have entry-level and experienced hourly wages above the living wage estimate.

Exhibit 3. Hourly earnings by percentile for the geospatial information occupational group, Inland Empire/Desert Region, 2022


	Pct. 10 Hourly Earnings	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings	Pct. 90 Hourly Earnings
Surveying and Mapping Technicians	$17.71	$23.00	$29.68	$38.18	$49.43
Geological Technicians, Except Hydrologic Technicians	$16.46	$22.33	$23.97	$29.78	$35.49

- Surveying and Mapping Technicians
- Geological Technicians, Except Hydrologic Technicians
- MIT Living Wage ($14)
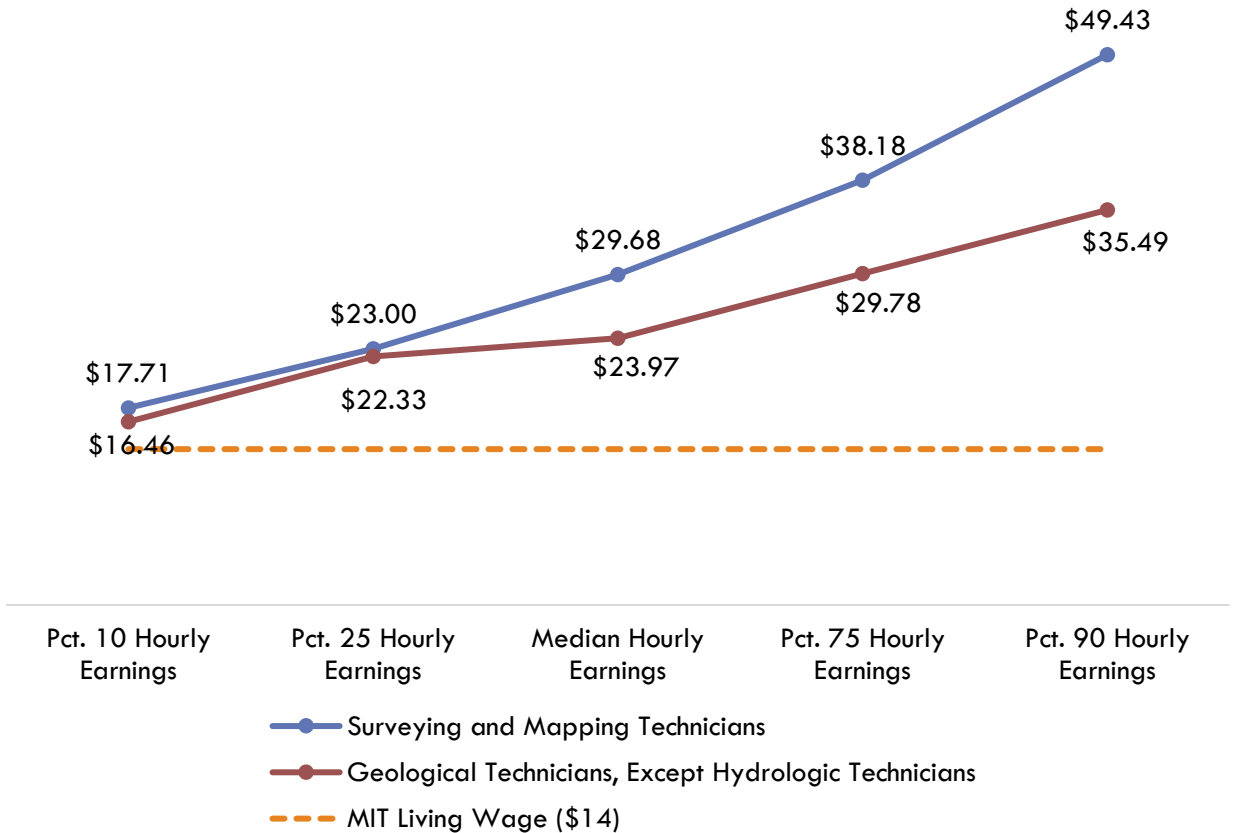
Source: Lightcast 2023.3

Advertised Salary from Online Job Ads

Exhibit 4 displays the regional online advertised salaries for the geospatial information occupational group over the last 12 months. Online job ads salary information reveals that the majority of employers advertise an annual salary between $43,000 and $67,000.

Exhibit 4. Online advertised salaries for the geospatial information occupational group, Inland Empire/Desert Region, October 2022 through September 2023
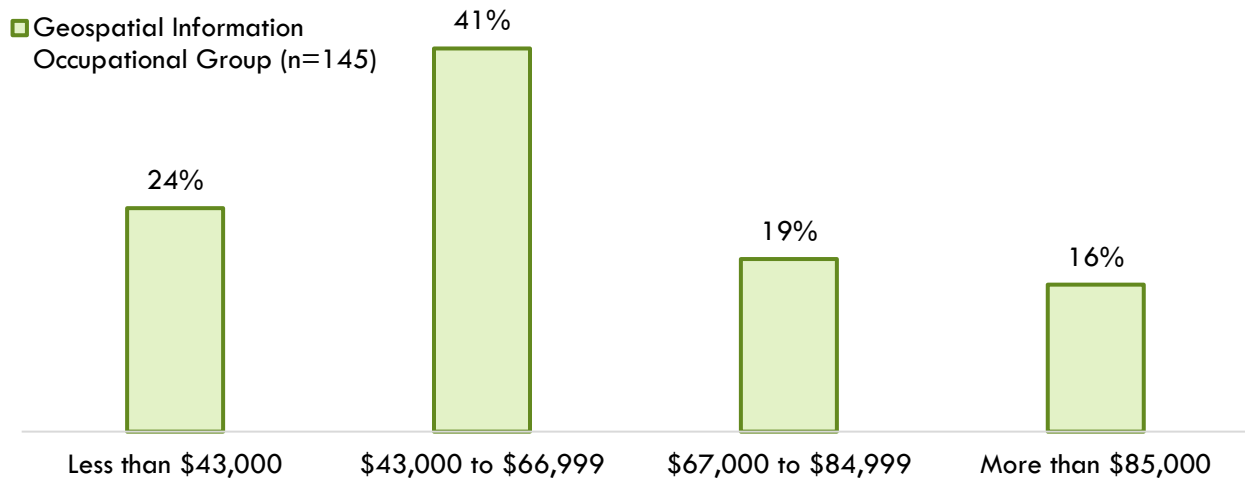
Source: Lightcast 2023.3

Online Job Advertisements: Job Titles, Employers, Skills, Education, & Work Experience

Exhibit 5 displays the job titles most frequently used in geospatial information job ads over the last 12 months.

Displaying advertised job titles may provide insight into the types of positions sought by employers.

Exhibit 5. Job titles most frequently used in geospatial information job ads, Inland Empire/Desert Region, October 2022 through September 2023

Job Titles	Unique Job Ads
Survey Technicians	15
Geographic Information Systems Specialists	12
Technical Operators	9
GIS Specialists	7
GIS Analysts	7
Hazardous Materials Technicians	5
Industry Solutions Managers	5
Materials Technicians	5
Field Locators	4
Mapping Technicians	4

Source: Lightcast 2023.3

Exhibit 6 displays the employers posting the most job ads for the geospatial information occupational group during the last 12 months. Showing employer names provides insight into where students may find employment after completing a program. Esri posted the most job ads for the geospatial information occupational group over the last 12 months.

Exhibit 6. Employers posting the most job ads for geospatial information occupational group, Inland Empire/Desert Region, October 2022 through September 2023

Top Employer	Unique Job Ads
Esri	14
San Bernardino County	16
Tosca	6
Par Western Line Contractors	4
Flag Solutions	4
Sunrun	4

Source: Lightcast 2023.3

Exhibit 7 lists a sample of specialized and employability skills employers seek when seeking workers to fill geospatial information positions. Specialized skills are occupation-specific skills that employers request for industry or job competency. Common 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 7. Sample of in-demand skills from employer job ads, Inland Empire/Desert Region, October 2022 through September 2023

Specialized skills	Common skills
• Geographic Information Systems	• Communications
• ArcGIS (GIS Software)	• Customer Service
• Surveying	• Research
• Computer Science	• Operations
• Map Production	• Planning
• Cartography	• Time Management
• Data Entry	• Writing
• Project Management	• Management
• Field Notes	• Information Technology
• ArcMap	• Organizational Skills

Source: Lightcast 2023.3

Exhibit 8 displays the minimum advertised education requirements for the geospatial information occupational group. According to the Bureau of Labor Statistics, between 34% and 55% of incumbent workers in this field hold a community college-level of educational attainment; "some college, no degree," and an "associate degree." Most employer job ads (45%) sought a candidate holding a bachelor's degree as a minimum education level requirement.

Exhibit 8. Minimum advertised education requirements, Inland Empire/Desert Region, October 2022 through September 2023

Bachelor's degree — 45%
Associate degree — 11%
High school or GED — 44%

☐ Geospatial Information Occupational Group (n=82)
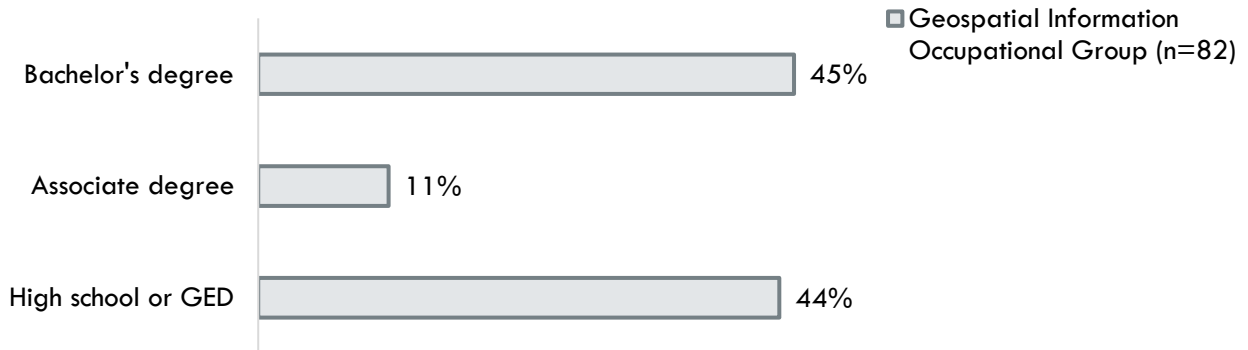
Source: Lightcast 2023.3

Exhibit 9 displays the work experience typically required from employer job ads for the geospatial information occupational group. Approximately half of employers listing minimum experience requirements sought candidates with two to three years of previous work experience.

Exhibit 9. Real-time work experience requirements, Inland Empire/Desert Region, October 2022 through September 2023

☐ Geospatial Information Occupational Group (n=101)

0 to 1 year — 32%
2 to 3 years — 49%
4 to 6 years — 15%
7 to 9 years — 5%
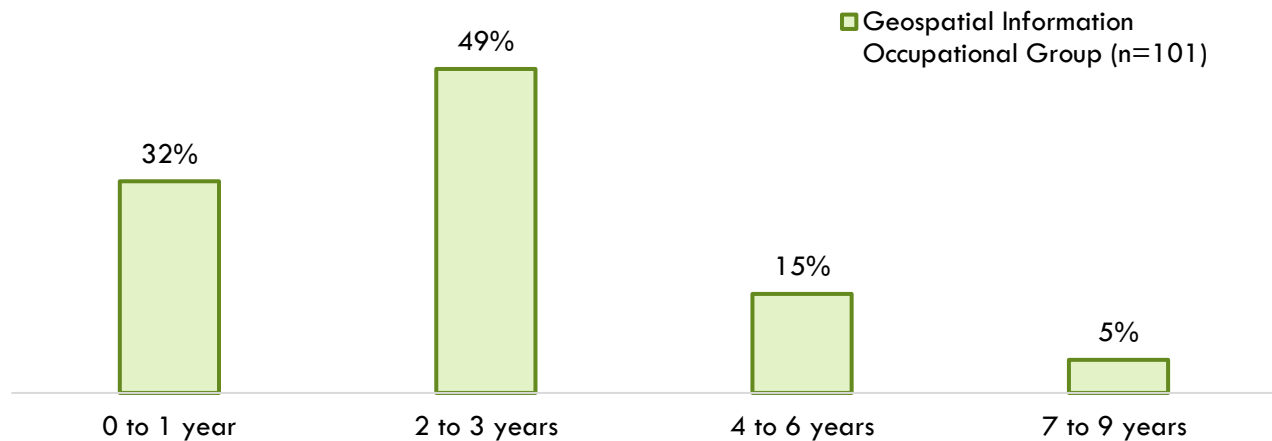
Source: Lightcast 2023.3

Certifications

Exhibit 10 displays the most frequently requested certifications by employers in job advertisements.

Job advertisements reveal that employers value the 10-hour OSHA General Industry Card certification.

Exhibit 10: Certifications most frequently required by employers, Inland Empire/Desert Region, October 2022 through September 2023

Certification	Jobs Ads
10-Hour OSHA General Industry Card	6
Drone Pilot Certificate	6
Hazardous Materials Certification – Technician Level	5
Land Surveyor in Training	5
30-Hour OSHA General Industry Card	4

Source: Lightcast 2023.3

Student Completions and Programs Outcomes

Exhibit 11 displays student completions for the geographic information systems (TOP 2206.10) program over the last three academic years (2019-22). In the previous three academic years, two regional community colleges issued six annual average awards.

Exhibit 11. Annual average community college awards for geographic information systems programs, Inland Empire/Desert Region, Academic Years 2019-2022

TOP Code	Program	College	2019-20 Awards	2020-21 Awards	2021-22 Awards	3-Year Award Average
2206.10	Geographic Information Systems	Mt. San Jacinto	-	1	-	0
		San Bernardino	2	7	9	6
		Supply Total/Average	**2**	**8**	**9**	**6**

Source: MIS Data Mart

California program outcome data may provide 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 12.

Exhibit 12. 2206.10 – Geographic information systems strong workforce program outcomes, Inland Empire/Desert Region, most recent academic year

Strong Workforce Program Metrics: 2206.10 – Geographic Information Systems	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2021-22)	101	2,147
Completed 9+ career education units in one year (2021-22)	25%	23%
Students who attained a noncredit workforce milestone in a year (2021-22)	Insufficient Data	26%
Students who earned a degree, certificate, or attained apprenticeship (2021-22)	Insufficient Data	95
Job closely related to the field of study (2019-20)	Insufficient Data	75%
Median annual earnings (all exiters) (2020-21)	$60,000	$54,768
Median change in earnings (all exiters) (2020-21)	11%	27%
Attained a living wage (completers and skills-builders) (2020-21)	95%	69%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 13 displays awards for other postsecondary education providers reported in geographic information science and cartography programs. Completion data is compiled from the Integrated Postsecondary Education Data System (IPEDS) for the most recent two years. Two non-community college institutions issued an average of 29 awards over the last two academic years.

Exhibit 13. Other educational providers for geographic information science and cartography programs, two-year annual average credentials, Inland Empire/Desert Region, Academic Years 2019-2021

CIP Code	Program	Institution	2019-20 Awards	2020-21 Awards	2-Year Award Average
45.0702	Geographic Information Science and Cartography	Loma Linda University	-	1	1
		University of Redlands	34	22	28
		Supply Total/Average	**34**	**23**	**29**

Source: IPEDS

Summary of Findings & Recommendation

Over the next five years, the geospatial information occupational group is projected to have 96 annual job openings and increase employment by 11% in the Inland Empire/Desert Region. Both occupations have entry-level and experienced hourly wages above the living wage estimate.

Over the last three academic years, two regional community colleges issued six annual average awards in geographic information systems programs. Another two non-community college postsecondary education institutions issued 29 annual average awards in geographic information science and cartography programs. Combined, all regional postsecondary education institutions issued 35 awards annually, on average.

The Centers of Excellence finds that there is a regional need for a geospatial/geographic information program to meet the regional demand for more workers. Colleges considering this program should partner with applicable employers to document their demand for workers and the skills/certifications required for students to earn a living wage after exiting the program.

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References

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Appendix: Methodology

Exhibit 11 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2019 and 2022 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total 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. 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, 2023a). 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, 2023a).

Table 1. 2022 to 2027 job growth, wages, entry-level education, training, and work experience required for the geospatial information occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino Counties combined)

Occupation (SOC)	2022 Jobs	5-Year Change	5-Year % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10th to 90th percentile)	Median Hourly Wage (50th percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Surveying and Mapping Technicians (17-3031)	481	58	12%	75	$17.71 to $49.43	$29.68	$67,232	High school diploma or equivalent & Moderate-term	None
Geological Technicians, Except Hydrologic Technicians (19-4043)	177	13	7%	22	$16.46 to $35.49	$23.97	$52,728	Associate degree & Moderate-term	None
Total	**658**	**71**	**11%**	**96**	-	-	-	-	-

Source: Lightcast 2023.3