



## Geographic Information Systems (TOP: 2206.10)

April 2019

Prepared by the South Central Coast Center of Excellence for Labor Market Research

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### Program Recommendation

This report was compiled by the South Central Coast<sup>1</sup> Center of Excellence to provide regional labor market data for the program recommendation – Geographic Information Systems Certificate of Achievement. This report can help determine whether there is demand in the local labor market that is not being met by the supply from programs of study (CCC and non-CCC) that align with this occupation group.

### Key Findings

- In the South Central Coast region, the number jobs related to Geographic Information Systems is expected to remain steady over the next five years.
- All occupations examined are at low risk of automation.
- In 2017 there were 591 regional completions in programs related to the occupations identified as related to Geographic Information Systems and 216 job openings, indicating an over-supply in this field within the region.
- Typical entry-level education ranges from a high school diploma or equivalent for Surveying and Mapping Technicians, to Bachelor's degrees for all other occupations.
- Completers of regional Geographic Information Systems programs (TOP 2206.10) from the 2015-2016 academic year had a median annual wage upon completion of \$42,337.
- 93% of students are earning a living.
- 87% of students are employed within a year after completing a program.

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<sup>1</sup> The South Central Coast Region consists of San Luis Obispo County, Santa Barbara County, Ventura County, and the following cities from North Los Angeles County: Canyon Country, Castaic, Lake Hughes, Lancaster, Littlerock, Llano, Newhall, Palmdale, Pearblossom, Santa Clarita, Stevenson Ranch, and Valencia.

## Occupation Codes and Descriptions

Currently, there are five occupations in the standard occupational classification (SOC) system that are related to Geographic Information Systems, however, due to the limitations of the data available from EMSI, two of the related occupations will be categorized together as one. The occupation titles and descriptions, as well as reported job titles are included in Exhibit 1.

**Exhibit 1 – Occupation, description, and sample job titles**

SOC Code	Title	Description	Sample of Reported Job Titles
15-1199	Computer Occupations, All Other (Geospatial Information Scientists and Technicians 15-1199.04 and Geographic Information Systems Technician 15-1199.05)	<p>Research or develop geospatial technologies. May produce databases, perform applications programming, or coordinate projects. May specialize in areas such as agriculture, mining, health care, retail trade, urban planning, or military intelligence.</p> <p>Assist scientists, technologists, or related professionals in building, maintaining, modifying, or using geographic information systems (GIS) databases. May also perform some custom application development or provide user support.</p>	<p>Geographic Information System Analyst (GIS Analyst), Geographic Information Systems Administrator (GIS Administrator), Geographic Information Systems Analyst (GIS Analyst), Geographic Information Systems Coordinator (GIS Coordinator), Geographic Information Systems Director (GIS Director), Geographic Information Systems Manager (GIS Manager), Geographic Information Systems Specialist (GIS Specialist), Geospatial Intelligence Subject Matter Expert, Geospatial Program Management Officer, Resource Analyst</p>
17-1021	Cartographers and Photogrammetrists	<p>Collect, analyze, and interpret geographic information provided by geodetic surveys, aerial photographs, and satellite data. Research, study, and prepare maps and other spatial data in digital or graphic form for legal, social, political, educational, and design purposes. May work with Geographic Information Systems (GIS). May design and evaluate algorithms, data structures, and user interfaces for GIS and mapping systems.</p>	<p>Aerial Photogrammetrist, Cartographer, Cartographic Designer, Compiler, Digital Cartographer, Mapper, Photogrammetric Technician, Photogrammetrist, Stereo Compiler, Stereoplotter Operator</p>
17-3031	Surveying and Mapping Technicians (Mapping Technicians 17-3031.02)	<p>Perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of maps.</p>	<p>Aerotriangulation Specialist, CAD Technician (Computer Aided Design Technician), Geospatial Analyst, Mapping Editor, Mapping Technician, Photogrammetric Compilation Specialist, Photogrammetric Stereo Compiler, Photogrammetric Technician, Stereoplotter Operator, Tax Map Technician</p>

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19-2099	Physical Scientists, All Other  (Remote Sensing Scientists and Technologists 19- 2099.01)	All physical scientists not listed separately.  Apply remote sensing principles and methods to analyze data and solve problems in areas such as natural resource management, urban planning, or homeland security. May develop new sensor systems, analytical techniques, or new applications for existing systems.	Data Analytics Chief Scientist, Geospatial Intelligence Analyst, Professor, Remote Sensing Analyst, Remote Sensing Program Manager, Remote Sensing Scientist, Research and Development Director (R&D Director), Research Scientist, Scientist, Sensor Specialist
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Source: O\*NET Online

## Current and Future Employment

In the South Central Coast region, the number jobs related to Geographic Information Systems is expected to remain steady over the next five years. Exhibit 2 contains detailed employment projections data for these occupations.

**Exhibit 2 – Five-year projections for Geographic Information Systems in the South Central Coast region**

SOC	Occupation	2018 Jobs	2023 Jobs	2018-2023 Change	2018-2023 % Change
15-1199	Computer Occupations, All Other	1,927	1,990	63	3%
17-1021	Cartographers and Photogrammetrists	102	109	7	7%
17-3031	Surveying and Mapping Technicians	223	231	8	4%
19-2099	Physical Scientists, All Other	205	204	-1	0%

Source: Economic Modeling Specialists International (EMSI)

## Earnings

In the South Central Coast region, the average wage for the listed occupations is \$38.91 per hour.

Exhibit 3 contains hourly wages and annual average earnings for this occupation. Entry-level hourly earnings is represented by the 25<sup>th</sup> percentile of wages, median hourly earnings is represented by the 50<sup>th</sup> percentile of wages, and experienced hourly earnings is represented by the 75<sup>th</sup> percentile of wages, demonstrating various levels of employment.

**Exhibit 3 – Earnings for Geographic Information Systems in the South Central Coast region**

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
15-1199	Computer Occupations, All Other	\$27.60	\$39.63	\$51.80
17-1021	Cartographers and Photogrammetrists	\$23.40	\$32.54	\$42.29
17-3031	Surveying and Mapping Technicians	\$23.42	\$27.21	\$34.31
19-2099	Physical Scientists, All Other	\$42.01	\$53.94	\$63.02

Source: Economic Modeling Specialists International (EMSI)

## Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is employing geographic information system related workers, and what they are looking for in potential candidates. To identify job postings related to Geographic Information Systems, the following standard occupational classifications were used:

15-1199.04	<b>Geospatial Information Scientists and Technicians</b>
15-1199.05	<b>Geographic Information Systems Technicians</b>
17-1021	<b>Cartographers and Photogrammetrists</b>
17-3031.02	<b>Mapping Technicians</b>
19-2099.01	<b>Remote Sensing Scientists and Technologists</b>

## Top Occupations

In 2018, there were 31 employer postings for occupations related to Geographic Information Systems.

**Exhibit 4 – Top occupations in job postings and risk of automation tables**

SOC Code	Occupation	Job Postings, Full Year 2018
15-1199.04	Geospatial Information Scientists and Technicians	13
19-2099.01	Remote Sensing Scientists and Technologists	7
15-1199.05	Geographic Information Systems Technician	6
17-3031.02	Mapping Technicians	5
17-1021	Cartographers and Photogrammetrists	0

Source: Labor Insight/Jobs (Burning Glass)

SOC Code	Occupation	Risk of Automation
15-1199.04	Geospatial Information Scientists and Technicians	Low
19-2099.01	Remote Sensing Scientists and Technologists	Low
15-1199.05	Geographic Information Systems Technician	Low
17-3031.02	Mapping Technicians	Low
17-1021	Cartographers and Photogrammetrists	Low

### Top Titles

The top job titles for employers posting ads for jobs related to Geographic Information Systems are listed in Exhibit 5. GIS Analysts are the most sought after, with over 22% of postings including GIS Analyst in the title (7 postings).

**Exhibit 5 –Job titles**

<b>Title</b>	<b>Job Postings, Full Year 2018</b>
Geographic Information Systems (GIS) Analyst	7
Remote Sensing Specialist	7
Field Technician	3
GIS Related Content	2
Mapping Technician	2
GIS Developer	1

Source: Labor Insight/Jobs (Burning Glass)

### Top Employers

Exhibit 6 lists the major employers hiring professionals in the field of Geographic Information Systems. The top employer posting job ads was Boston Scientific Corporation. Over 33% of postings did not list the employer. The top worksite cities in the region for these occupations were Oxnard, San Luis Obispo, Ventura, Santa Barbara, and Santa Clarita.

**Exhibit 6 – Top employers (n=21)**

<b>Employer</b>	<b>Job Postings, Full Year 2018</b>
Boston Scientific Corporation	3
Cannon	3
Quinn Company	3
Lowe's Companies Inc	2
Premise Health	2

Source: Labor Insight/Jobs (Burning Glass)

**Skills**

ArcGIS is the most sought after skill for employers hiring Geographic Information Systems related workers.

**Exhibit 7 – Job skills (n=27)**

Skills	Job Postings, Full Year 2018
ArcGIS	9
Global Positioning System (GPS)	9
AutoCAD	8
Geographic Information System (GIS)	8
Budgeting	7

Source: Labor Insight/Jobs (Burning Glass)

**Industry Concentration**

Exhibit 9 shows the industries where most working in the Geographic Information Systems field are employed in the South Central Coast region. Note: 52% of records have been excluded because they do not include an industry. As a result, the chart below may not be representative of the full sample.

**Exhibit 9 – Industries employing the most Geographic Information Systems related workers, 2018**

Industry	Occupation Group Jobs in Industry	% of Occupation Group in Industry
Professional, Scientific, and Technical Services	5	33%
Administrative and Support and Waste Management and Remediation Services	3	20%
Wholesale Trade	3	20%
Healthcare and Social Assistance	2	13%
Retail Trade	2	13%

## Education and Training

Exhibit 10 shows the typical entry-level education requirement for the occupation of interest, along with the typical on-the-job training needed to attain competency in the occupation.

**Exhibit 10 – Education and training requirements**

SOC	Occupation	Typical entry-level education	Typical on-the-job training
15-1199	<b>Computer Occupations, All Other</b>	Bachelor's Degree	None
17-1021	<b>Cartographers and Photogrammetrists</b>	Bachelor's Degree	None
17-3031	<b>Surveying and Mapping Technicians</b>	High school diploma or equivalent	Moderate-term on-the-job training
19-2099	<b>Physical Scientists, All Other</b>	Bachelor's Degree	None

Source: Bureau of Labor Statistics Employment Projections (Educational Attainment)

## Regional Completions and Openings

There were 591 regional completions (2017) and 216 regional openings (2017) in the South Central Coast region for programs related to Geographic Information Systems.

**Exhibit 11 – Completions and Openings**

<b>7</b> Related Programs (2017)	<b>591</b> Regional Completions (2017)	<b>216</b> Annual Openings (2017)
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Source: Economic Modeling Specialists International (EMSI)

## Related Programs

CIP Code	Program	Completions (2017)
11.0701	Computer Science	499
45.0702	Geographic Information Science and Cartography	56
11.0101	Computer and Information Sciences, General	15
15.0000	Engineering Technology, General	10
11.0401	Information Science/Studies	6
15.1102	Surveying Technology/Surveying	5
30.1801	Natural Sciences	0



## Student Outcomes

The CTE LaunchBoard provides student outcome data on the effectiveness of CTE programs. In the South Central Coast region, 46 students took courses in Geographic Information Systems (TOP 2206.10) during the 2015-16 academic year.

- The median annual wage for students after exiting is \$42,337
- Starting salary in the region for Surveying and Mapping Technicians is \$46,571
- 93% of students are earning a living wage
- 87% of students are employed within a year after completing a program
- Students who transfer and earn a bachelor's degree could pursue the following careers:
  - Computer Occupations, All Other

Source: CTE LaunchBoard

## Sources

O\*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, CTE LaunchBoard, Statewide CTE Outcomes Survey, Employment Development Department Unemployment Insurance Dataset

## Notes

Data included in this analysis represents the labor market demand for positions most closely related to Geographic Information Systems. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study and should not be used to establish current job openings, because the numbers may include duplicate job postings or postings intended to gather a pool of applicants. Real-time labor market information can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.