Geospatial Tech & Data Sci-FH Geospatial Tech

Instructional Discipline Template
A. Program Information
Program Mission Statement

Please enter your mission statement here.

Geospatial technology is the unifying tool that explores spatial phenomena. Geospatial technology consists of Geographic Information Systems, Global Positioning Systems and Remote Sensing. The Geographic Information Systems Technology program at Foothill College provides opportunities for all students to gain career preparation and lifelong learning by providing courses that meet workforce needs, and aligns with the U.S. Department of Labor geospatial competency model for geospatial careers. Geographic Information Systems are collections of computers and software applications used to capture, store, transform, manage, analyze and display spatial information. The associate degree provides a solid technical background in geographic information systems concepts and applications including cartographic concepts, database design, programming and interdisciplinary applications of the technology. The Geographic Information Systems Technology degree prepares students for entry-level technician jobs and meets workforce needs. The stacked certificates of achievement help professionals transition to new roles in the workforce or advance in their current profession.

Program Level Student Learning Outcomes

Please list the program level student learning outcomes.

-Students will be able to apply cartographic principles of scale, resolution, projection, data management and spatial analysis to a problem of a geographic nature using a geographic information system.
-Students will be able to plan, evaluate and execute an original geographic information systems project.
-Students will be able to demonstrate the ability to communicate orally, in writing and graphically, the outcome of geographic information systems analysis.
-Students will be able to demonstrate an awareness of professional obligations to society, employers and funders and individuals as outlined in the Geographic Information Systems Professional Certification Institute Code of Ethics.

B. FTES - Enrollment Trends
Enrollment Variables and Trends

Enrollment Trends
Business & Social Sciences - Geospatial Tech & Data Sci-FH

	2015-16	2016-17	2017-18	2018-19	2019-20	5-yr %Inc
Unduplicated Headcount	65	67	47	130	146	124.6%
Census Enrollment	198	152	79	266	280	41.4%
Sections	9	9	5	9	8	-11.1%
WSCH	326	243	135	392	394	21.0%
FTES (end of term)	22	16	9	26	26	21.9%
FTEF (end of term)	1.0	1.0	0.4	0.9	0.8	-15.3%
Productivity (WSCH/FTEF)	333	248	317	450	476	42.8%

1. In the data table above, what does the FTES data trend indicate?

☑   the data trend shows an increase in FTES

☐   the data trend shows a decrease in FTES

☐   the data trend shows no change and/or is flat in FTES

Discuss the factors that would help the college understand these trends and whether there are tangible reasons for no change/flat, an increase or decrease in the trend.

> The Geospatial Technology program has weathered several major transitions in the past five years. The program shifted its offerings to the Sunnyvale Center when it opened in Fall of 2016. The program suffered a decline in enrollment in the subsequent years. Anecdotally this may have been due to the difficulty in accessing the Sunnyvale Center for evening classes due to gridlock traffic in its 101/237 location. On the advice of its advisory board, in fall of 2018 the GIST program moved 100% online. This has drastically increased program enrollment and productivity. The program is dominated by lab-based classes that have a limited seat count of 35, effectively capping possible productivity.

2. Looking at the data trend, has the faculty/staff discussed proposed actions to stabilize/increase FTES?

☑   yes

☐   no

If yes, describe the proposed actions for stabilizing/increasing the FTES.

> The faculty, in consultation with the professional advisory board, moved the program online in fall 2018. This was possible with the support of ETS who provided cloud-based "virtual desktops" that students can login to remotely and run the specialized GIS software. The GIS software requires robust PC computers, and the cloud-based virtual desktops allow students on any computer platform to run the software if they have a strong and stable internet connection. If students own robust PC computers they also have the option to download and run the GIS software on their own computer thanks to the college site license for the GIS software. The action proposed to stabilize/increase FTES is to additional sections of GIST 11 and GIST 12, the two "gateway" courses to the program. GIST 11 is entirely lecture, so has higher productivity which stands to benefit the program. The faculty will continue multi-pronged outreach efforts also.

C. Sections - Enrollment Trends

1. In the data table above, what does the data trend indicate about the number of sections offered?

☐   the data trend shows an increase in sections

☐   the data trend shows a decrease in sections

☑   the data trend shows no change and/or is flat in sections

If the data trend shows no change/flat or an increase or decrease in sections, explain why the number of sections is flat, increased or decreased.

> The GIST program in the past 5 years offered the minimum number of sections required to allow students to earn their degree or certificate. The increase in WSCH and productivity is the result of these classes being fully enrolled. It is the goal of the program to offer additional sections of the "gateway" classes, GIST 11 and 12 to increase interest in the program. In addition, GIST 11 and 12 are required for several AA and AA-T degrees, so also attract transfer students who do not intend to earn a CTE certificate. It is the goal of the program to run two to three full sections annually of the two introductory classes (GIST 11 and GIST 12), with an aim to fill the advanced program classes after natural attrition. The program is small (under 50 FTES) and is intended to remain small, as this satisfies the demands of regional workforce.

If the data indicates an increase in sections with a decrease in FTES, explain why the number of sections increased while FTES decreased.

> N/A

D. Productivity - Enrollment Trends

1. In the data table above, what does the data trend indicate about the productivity number?

☑   the data trend shows the productivity number increased

☐   the data trend shows the productivity number decreased

☐   the data trend shows no change and/or flat in the productivity number

If the data trend shows no change/flat or an increase or decrease in productivity, explain why the productivity is flat, increased or decreased.

> The productivity has increased over the five year period due to the program's move online. The target student based for this program is the upskilling working professional. The move to an online format has increased access to the classes, thereby increasing productivity. Previously the face to face location of the program limited enrollment because of difficulty accessing the campus for evening classes. The "anytime/anywhere" nature of asynchronous online instruction better meets the needs of this student population.

2. Does the data trend suggest changes are necessary to improve productivity?

☐   yes

☑   no

If yes, describe the proposed actions for stabilizing/increasing the productivity number.

> N/A

E. Enrollment by Student Demographics
Enrollment Distribution

Enr Distribution by Student Demographics
Business & Social Sciences - Geospatial Tech & Data Sci-FH

by Gender

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent
Female	97	49%	80	53%	40	51%	133	50%	135	48%
Male	100	51%	72	47%	39	49%	132	50%	139	50%
Not Reported	1	1%	0	0%	0	0%	1	0%	6	2%
Total	198	100%	152	100%	79	100%	266	100%	280	100%

by Ethnicity

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent
African American	1	1%	6	4%	0	0%	3	1%	4	1%
Asian	53	27%	42	28%	12	15%	57	21%	46	16%
Filipinx	12	6%	3	2%	2	3%	14	5%	14	5%
Latinx	36	18%	34	22%	17	22%	38	14%	39	14%
Native American	3	2%	0	0%	0	0%	1	0%	7	3%
Pacific Islander	0	0%	0	0%	3	4%	1	0%	6	2%
White	86	43%	60	39%	41	52%	144	54%	133	48%
Decline to State	7	4%	7	5%	4	5%	8	3%	31	11%
Total	198	100%	152	100%	79	100%	266	100%	280	100%

by Age

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent
19 or less	0	0%	0	0%	0	0%	7	3%	4	1%
20-24	14	7%	30	20%	25	32%	68	26%	52	19%
25-39	139	70%	87	57%	32	41%	134	50%	160	57%
40 +	45	23%	35	23%	22	28%	57	21%	64	23%
Total	198	100%	152	100%	79	100%	266	100%	280	100%

by Education Level

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent
Bachelor or higher	164	83%	106	70%	50	63%	189	71%	185	66%
Associate	1	1%	6	4%	3	4%	9	3%	24	9%
HS/Equivalent	32	16%	38	25%	26	33%	65	24%	64	23%

All Other	1	1%	2	1%	0	0%	3	1%	7	3%
Total	198	100%	152	100%	79	100%	266	100%	280	100%

a. Enrollment by Gender

The following questions concern enrollment distribution by gender.

1. In the data table above, what does the data trend indicate about program enrollment by gender?

Females

- ☐   the data trend shows an increase in the female enrollment rates
- ☐   the data trend shows a decrease in the female enrollment rates
- ☑   the data trend shows no change and/or is flat in the female enrollment rates

Males

- ☐   the data trend shows an increase in the male enrollment rates
- ☐   the data trend shows a decrease in the male enrollment rates
- ☑   the data trend shows no change and/or is flat in the male enrollment rates

Non-Binary

- ☐   the data trend shows an increase in the non-binary enrollment rates
- ☐   the data trend shows a decrease in the non-binary enrollment rates
- ☑   the data trend shows no change and/or is flat in the non-binary enrollment rates

If the data trend shows no change/flat, an increase or decrease in male, female, or non-binary enrollment, explain why the enrollment rates is flat, increased, or decreased.

> The data shows approximate 50%-50% male to female ratios in the GIST program. This is remarkable because industry-wide GIST is approximately 65% male. The equitable distribution of genders in the Foothill College GIST program is a positive reflection of the program and college's emphasis on gender equity.

2. Does your program differ in the percentage of males to females, in this most recent year, compared to the College? (College 2019-20 = 51% Female, 47% Male)

- ☐   yes
- ☑   no

If the data indicates a lack of gender parity in your program as compared to the college percentages, what is the source of that disparity and what proposed/planned actions is the program taking to achieve parity?

> N/A

Data Table for Enrollment by Gender of Declared Majors
https://foothill.edu/programreview/prg-rev-docs/20-21-enroll-by-gender-and-declared-major.pdf

Click the link to view Enrollment by Gender of Declared Majors data table and respond to the questions below.

3. In the data table above, what does the data trend indicate about enrollment (headcount) by gender of declared majors in the program?

Females

- ☐   the data trend shows an increase in the female enrollment of the declared major
- ☐   the data trend shows a decrease in the female enrollment of the declared major

☑   the data trend shows no change and/or is flat in the female enrollment of the declared major

Males

☐   the data trend shows an increase in the male enrollment of the declared major

☐   the data trend shows a decrease in the male enrollment of the declared major

☑   the data trend shows no change and/or is flat in the male enrollment of the declared major

Non-Binary

☐   the data trend shows an increase in the non-binary enrollment rates

☐   the data trend shows a decrease in the non-binary enrollment rates

☑   the data trend shows no change and/or is flat in the non-binary enrollment rates

b. Enrollment by Ethnicity

The following questions concern enrollment distribution by ethnicity.

1. In the data table above, what do the data trends indicate about program enrollment by ethnicity?

African American

☐   the data trend shows an increase in the African Americans enrollment rates

☐   the data trend shows a decrease in the African Americans enrollment rates

☑   the data trend shows no change and/or is flat in the African Americans enrollment rates

Asian

☐   the data trend shows an increase in the Asian enrollment rates

☑   the data trend shows a decrease in the Asian enrollment rates

☐   the data trend shows no change and/or is flat in the Asian enrollment rates

Filipinx

☐   the data trend shows an increase in the Filipinx enrollment rates

☐   the data trend shows a decrease in the Filipinx enrollment rates

☑   the data trend shows no change and/or is flat in the Filipinx enrollment rates

Latinx

☐   the data trend shows an increase in the Latinx enrollment rates

☑   the data trend shows a decrease in the Latinx enrollment rates

☐   the data trend shows no change and/or is flat in the Latinx enrollment rates

Native American

☐   the data trend shows an increase in the Native American enrollment rates

☐   the data trend shows a decrease in the Native American enrollment rates

☑   the data trend shows no change and/or is flat in the Native American enrollment rates

Pacific Islander

☐   the data trend shows an increase in the Pacific Islander enrollment rates

☐   the data trend shows a decrease in the Pacific Islander enrollment rates

☑   the data trend shows no change and/or is flat in the Pacific Islander enrollment rates

White

☐   the data trend shows an increase in the White enrollment rates

☐   the data trend shows a decrease in the White enrollment rates

☑   the data trend shows no change and/or is flat in the White enrollment rates

Decline to State

☑ the data trend shows an increase in the Decline to State enrollment rates

☐ the data trend shows a decrease in the Decline to State enrollment rates

☐ the data trend shows no change and/or is flat in the Decline to State enrollment rates

2. Does your program differ in enrollment distribution among ethnic groups, in this most recent year, compared to the College enrollment by ethnic group? (College 2019-20 = 4% African American, 38% Asian, 5% Filipinx, 25% Latinx, 0% Native American, 1% Pacific Islander, 21% White, 4% Decline to State)

☑ yes

☐ no

If yes, looking at the ethnic groups above, explain changes identified over the past five years for each ethnic group (address each ethnic group by bullet point).

The percentages of disproportionately impacted groups in the GIST program appears to vary due to small overall numbers. The overall enrollment of the program has increased, but the raw numbers of the disproportionally impacted groups has stayed constant. The largest change has been in the Decline to State group. The overall trend is that there is a higher fraction of whites in the program. This aligns with the technology industry in general (nationally, the tech industry is 68% white). For example:

- In 2015 there were 36 Latinx enrolled, comprising 18% of the total. In 2019 there were 39 Latinx comprising 14% of the total. This is lower than the college percentage
- In 2015 there were 53 Asians enrolled, comprising 27% of the total. In 2019 there were 43 Asians enrolled, comprising 16% of the total. This is lower than the college percentage
- The two largest groups to increase are White and Decline to State
    - There is an increase in the White population (from 43% to 48%), which may be due to the overall larger fraction of whites in technology related disciplines.
    - The largest variance is in the Decline to State group from 4% to 31% may partly account for the decline in some of the other disproportionately impacted groups as many of the students in the program are multi-racial and this group may have shifted their self-identification

The program holds an annual advisory board meeting where we discuss student recruitment and support with campus services such as Veterans Resources, EOPS and DSPS, as well as our broad representation of industry employers. Noting this trend of a divergence from the college enrollment by ethnic group, the program will specifically emphasize recruitment at the upcoming advisory board meeting.

3. Do the data trends suggest programmatic actions are necessary to address disparities in enrollment by ethnicity, including low enrollment within a particular group?

☑ yes

☐ no

If yes, describe the proposed actions for addressing disparities in enrollment by ethnic group within the program.

The Geospatial Technology program, in consultation with its professional advisory board, will work with the counselors and college marketing program to engage in outreach to disproportionately impacted groups, specifically targeting the program "gateway" courses of GIST 11 and GIST 12. The instructor for GIST 11 has engaged in multiple equity training groups and is positioned to build an outreach program and a learning environment where all students will feel belonging. The program will work with the instructors in its higher level classes to maintain the equitable learning environment. In addition, faculty in the Geography program (most of whom also teach in GIST) are using GIST software in their Physical Geography classes to expose students to GIS and get them excited about taking GIST classes.

The program holds an annual advisory board meeting where we discuss student recruitment and support with campus services such as Veterans Resources, EOPS and DSPS, as well as our broad representation of industry employers. Noting this trend of a divergence from the college enrollment by ethnic group, the program will specifically emphasize recruitment at the upcoming advisory board meeting.

F. Student Course Success

Course Success Rates by Unit

Course Success
Business & Social Sciences - Geospatial Tech & Data Sci-FH

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Success	167	84%	117	77%	61	77%	186	70%	181	65%
Non Success	14	7%	20	13%	10	13%	32	12%	25	9%
Withdrew	17	9%	15	10%	8	10%	47	18%	74	26%
Total	198	100%	152	100%	79	100%	265	100%	280	100%

Course Success by Race/Ethnicity
Business & Social Sciences - Geospatial Tech & Data Sci-FH

Course Success for African American, Latinx, and Filipinx Students

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Success	42	86%	34	79%	12	63%	30	55%	34	60%
Non Success	3	6%	5	12%	4	21%	13	24%	8	14%
Withdrew	4	8%	4	9%	3	16%	12	22%	15	26%
Total	49	100%	43	100%	19	100%	55	100%	57	100%

Course Success for Asian, Native American, Pacific Islander, White, and Decline to State Students

	2015-16		2016-17		2017-18		2018-19		2019-20	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Success	125	84%	83	76%	49	82%	156	74%	147	66%
Non Success	11	7%	15	14%	6	10%	19	9%	17	8%
Withdrew	13	9%	11	10%	5	8%	35	17%	59	26%
Total	149	100%	109	100%	60	100%	210	100%	223	100%

Some courses may continue to be listed but no longer have data due to renumbering or because the course was not offered in the past five years.

a. Student Course Success

1. In the data table above, what does the data trend indicate about overall course success?

☐ the data trend shows an increase in the students' course success percentage

☑ the data trend shows a decrease in the students' course success percentage

☐ the data trend shows no change and/or is flat in the students' course success percentage

If the data trend shows an increase, decrease, or no change and/or is flat in students' course success percentage, explain what programmatic factors led to such a trend.

The overall success rate in the program has declined, and notably the withdraw rate has more than doubled (9% to 26%). This is a result of the program's move to a 100% online offering in 2018. The online platform requires that students either own a robust PC computer so they can download GIS software or have a strong, reliable internet connection to use the "virtual desktop" cloud computers that ETS has provided the program. Unreliable wifi or hotspot internet connections are not robust enough to run the GIST software on virtual desktops. The data notes that of all sub groups for disproportionate impact, low income students were the only group with an outsized impact. Students are advised of this limitation prior to enrollment via postings on the program's webpage as well as pre-course information web pages set up by instructors and messages sent to enrolled students prior to the quarter.

2. Do the data suggest changes are necessary to improve student course success?

☑ yes

☐ no

If yes, describe the proposed actions for stabilizing/increasing the student's course success percentages.

The program would like to continue to maintain an on-campus open lab for students who do not have access to robust PC computers or stable internet connections to run virtual desktops. Maintaining on-campus resources for low income students who

cannot afford a new PC computer and/or must rely on hot spots or slow wifi in their living situation are at a disadvantage for success may help to address this disparity. In addition, the program has begun (in winter 2020) tutorial services at the Garden tutorial center. While it is too early to see success from this offering in the program review data, the faculty is hopeful that this extended support network will help increase success rates. The program will work with deans in BSS and PSME to discuss supporting an open campus lab for students in all computer related disciplines to access robust computers and software needed for course success.

b. Student Course Success by Student Groups

1. In the data table above, what is the observed trend for course success rates for African American, Filipinx, and Latinx student groups?

☐   the data trend shows an increase in the course success percentage

☑   the data trend shows a decrease in the course success percentage

☐   the data trend shows no change and/or is flat in the course success percentage

2. In the data table above, what is the observed trend for course success rates for Asian, Native American, Pacific Islander, White, and Decline to State student groups?

☐   the data trend shows an increase in the course success percentage

☑   the data trend shows a decrease in the course success percentage

☐   the data trend shows no change and/or is flat in the course success percentage

3. In the data table above, is there a course success gap between African-American, Latinx, Filipinx student groups and Asian, Native American, Pacific Islander, White, Decline to State student groups?

☑   yes

☐   no

If the data trend shows an increase, decrease, or no change/flat in course success gap, explain why the course success gap is flat, increased, or decreased.

The factors affecting the disproportionately impacted groups with declining success are the same that affected the non-disproportionately impacted groups. In both cases, the move to 100% online left students who lacked a stable internet connection without a means to reliably access the software needed to complete their lab work (hot spot and wifi are often not stable enough to run the virtual desktop software). The difference in success rates between the groups is very small, but shows an overall trend of decline in success in both groups.

4. Does the data suggest that changes are necessary to decrease student course success gap between African-American, Latinx, Filipinx student groups and Asian, Native American, Pacific Islander, White, and Decline to State student groups?

☑   yes

☐   no

If yes, what actions are program faculty and staff engaged in to decrease the course success gap between African-American, Latinx, and Filipinx student groups and Asian, Native American, Pacific Islander, White, and Decline to State student groups?

The program would like to continue to maintain an on-campus open lab for students who do not have access to robust PC computers or stable internet connections to run virtual desktops. The department will work with deans in BSS and PSME to build support for an open computer lab that would benefit students in all computer related disciplines. In addition, the program has begun (in winter 2020) tutorial services at the Garden tutorial center. While it is too early to see success from this offering in the program review data, the faculty is hopeful that this extended support network will help increase success rates for all groups.

G. Student Course Success by Demographics
a. Student Course Success by Gender

The following questions concern student success rates by gender.

Course Success Rates by Group

Success Rates by Gender
Business & Social Sciences - Geospatial Tech & Data Sci-FH

2019-20

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	99	73%	8	6%	28	21%	135	100%
Male	79	57%	17	12%	43	31%	139	100%
Not Reported	3	50%	0	0%	3	50%	6	100%
All	181	65%	25	9%	74	26%	280	100%

2018-19

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	88	67%	16	12%	28	21%	132	100%
Male	97	73%	16	12%	19	14%	132	100%
Not Reported	1	100%	0	0%	0	0%	1	100%
All	186	70%	32	12%	47	18%	265	100%

2017-18

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	29	73%	5	13%	6	15%	40	100%
Male	32	82%	5	13%	2	5%	39	100%
Not Reported	0	N/A	0	N/A	0	N/A	0	100%
All	61	77%	10	13%	8	10%	79	100%

2016-17

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	63	79%	11	14%	6	8%	80	100%
Male	54	75%	9	13%	9	13%	72	100%
Not Reported	0	N/A	0	N/A	0	N/A	0	100%
All	117	77%	20	13%	15	10%	152	100%

2015-16

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	87	90%	7	7%	3	3%	97	100%
Male	79	79%	7	7%	14	14%	100	100%
Not Reported	1	100%	0	0%	0	0%	1	100%

All	167	84%	14	7%	17	9%	198	100%

Success Rates by Age
Business & Social Sciences - Geospatial Tech & Data Sci-FH

2019-20

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
19 or less	3	75%	0	0%	1	25%	4	100%
20-24	36	69%	8	15%	8	15%	52	100%
25-39	103	64%	15	9%	42	26%	160	100%
40 +	39	61%	2	3%	23	36%	64	100%
All	181	65%	25	9%	74	26%	280	100%

2018-19

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
19 or less	5	71%	2	29%	0	0%	7	100%
20-24	53	78%	9	13%	6	9%	68	100%
25-39	88	66%	16	12%	30	22%	134	100%
40 +	40	71%	5	9%	11	20%	56	100%
All	186	70%	32	12%	47	18%	265	100%

2017-18

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
19 or less	0	N/A	0	N/A	0	N/A	0	100%
20-24	21	84%	3	12%	1	4%	25	100%
25-39	25	78%	4	13%	3	9%	32	100%
40 +	15	68%	3	14%	4	18%	22	100%
All	61	77%	10	13%	8	10%	79	100%

2016-17

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
19 or less	0	N/A	0	N/A	0	N/A	0	100%
20-24	24	80%	1	3%	5	17%	30	100%
25-39	66	76%	16	18%	5	6%	87	100%
40 +	27	77%	3	9%	5	14%	35	100%
All	117	77%	20	13%	15	10%	152	100%

2015-16	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
19 or less	0	N/A	0	N/A	0	N/A	0	100%
20-24	10	71%	1	7%	3	21%	14	100%
25-39	117	84%	11	8%	11	8%	139	100%
40 +	40	89%	2	4%	3	7%	45	100%
All	167	84%	14	7%	17	9%	198	100%

Success Rates by Ethnicity
Business & Social Sciences - Geospatial Tech & Data Sci-FH

2019-20	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	1	25%	3	75%	0	0%	4	100%
Asian	29	63%	5	11%	12	26%	46	100%
Filipinx	9	64%	2	14%	3	21%	14	100%
Latinx	24	62%	3	8%	12	31%	39	100%
Native American	4	57%	0	0%	3	43%	7	100%
Pacific Islander	2	33%	0	0%	4	67%	6	100%
White	92	69%	4	3%	37	28%	133	100%
Decline to State	20	65%	8	26%	3	10%	31	100%
All	181	65%	25	9%	74	26%	280	100%

2018-19	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	1	33%	1	33%	1	33%	3	100%
Asian	42	74%	4	7%	11	19%	57	100%
Filipinx	5	36%	4	29%	5	36%	14	100%
Latinx	24	63%	8	21%	6	16%	38	100%
Native American	0	0%	0	0%	1	100%	1	100%
Pacific Islander	0	0%	0	0%	1	100%	1	100%
White	107	75%	15	10%	21	15%	143	100%
Decline to State	7	88%	0	0%	1	13%	8	100%
All	186	70%	32	12%	47	18%	265	100%

2017-18	Success		Non Success		Withdrew		Total	

	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	0	N/A	0	N/A	0	N/A	0	100%
Asian	10	83%	1	8%	1	8%	12	100%
Filipinx	1	50%	1	50%	0	0%	2	100%
Latinx	11	65%	3	18%	3	18%	17	100%
Native American	0	N/A	0	N/A	0	N/A	0	100%
Pacific Islander	3	100%	0	0%	0	0%	3	100%
White	34	83%	3	7%	4	10%	41	100%
Decline to State	2	50%	2	50%	0	0%	4	100%
All	61	77%	10	13%	8	10%	79	100%

2016-17

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	4	67%	2	33%	0	0%	6	100%
Asian	33	79%	4	10%	5	12%	42	100%
Filipinx	2	67%	1	33%	0	0%	3	100%
Latinx	28	82%	2	6%	4	12%	34	100%
Native American	0	N/A	0	N/A	0	N/A	0	100%
Pacific Islander	0	N/A	0	N/A	0	N/A	0	100%
White	45	75%	9	15%	6	10%	60	100%
Decline to State	5	71%	2	29%	0	0%	7	100%
All	117	77%	20	13%	15	10%	152	100%

2015-16

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	1	100%	0	0%	0	0%	1	100%
Asian	48	91%	2	4%	3	6%	53	100%
Filipinx	10	83%	0	0%	2	17%	12	100%
Latinx	31	86%	3	8%	2	6%	36	100%
Native American	3	100%	0	0%	0	0%	3	100%
Pacific Islander	0	N/A	0	N/A	0	N/A	0	100%
White	67	78%	9	10%	10	12%	86	100%
Decline to State	7	100%	0	0%	0	0%	7	100%
All	167	84%	14	7%	17	9%	198	100%

Some courses may continue to be listed but no longer have data due to renumbering or because the course was not offered in the past five years.

1. In the data table above, what does the data indicate about program course success by gender?

   Females

☐   the data trend shows an increase in the female course success rates

☑   the data trend shows a decrease in the female course success rates

☐   the data trend shows no change and/or is flat in the female course success rates

Males

☐   the data trend shows an increase in the male course success rates

☑   the data trend shows a decrease in the male course success rates

☐   the data trend shows no change and/or is flat in the male course success rates

Non-Binary

☐   the data trend shows an increase in the non-binary course success rates

☐   the data trend shows a decrease in the non-binary course success rates

☑   the data trend shows no change and/or is flat in the non-binary course success rates

If the data trend shows an increase, decrease, or no change/flat in the male, female, or non-binary student course success percentages, explain why the percentage is flat, increased, or decreased.

> The patterns observed above in the disproportionately impacted student groups are similar to the patterns with success by gender. The program's move to online in 2018, while it drastically increased the program enrollment and productivity, resulted in a drop in success and an increase in withdraws across the board. Both males and female groups success decreased with the move from in-person computer lab offerings of the GIST courses to online courses that relied on student-owned computers that could download the GIS software or reliable, robust internet connections to run cloud-based software.

2. Do the data suggest changes are necessary to improve female, male, or non-binary student course success percentage rates?

☑   yes

☐   no

If yes, describe proposed actions to stabilize/increase the course success rates for male, female, or non-binary.

> The program would like to continue to maintain an on-campus open lab for students who do not have access to robust PC computers or stable internet connections to run virtual desktops. In addition, the program has begun (in winter 2020) tutorial services at the Garden tutorial center. While it is too early to see success from this offering in the program review data, the faculty is hopeful that this extended support network will help increase success rates.

b. Student Course Success by Ethnicity

These questions concern the course success rates of students by ethnicity.

1. In the data table above, what does the data trend indicate about program student course success by ethnicity?

African Americans

☐   the data trend shows an increase in the African Americans course success rates

☑   the data trend shows a decrease in the African Americans course success rates

☐   the data trend shows no change and/or is flat in the African Americans course success rates

Asian

☐   the data trend shows an increase in the Asian course success rates

☑   the data trend shows a decrease in the Asian course success rates

☐   the data trend shows no change and/or is flat in the Asian course success rates

Filipinx

☐   the data trend shows an increase in the Filipinx course success rates

☑   the data trend shows a decrease in the Filipinx course success rates

☐   the data trend shows no change and/or is flat in the Filipinx course success rates

Latinx

☐   the data trend shows an increase in the Latinx course success rates

☑   the data trend shows a decrease in the Latinx course success rates

☐   the data trend shows no change and/or is flat in the Latinx course success rates

Native American

☐   the data trend shows an increase in the Native American course success rates

☑   the data trend shows a decrease in the Native American course success rates

☐   the data trend shows no change and/or is flat in the Native American course success rates

Pacific Islander

☐   the data trend shows an increase in the Pacific Islander course success rates

☑   the data trend shows a decrease in the Pacific Islander course success rates

☐   the data trend shows no change and/or is flat in the Pacific Islander course success rates

White

☐   the data trend shows an increase in the White course success rates

☑   the data trend shows a decrease in the White course success rates

☐   the data trend shows no change and/or is flat in the White course success rates

Decline to State

☐   the data trend shows an increase in the Decline to State course success rates

☑   the data trend shows a decrease in the Decline to State course success rates

☐   the data trend shows no change and/or is flat in the Decline to State course success rates

If the data trend shows a decrease in any of the student ethnic groups' course success rates, explain why the percentage decreased for each (address each ethnic group by bullet point).

A decline in success has been observed across all ethnic groups over the past five year. In some cases (Native American, Pacific Islander) the numbers are too small to discern a specific trend. However, all groups appear to have been affected by the move online and the required access to technology (robust internet connection or personal PC computer) for program success. As noted previously, the most significant trend in success rates is an outsized lack of success among low income students, many of which fall into the African American and Latinx ethnic categories. Low income students are far more likely to access the internet through hot spot or poor wifi connection which renders the cloud "virtual desktop" computers useless for running GIS software virtually.

2. Do the data indicate a gap in course success for any of the ethnic groups as compared to other groups?

☐   yes

☑   no

If yes, describe the reasons for the gap in course success.

[object Object]

3. Do the data suggest that changes are necessary to improve program course success equality?

☑   Yes

☐   No

If yes, describe the proposed actions for stabilizing/improving the course success by ethnicity.

The program's action plan for addressing the program course success equality is three-fold. The program would like to continue to

maintain an on-campus open lab for students who do not have access to robust PC computers or stable internet connections to run virtual desktops. We plan to work with deans in BSS and PSME to build support for a campus open computer lab. In addition, the program has begun (in winter 2020) tutorial services at the Garden tutorial center. While it is too early to see success from this offering in the program review data, the faculty is hopeful that this extended support network will help increase success rates. Finally, the program faculty engage in ongoing dialog about creating culturally relevant and equitable curriculum using data sets and examples that are relevant to a wide cross section of the student body.

Use this opportunity to provide feedback on the template or address a topic that was not previously discussed.

As an update to this PR, as of April 2021 the GIST program is actively collaborating with the Garden Tutorial center to build out an open computer lab (4-6 machines) on campus to support GIS students and provide an opportunity for faculty to hold in person office hours to address the equity gaps identified in this PR.

Self-Study Checklist

Writers can use this final checklist for ensuring quality control before hitting the final submit button.

- ☑ Attended the Writer Orientation/Training in November

- ☑ Responses are supported by the data

- ☑ Engaged in discussion with IR Coach

- ☑ The Self-Study Report was written collaboratively with other program stakeholders

- ☑ The Self-Study Report was proofread by a collaborator

This form is completed and ready for acceptance.

Geospatial Tech & Data Sci-FH Geospatial Tech

Career and Technical Education Programs Addendum
A. Re-Accreditation Information

1. When was your last re-accreditation visit?

There is not an accrediting body for this program

2. Did the program maintain accreditation?

☑ yes

☐ no

3. Were there any commendations/special mentions identified? If yes, please elaborate.

There is not an accrediting body for this program, however the curriculum is modeled after the NSF Model Geospatial Technology curriculum

4. What were the major citations of the last re-accreditation report (e.g. areas of improvement, strategic direction, facilities, personnel, etc.)?

see above

5. What actions has the program taken to address the accreditation citations/recommendations? What barriers has the program faced in implementing improvements?

see above

6. If applicable, what areas of concern were noted during the annual accreditation report?

see above

B. Advisory Board

1. Did the program hold an annual advisory meeting each year of the five-year cycle?

☑ yes

☐ no

2. Did the program submit advisory board meeting minutes each year of the five-year cycle?

☑ yes

☐ no

3. Web link to meeting minutes?

https://foothill.edu/gis/resources.html 2020 meeting was scheduled for April 2020 and was postponed due to Covid

4. Were there any advisory board commendations/special mentions identified?

- The advisory board commended the smooth transition online by the program faculty in 2018
- The advisory board noted that Foothill is one of community colleges in the region that offers a comprehensive GIST certificate program (the other is Diablo Valley). Other schools offer 1-3 GIS classes. Notably, students who take an introductory GIS class at Skyline or San Francisco City college will often transfer to Foothill to obtain an industry-approved certificate
- The advisory board has consistently commended the program on the well rounded nature of students completing the program with both technical and "soft" skills desired by employers
- The advisory board has commended the program on the up-to-date software skills possessed by program graduates

5. Are there any identified actions for improvement or recommendations based on feedback from the program's advisory board?

In response to declining enrollment in 2015-17 the advisory board suggested that the GIST program move entirely online. This was due to the nature of the student body who are predominately working professionals seeking to upskill. These professionals often are challenged to attend face to face classes in the evenings after working all day. In addition, the advisory board noted that with online classes the program would be able to draw from a larger area and meet the needs of professionals such as forest service workers who do not live near to a college.

6. What actions has the program taken to address recommendations made by the Advisory Board? What barriers has the program faced in implementing improvements?

The program has moved online with support from the Online Learning Office and ETS who has provided cloud-based "virtual desktops" that students can use to run GIS software over the cloud. The largest barrier that the program has faced is student access to adequate technology to successfully complete program requirements. Students must either own a robust PC computer so that they can download and run the GIS software, or rely on a very stable internet connection to run the software on a virtual desktop. Students who do not have strong and stable internet connections struggle to successfully run the virtual desktop GIS software.

C. Regional Labor Demand

Labor Demand - Sports Medicine

Total Regional Employment

The total number of jobs for 2018 and 2023 and percentage growth or decline in occupations associated with the selected TOP code in the microregion where the college is located

- Bay Area, Athletic Training and Sports Medicine (1228), 2018-2019

	2018	2023	Change 2018-23	% Change
Regional Jobs Total	11,400	12,100	700	6%
Requires a Bachelor's Degree or Higher				
Athletic Trainers (29-9091)	232	262	30	13%
Requires a Requires a High School Diploma or Equivalent				
Fitness Trainers and Aerobics Instructors (39-9031)	11,168	11,838	670	6%

Projected Regional Job Openings

The total number of annual job openings for 2018-23 time period in occupations associated with the selected TOP code in the microregion where the college is located

- Bay Area, Athletic Training and Sports Medicine (1228), 2018-2019

	Projected Average Annual Openings (2018-2023)
Regional Annual Openings Total	2,064
Requires a Bachelor's Degree or Higher	
Athletic Trainers (29-9091)	18
Requires a Requires a High School Diploma or Equivalent	
Fitness Trainers and Aerobics Instructors (39-9031)	2,046

Labor Demand - Geospatial Tech & Data Sci

Total Regional Employment

The total number of jobs for 2018 and 2023 and percentage growth or decline in occupations associated with the selected TOP code in the microregion where the college is located

- Bay Area, Geographic Information Systems (220610), 2018-2019

	2018	2023	Change 2018-23	% Change
Regional Jobs Total	12,194	13,154	960	7%
Requires a Bachelor's Degree or Higher				
Computer Occupations, All Other (15-1199)	11,366	12,306	940	8%
Requires a Requires a High School Diploma or Equivalent				
Surveying and Mapping Technicians (17-3031)	828	848	20	2%

Projected Regional Job Openings

The total number of annual job openings for 2018-23 time period in occupations associated with the selected TOP code in the microregion where the college is located

- Bay Area, Geographic Information Systems (220610), 2018-2019

	Projected Average Annual Openings (2018-2023)
Regional Annual Openings Total	1,064
Requires a Bachelor's Degree or Higher	
Computer Occupations, All Other (15-1199)	971
Requires a Requires a High School Diploma or Equivalent	
Surveying and Mapping Technicians (17-3031)	93

1. In the data table, what does the regional labor demand data trend indicate?

☑ the data trend shows an increase in labor demand

☐ the data trend shows a decrease in labor demand

☐ the data trend shows no change and/or is flat in labor demand

2. Describe the regional demand for labor in this sector. If the projected data trend shows no change/flat, an increase, or decrease in labor demand, explain why.

The regional labor demand is increasing. This field is notoriously difficult to define in the Projected Regional Job Openings as Geospatial Technology skills are supplemental to many fields and are used to enhance/upskill workers in a variety of fields. The majority of jobs required a bachelor's degree in GIS or some other field. Most program students have a bachelor's degree in some other field and are returning to gain GIST skills. Many students in the program would not define GIS as their primary occupation. Many students are in fields ranging from Environmental Sciences, Forest Service, Law Enforcement and Public Safety, Cultural Resource Management, Computer Science and Community Organizing.

D. Regional Labor Supply

Labor Supply - Sports Medicine

Overall	●
2011-2012	420
2012-2013	411
2013-2014	379
2014-2015	364
2015-2016	349
2016-2017	402
2017-2018	349
2018-2019	604

Labor Supply - Geospatial Tech & Data Sci

Overall	●
2011-2012	660
2012-2013	605
2013-2014	528
2014-2015	543
2015-2016	581
2016-2017	518
2017-2018	542
2018-2019	729

1. In the data table, what does the regional labor supply data trend indicate?

☑ the data trend shows an increase in labor supply

☐   the data trend shows a decrease in labor supply

☐   the data trend shows no change and/or is flat in labor supply

2. Describe the regional supply for labor in this sector over the last five years. If the data trend shows no change/flat, an increase, or decrease in labor supply, explain why.

The trend shows a slight increase in the labor supply. The data pulled for this study comprises job openings where GIS is the primary skill desired. While there continues to be a slight increase in the need for GIS technicians, the demand is far greater (and continues to increase) for workers who have GIS skills that supplement their primary occupational category. Foothill College fills a demand in the regional labor market. Foothill is one of two community colleges in the Bay Region to offer GIST Certificates and AS degree programs. While several other colleges offer GIST coursework (1-2 classes), Foothill and Diablo Valley College meet a need in the regional labor market for a robust GIS education by offering comprehensive certificates and degrees in the field.

E. Regional Wages

FOOTHILL-DE ANZA
Community College District

PRECISION CAMPUS

Regional Wages- Sports Medicine

Median Annual Earnings After Exiting

Among students who exited the community college system and who did not transfer to any postsecondary institution, median earnings following the academic year of exit

● Bay Area, Athletic Training and Sports Medicine (122800), 2018-2019

DRILL DOWN

Time Trend ▼
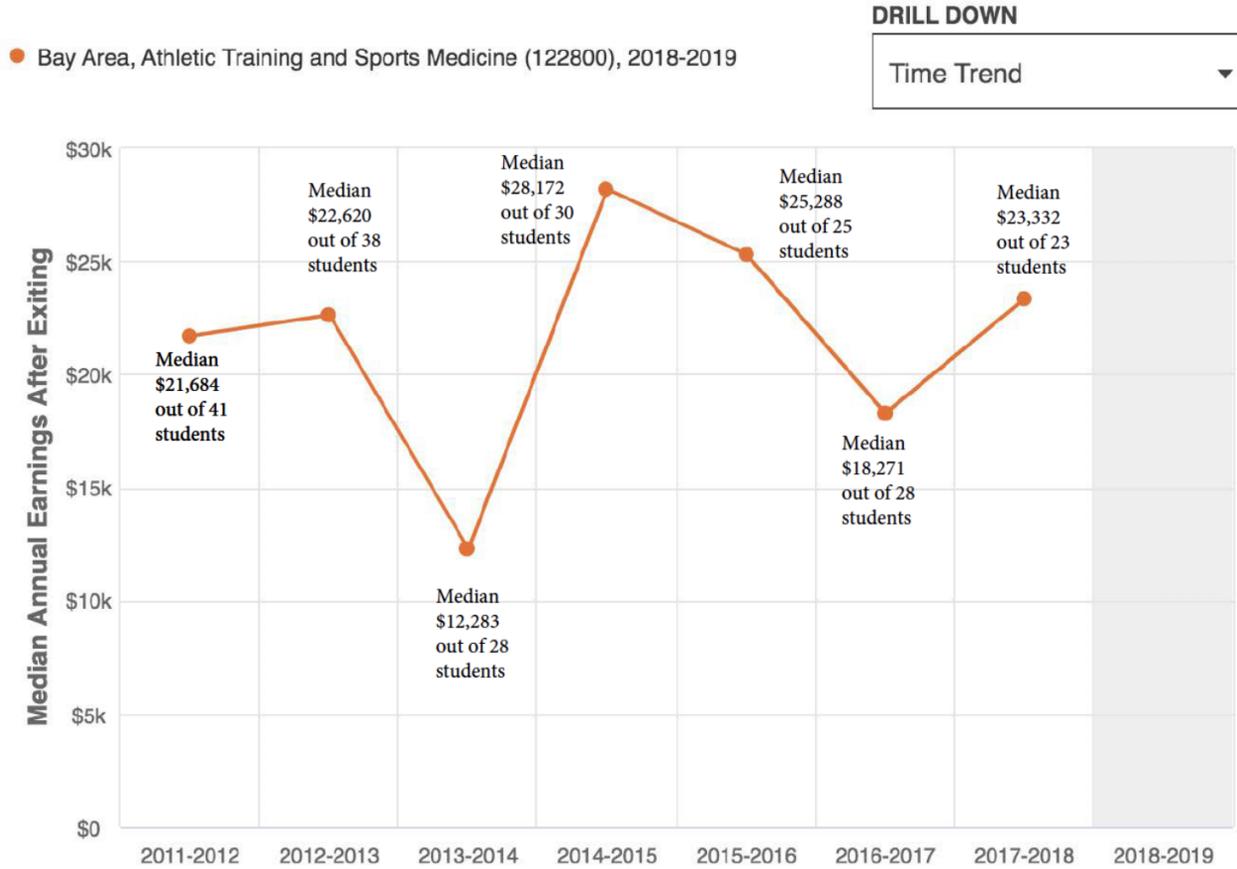
Regional Wages- Geospatial Tech & Data Sci

Median Annual Earnings After Exiting

Among students who exited the community college system and who did not transfer to any postsecondary institution, median earnings following the academic year of exit

● Bay Area, Geographic Information Systems (220610), 2018-2019

DRILL DOWN

Time Trend ▼
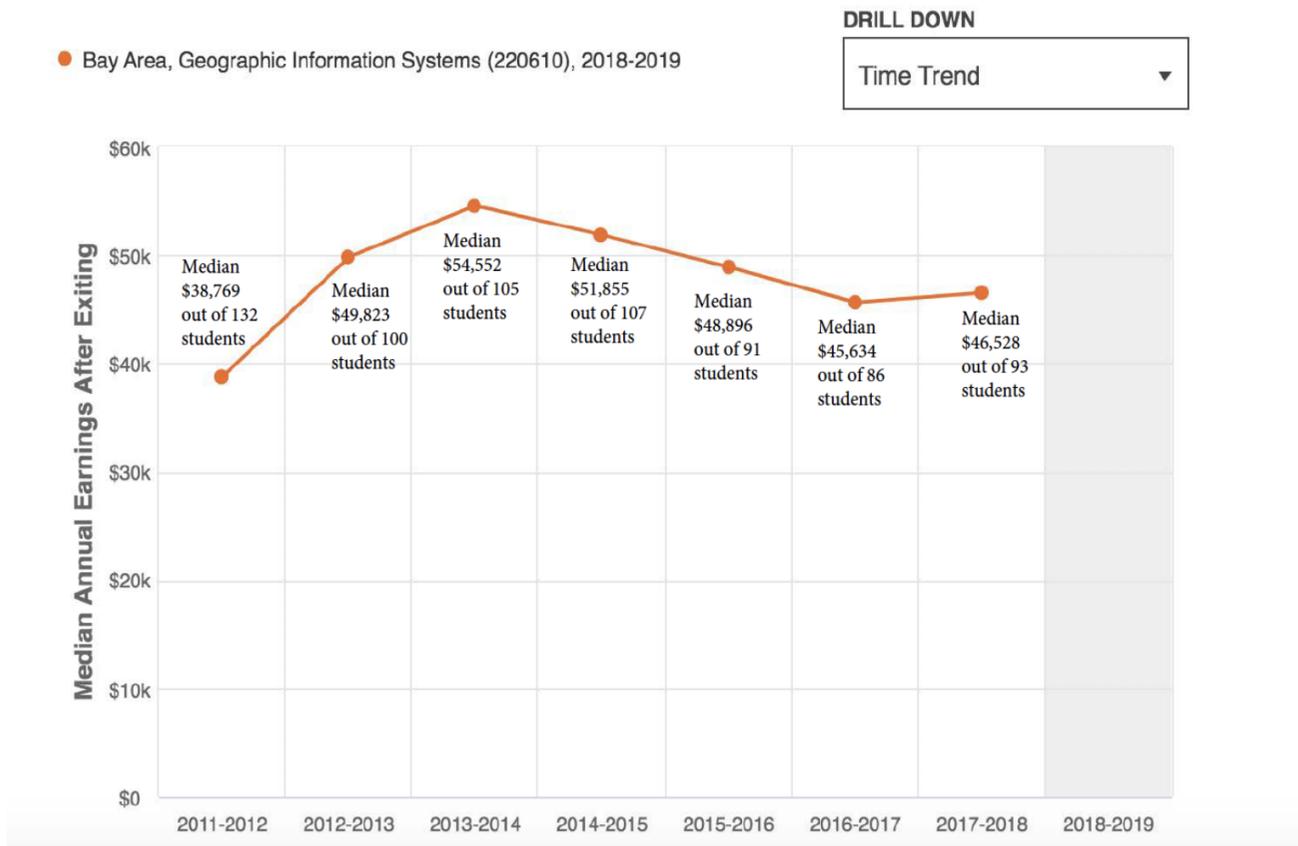
1. In the data table, what does the wage data trend indicate?

☐   the data trend shows an increase in wages

☐   the data trend shows a decrease in wages

☑   the data trend shows no change and/or is flat in wages

2. Describe the regional trend for wages in this sector over the last five years. If the data trend shows no change/flat, an increase, or decrease in wages, explain why.

> The trend shows an overall slight increase in wages, starting with a low of $38,769 iin 2012, a high of $54,552 in 2014, and ending at a median salary of $46,528 in 2019. This data encompasses a broad spectrum of careers, from computer data scientists to transportation technicians. Students included in this survey completed one or more GIS classes, but may not have GIS as their primary occupation. The "Median Wage" of graduates reflects the varying composition and wide pay range of the jobs that require GIST skills.

F. Program 13.5 Course Completion

Foothill College Program Review 2020-2021
CTE Addendum 13.5 Units

Program 13.5 Course Completion					
Unduplicated Headcount	2015-16	2016-17	2017-18	2018-19	2019-20
Geographic Information Systems Technology	18	8	2	12	10
Sports Medicine	7	5	6	4	4

CTE courses offered between 2015-16 and 2019-20 that were used to retrieve completion counts include the following:

Geographic Information Systems Technology: GIST 11, 12, 52, 53, 54A, 58 and 59.

Sports Medicine: KINS 1, 16A/B/C and 62A/B/C/D/E.

1. In the data table, what does the data trend indicate about the number of students completing the 13.5 CTE units each year in the last five years within your program?

☐   the data trend shows an increase in the number of students completing the 13.5 CTE units

☑   the data trend shows a decrease in the number of students completing the 13.5 CTE units

☐   the data trend shows no change and/or is flat in the number of students completing the 13.5 CTE units

2. If the data trend shows no change/flat, an increase, or decrease in the number of students completing the 13.5 CTE units, explain why.

> As the program moved online in 2018, the program struggled to have students complete their degrees/certificates as many students were "drop in" for specific skills and did not see the need to complete the full certificate. This problem is compounded by the GIST industry not having a formal accrediting body or licensure exam. Program faculty are working to encourage students to complete their full certificates, and are also encouraging students to apply for the lower level certificates that they may not realize that they qualify for.

G. Program Graduate Employment Rate

Graduate Employment Rates - Sports Medicine

Employed in the Second Fiscal Quarter After Exit

Among students who exited the community college system and did not transfer to any postsecondary institution, the proportion of students who were employed in the second fiscal quarter after exit
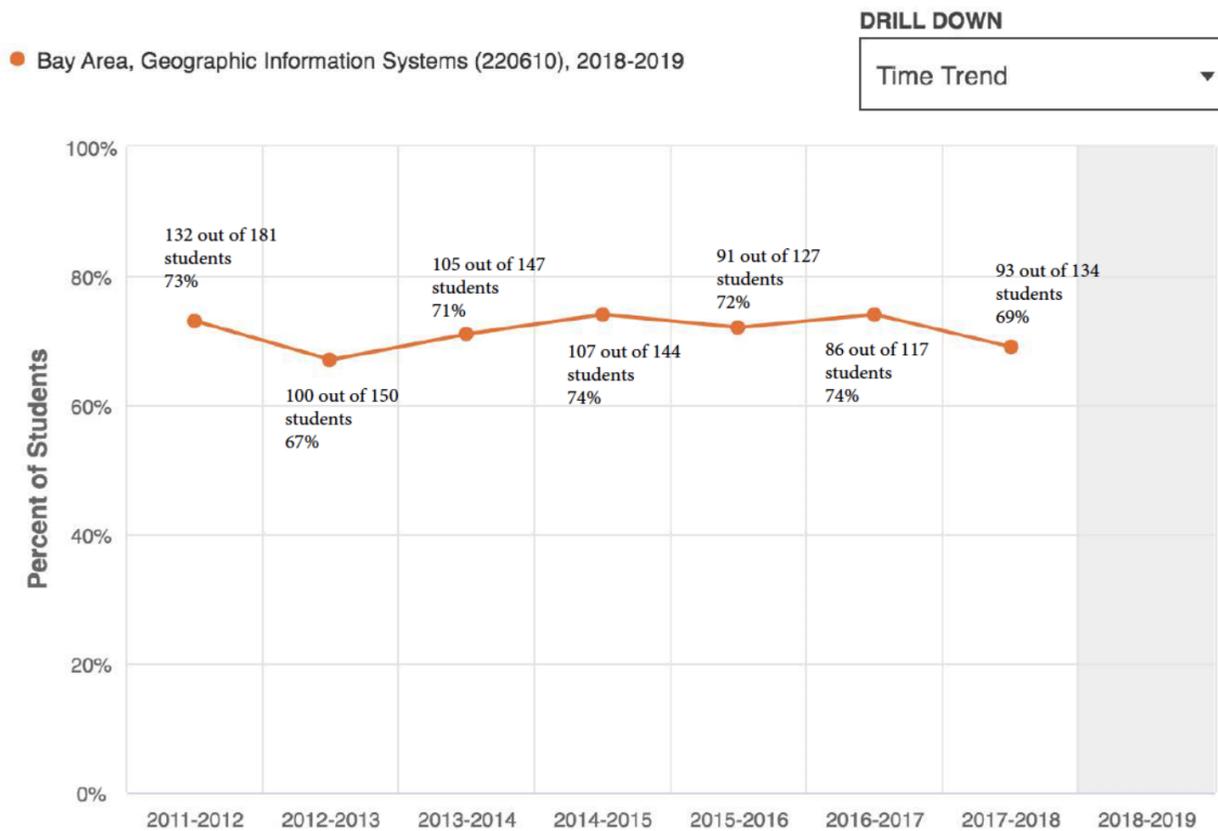
● Bay Area, Athletic Training and Sports Medicine (1228), 2018-2019

DRILL DOWN

Time Trend
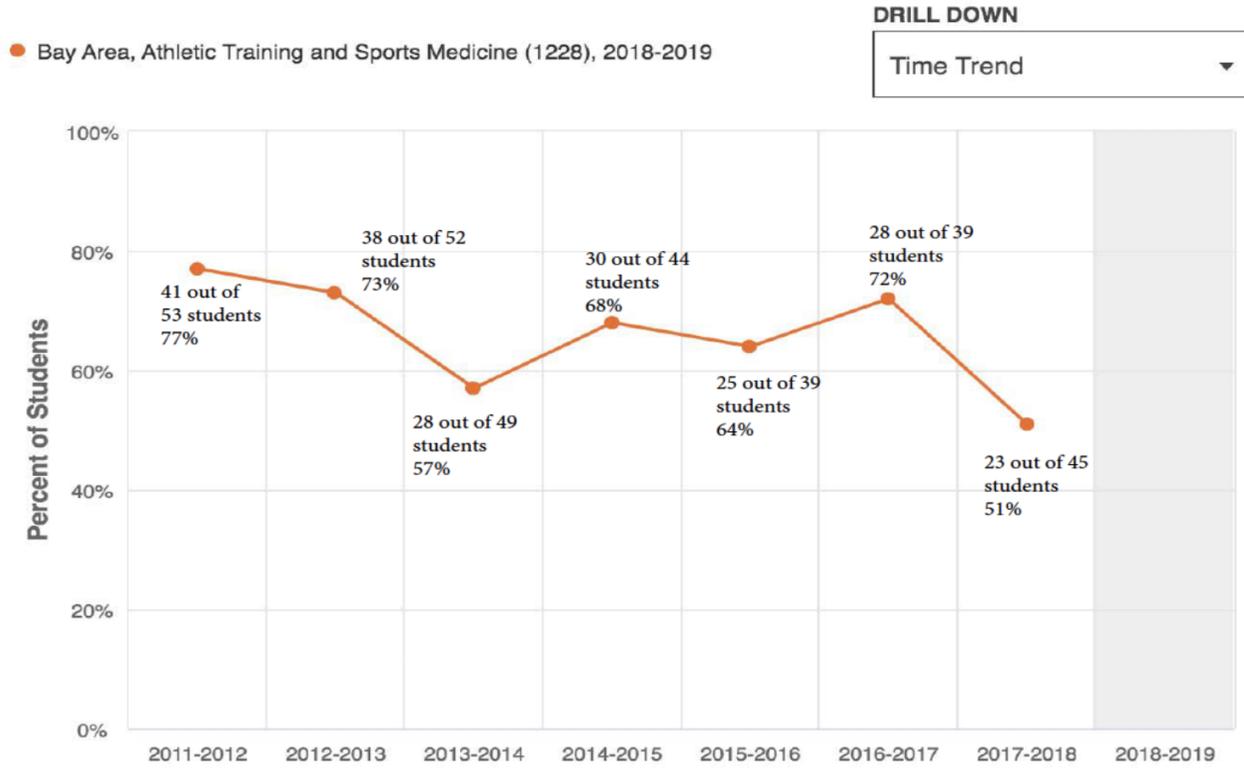
Source: Chancellor's Office Management Information System, Employment Development Department Unemployment Insurance Wage File

Graduate Employment Rates - Geospatial Tech & Data Sci

Employed in the Second Fiscal Quarter After Exit

Among students who exited the community college system and did not transfer to any postsecondary institution, the proportion of students who were employed in the second fiscal quarter after exit

● Bay Area, Geographic Information Systems (220610), 2018-2019

DRILL DOWN

Time Trend

FOOTHILL-DE ANZA
Community College District

PRECISION CAMPUS

1. In the data table above, what does the graduate employment rate indicate for certificate/degree completers (e.g., Within one year after Community College Completion)?

☐   the data trend shows an increase in graduate employment

☐   the data trend shows a decrease in graduate employment

☑   the data trend shows no change and/or is flat in graduate employment

2. Describe the graduate employment rate trend for both certificates and degrees. If the projected data trend shows no change/flat, an increase, or decrease, explain why.

> Due to the small number of certificate and degree completers in GIST in the Bay Area, the data table shows all students who took GIST classes and completed any degree or certificate (not necessarily GIST). The data reflects that GIS skills can help to enhance the employability of students as between 67% and 73% of students who took a GIS course as a part of their certificate or degree at any Bay Area Community College found gainful employment within two fiscal quarters.

Self-Study Checklist

Writers can use this final checklist for ensuring quality control before hitting the final submit button.

☐   Attended the Writer Orientation/Training in November

☐   Responses are supported by the data

☐   Engaged in discussion with IR Coach

☐   The Self-Study Report was written collaboratively with other program stakeholders

☐   The Self-Study Report was proofread by a collaborator

This form is completed and ready for acceptance.