Instructional Discipline Template
A. Program Information
Program Mission Statement

Please enter your mission statement here.

The Astronomy program aims to prepare students from all majors to reason about the world using evidence and logic. For many students, the program's general education courses are the last formal opportunity they will have to learn scientific reasoning and key facts about the universe. Thus, we use Astronomy topics to

- motivate learning of fundamental knowledge about nature,
- practice the qualitative and quantitative reasoning skills needed to tie concepts together and build-up new ideas,
- provide context for the math classes non-STEM majors will take; and
- engage students who had previously not had access to scientific training or did not see themselves as being able to pursue science, and provide them an on-ramp to further science and math education .

Throughout, we connect astronomical topics and reasoning skills to students' lives, in order to prepare them to better understand and respond to local and global challenges.

Program Level Student Learning Outcomes

Please list the program level student learning outcomes.

Students will:

- learn about the basic classes of objects in the universe (light, planets, stars, galaxies, space-time), which properties we can measure, and how we infer other properties and processes (ILOs: CT K1 & 6, R1 & 5, Q4, C1, 2, 3, & 5)
- carry out qualitative functional reasoning about physical situations (e.g., using verbal description of factors affecting gravitational force and the condition for circular motion to figure out how we can use orbits to measure masses) (ILOs: Comp P2, C1; Comm O9)
- use patterns in data - represented in graphs or tables - to lookup or infer values and deduce qualitative relationships between quantities (ILOs: Comp P6, C4)
- compare new claims to known phenomena in order to evaluate reasonableness (ILOs: Comp C5)
- work with other students to both improve their own learning and the learning of their classmates (ILOs: Comm I1, I8, I9, O1, O8, O9)

B. FTES - Enrollment Trends

Enrollment Variables and Trends

Enrollment Trends
Science Technology Engineering & Mathematics - Astronomy-FD

	2016-17	2017-18	2018-19	2019-20	2020-21	5-yr %Inc
Unduplicated Headcount	685	375	379	330	289	-57.8%
Census Enrollment	994	467	502	431	374	-62.4%
Sections	25	15	16	14	13	-48.0%
WSCH	1,681	715	740	639	561	-66.6%
FTES (end of term)	112	47	49	42	37	-67.0%
FTEF (end of term)	2.4	1.5	1.2	1.1	1.0	-57.0%
Productivity (WSCH/FTEF)	710	470	634	601	551	-22.5%

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.

1. department ended the practice of scheduling double size courses in order to facilitate active learning and teaching reasoning skills
2. at the end of 2018-19, reduced the enrollment cap in lecture courses to a number of students (from 65 to 50) who can be effectively taught reasoning skills using active learning strategies by a single instructor. This also corrected enrollment numbers into line with other large courses at Foothill
3. drop in 2020/21 was due to cancellation of summer section of ASTR 10A (academic year lecture course enrollment in 2019-20 was 282, 2020-21 was 278)

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.

FTES is stable after the complete turnover of the department in the 2017-2018 academic year. We consider the enrollment levels to be satisfactory for achieving student learning, but we do continue efforts that can have the effect of attracting student attention:

1. maintain on-campus, in-person courses. ASTR lectures are the largest in-person general education-focused physical science courses for students pursuing IGETC
2. we intend to work with guided pathways and counselors to ensure students understand Astronomy is a general education option
3. continue class assignments aimed at communications skills and outreach (e.g., setting up telescope at library quad), and expand other assignment types (e.g., making astronomical images and writing public-understandable explanations)
4. restart, as soon as it is safe, outreach and public events that raise the profile of astronomy (in-person Silicon Valley Astronomy lectures, Friday night observatory viewing, special astronomy events)
5. continue modernizing Astronomy lab course to work with modern data from telescopes (both archival data and college-controlled)

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.

1. the only major change in the number of sections came with the retirement of Andrew Fraknoi in 2017. We stopped offering double-size sections and additional sections taught by part-time faculty during the academic year
2. during COVID crisis, we did not offer a summer section of ASTR 10A
3. a minor change was removal of a separate honors seminar, with core skills being integrated directly into the ASTR 10BH course (an equity measure, to reduce tuition cost)

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

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☑   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.

1. from 2016-2017 to 2017-2018, productivity had a large drop due to no longer offering double sections.
2. Fall 2017 courses were particularly under-filled due to student hesitance to sign up for courses listed as taught by "Staff", this heavily impacted productivity that academic year
3. From 2018-2019 to 2019-2020, there was another drop in productivity due to reducing class sizes from 65 to 50, in order to better support use of active learning in the classroom
4. Even with the class size changes starting in 2017 aimed at improving student learning, and the 100% turnover of the department that same year, productivity has consistently been higher than productivity for physical sciences division in general (633, 601, 550 vs. 556, 530, 536), as well as the nearest comparable courses satisfying physical science general education requirements (ANTH1 face-to-face 582, 556, 546 and GEOG1 online-only 500, 503, 477)

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.

[object Object]

E. Enrollment by Student Demographics

Enrollment Distribution

by Gender

	2016-17		2017-18		2018-19		2019-20		2020-21	
	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent
Female	418	42%	208	45%	237	47%	203	47%	187	50%
Male	552	56%	250	54%	257	51%	228	53%	183	49%
Non-Binary	0	0%	0	0%	0	0%	0	0%	1	0%
Unknown	24	2%	9	2%	8	2%	0	0%	3	1%
Total	994	100%	467	100%	502	100%	431	100%	374	100%

by Ethnicity

	2016-17		2017-18		2018-19		2019-20		2020-21	
	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent	Enr	Percent
African American	39	4%	13	3%	21	4%	10	2%	20	5%
Asian	202	20%	97	21%	112	22%	104	24%	76	20%
Decline to State/Unknown	74	7%	15	3%	5	1%	20	5%	11	3%
Filipinx	50	5%	12	3%	29	6%	15	3%	27	7%
Latinx	298	30%	158	34%	133	26%	142	33%	111	30%
Native American	7	1%	0	0%	5	1%	0	0%	6	2%
Pacific Islander	16	2%	12	3%	8	2%	4	1%	5	1%
White	308	31%	160	34%	189	38%	136	32%	118	32%
Total	994	100%	467	100%	502	100%	431	100%	374	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.

> Astronomy courses have seen an increasing share of enrollment by female students, with an increasing share from 45% in 2017 (when the department experienced total turnover) to 50% in 2021. We suspect this is due to structuring the courses around active learning techniques, which research has shown leads to more equitable outcomes. While the college has no polling of students to understand why they select particular courses, this increasing enrollment fraction is consistent with self-reporting by students that Astronomy courses have been recommended to them by friends as good learning environments. In the courses, I also explicitly address the contributions of woman and under-represented minority groups to the field, as well as both how conditions have improved and remaining systemic challenges to be addressed.

2. Does your program differ in the percentage of males to females, in this most recent year, compared to the College? (College 2020-21 = 52% Female, 46% 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?

> The gender distribution in ASTR courses is close to the distribution at the college as a whole. Compared to general education astronomy courses in general, in a 2010 study of 2000 general education astronomy students across the country, 47% were female (Rudolph 2010, the most recent national level survey on the topic).

Data Table for Enrollment by Gender of Declared Majors

https://foothill.edu/programreview/prg-rev-docs/majors-by-gender-10.25.21.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

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☑ 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 2020-21 = 5% African American, 28% Asian, 5% Filipinx, 28% Latinx, 1% Native American, 1% Pacific Islander, 29% 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).

While there is no astronomy major, I can still speak to enrollment in the ASTR courses since the turnover of the entire department in 2017.

From 2017-2021, Asian students are under-represented in ASTR courses by 6% (22% vs. 28%), which is approximately half the degree that they are over-represented in Physical Sciences majors (12%). Students in physical sciences majors satisfy their general-education science requirements using required courses from their degrees, therefore, fewer will take ASTR courses. The effect of this is to make the other two large groups of students - white and Latinx - appear over-represented (33% and 31%, respectively, averaged over 2017 - 2021).

The number of African American, Filipinx, Native American, and Pacific Islander students is low enough that trends are difficult to identify, however, averaged over the past four years, they account for 4%, 5%, 1%, and 2% of enrolled students, close to the college-wide

distribution.

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.

[object Object]

F. Student Course Success

Course Success Rates by Unit

Course Success
Science Technology Engineering & Mathematics - Astronomy-FD

	2016-17		2017-18		2018-19		2019-20		2020-21	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Success	765	77%	375	80%	396	79%	387	90%	315	84%
Non Success	152	15%	48	10%	65	13%	27	6%	32	9%
Withdrew	77	8%	44	9%	41	8%	17	4%	27	7%
Total	994	100%	467	100%	502	100%	431	100%	374	100%

Course Success for African American, Latinx, and Filipinx Students

	2016-17		2017-18		2018-19		2019-20		2020-21	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Success	252	65%	134	73%	130	71%	140	84%	125	79%
Non Success	93	24%	25	14%	33	18%	19	11%	18	11%
Withdrew	42	11%	24	13%	20	11%	8	5%	15	9%
Total	387	100%	183	100%	183	100%	167	100%	158	100%

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

	2016-17		2017-18		2018-19		2019-20		2020-21	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Success	513	85%	241	85%	266	83%	247	94%	190	88%
Non Success	59	10%	23	8%	32	10%	8	3%	14	6%
Withdrew	35	6%	20	7%	21	7%	9	3%	12	6%
Total	607	100%	284	100%	319	100%	264	100%	216	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.

I attribute increased course success to active learning strategies, which increase student achievement via:

- greater engagement (due to feelings of success that come from gradually increasing challenge levels and social factors);
- multiple learning opportunities via in-class work, peer-instruction, and out-of-class practice with rapid feedback; and
- emphasis on practicing reasoning versus memorizing facts.

Other aspects of course design aim to boost engagement, including:

- building courses from the ground-up around interesting "big picture" questions (such as the search for intelligent life or how we are all made from "star stuff"),
- highlighting contributions by women and under-represented minorities, and
- modernization of lab courses to have students using images and spectra from telescopes to reason about our universe.

I include assignments designed to coach students in organization and planning sufficient time for the effort needed for learning. I also send assignment reminders to students who miss deadlines, to help keep them on-track, and make efforts to contact absent students.
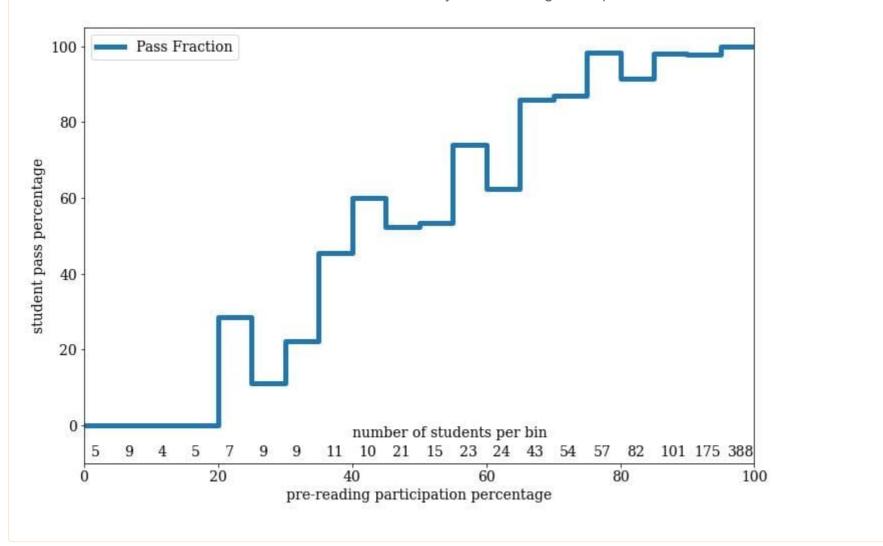
2. Do the data suggest changes are necessary to improve student course success?

☑ yes

☐ no

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

1. Implement further interventions. The success fraction drops steeply with non-attendance (estimated using the lecture course start-of-class quizzes as a proxy, see figure). Students report that non-attendance is due to factors unrelated to classes. I will add to my messages to absent students information about aid such as emergency loans and psychological services, and strive to more promptly send these messages.
2. Continue developing activities and web-based simulations to support active learning. I have already developed first-in-the-world tools for scaffolding general education students' reasoning about topics such as gravitational lensing and dark matter, and I continue developing new tools.
3. I am working to increase engagement in lab courses by emphasizing modern astronomy practices - using astronomical images to reason about our universe and communicate astronomy ideas to the general public.

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.

1. The course success gap has decreased from ~20% to 10%, though it has stabilized at that value.
2. The improvement is likely due to the use of active learning strategies, including continuous in-class formative questioning and small-group work that facilitates peer instruction.
3. The persistence of the gap is, I suspect, due to the unfortunately higher rate of external complications experienced by students in under-represented groups. 90% of unsuccessful students missed 1/5 or more of classes and had low assignment completion rates. While I do not have systematic surveys of absent students, in the conversations I have had they overwhelmingly report outside events interfering with attendance, study time, and assignment completion.
4. I can identify students for extra interventions using the day 1 basic math skills test. While scores on this pre-assessment and course success are mostly uncorrelated, the 10% of students who scored a 6/18 or less had only a 30% course success rate.

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?

I continue to improve upon active learning in my classes through continuous development of tools and activities to scaffold student reasoning. This improves the learning that happens in preparation for, during, and after class meetings.

I will continue adding to highlights of contributions by under-represented minorities, finding additional points in my courses to include this information. This can further boost student engagement.

I aim to improve upon personal interventions with absent students:

- improve upon my currently spotty outreach by building time in my schedule after each class meeting to send at least a quick email to absent students,
- add to my "missed you in class" emails information about resources to help with the issues that affect attendance, and
- add to my upcoming and late assignment reminders information about resources to help with issues that affect students' ability to make time and space for study outside of scheduled class times.

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
Science Technology Engineering & Mathematics - Astronomy-FD

2020-21

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	158	84%	12	6%	17	9%	187	100%
Male	154	84%	19	10%	10	5%	183	100%
Non-Binary	1	100%	0	0%	0	0%	1	100%
Unknown	2	67%	1	33%	0	0%	3	100%
All	315	84%	32	9%	27	7%	374	100%

2019-20

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	183	90%	15	7%	5	2%	203	100%
Male	204	89%	12	5%	12	5%	228	100%
Non-Binary	0	N/A	0	N/A	0	N/A	0	100%
Unknown	0	N/A	0	N/A	0	N/A	0	100%
All	387	90%	27	6%	17	4%	431	100%

2018-19

	Success		Non Success		Withdrew		Total	

	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	189	80%	25	11%	23	10%	237	100%
Male	202	79%	38	15%	17	7%	257	100%
Non-Binary	0	N/A	0	N/A	0	N/A	0	100%
Unknown	5	63%	2	25%	1	13%	8	100%
All	396	79%	65	13%	41	8%	502	100%

2017-18

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	173	83%	15	7%	20	10%	208	100%
Male	194	78%	33	13%	23	9%	250	100%
Non-Binary	0	N/A	0	N/A	0	N/A	0	100%
Unknown	8	89%	0	0%	1	11%	9	100%
All	375	80%	48	10%	44	9%	467	100%

2016-17

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	314	75%	64	15%	40	10%	418	100%
Male	428	78%	87	16%	37	7%	552	100%
Non-Binary	0	N/A	0	N/A	0	N/A	0	100%
Unknown	23	96%	1	4%	0	0%	24	100%
All	765	77%	152	15%	77	8%	994	100%

Success Rates by Ethnicity
Science Technology Engineering & Mathematics - Astronomy-FD

2020-21

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	18	90%	0	0%	2	10%	20	100%
Asian	69	91%	3	4%	4	5%	76	100%
Decline to State/Unknown	11	100%	0	0%	0	0%	11	100%
Filipinx	22	81%	3	11%	2	7%	27	100%
Latinx	85	77%	15	14%	11	10%	111	100%
Native American	5	83%	0	0%	1	17%	6	100%
Pacific Islander	4	80%	1	20%	0	0%	5	100%

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
White	101	86%	10	8%	7	6%	118	100%

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
All	315	84%	32	9%	27	7%	374	100%

2019-20

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	9	90%	1	10%	0	0%	10	100%
Asian	100	96%	1	1%	3	3%	104	100%
Decline to State/Unknown	19	95%	0	0%	1	5%	20	100%
Filipinx	12	80%	1	7%	2	13%	15	100%
Latinx	119	84%	17	12%	6	4%	142	100%
Native American	0	N/A	0	N/A	0	N/A	0	100%
Pacific Islander	4	100%	0	0%	0	0%	4	100%
White	124	91%	7	5%	5	4%	136	100%
All	387	90%	27	6%	17	4%	431	100%

2018-19

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	13	62%	5	24%	3	14%	21	100%
Asian	98	88%	9	8%	5	4%	112	100%
Decline to State/Unknown	5	100%	0	0%	0	0%	5	100%
Filipinx	23	79%	3	10%	3	10%	29	100%
Latinx	94	71%	25	19%	14	11%	133	100%
Native American	2	40%	2	40%	1	20%	5	100%
Pacific Islander	4	50%	2	25%	2	25%	8	100%
White	157	83%	19	10%	13	7%	189	100%
All	396	79%	65	13%	41	8%	502	100%

2017-18

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	7	54%	3	23%	3	23%	13	100%
Asian	87	90%	5	5%	5	5%	97	100%
Decline to State/Unknown	13	87%	1	7%	1	7%	15	100%
Filipinx	11	92%	1	8%	0	0%	12	100%
Latinx	116	73%	21	13%	21	13%	158	100%
Native American	0	N/A	0	N/A	0	N/A	0	100%

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Pacific Islander	10	83%	1	2017-18 8%	1	8%	12	100%

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
White	131	82%	16	10%	13	8%	160	100%
All	375	80%	48	10%	44	9%	467	100%

2016-17

	Success		Non Success		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	19	49%	11	28%	9	23%	39	100%
Asian	176	87%	14	7%	12	6%	202	100%
Decline to State/Unknown	66	89%	8	11%	0	0%	74	100%
Filipinx	39	78%	5	10%	6	12%	50	100%
Latinx	194	65%	77	26%	27	9%	298	100%
Native American	7	100%	0	0%	0	0%	7	100%
Pacific Islander	8	50%	7	44%	1	6%	16	100%
White	256	83%	30	10%	22	7%	308	100%
All	765	77%	152	15%	77	8%	994	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.

Restructuring all courses around active learning strategies has helped all groups, by multiplying the number of opportunities for students to receive feedback on their reasoning.

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.

> [object Object]

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

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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).

The one group showing a decrease in success rates, Native Americans, also have enrollment numbers low enough to make any trends difficult to discern. Since the total turnover of the department in 2017, only 11 Native American students have enrolled in ASTR classes - in two of those years, none enrolled.

Other groups with yearly enrollments low enough to make discerning trends statistically difficult (i.e., fewer than 20 students in a year) are African American, Filipinx, Pacific Islander, and Decline to State. Comparing the average over the past four years to the 2016-17 year, all four of those groups have either increased in success rate or held steady.
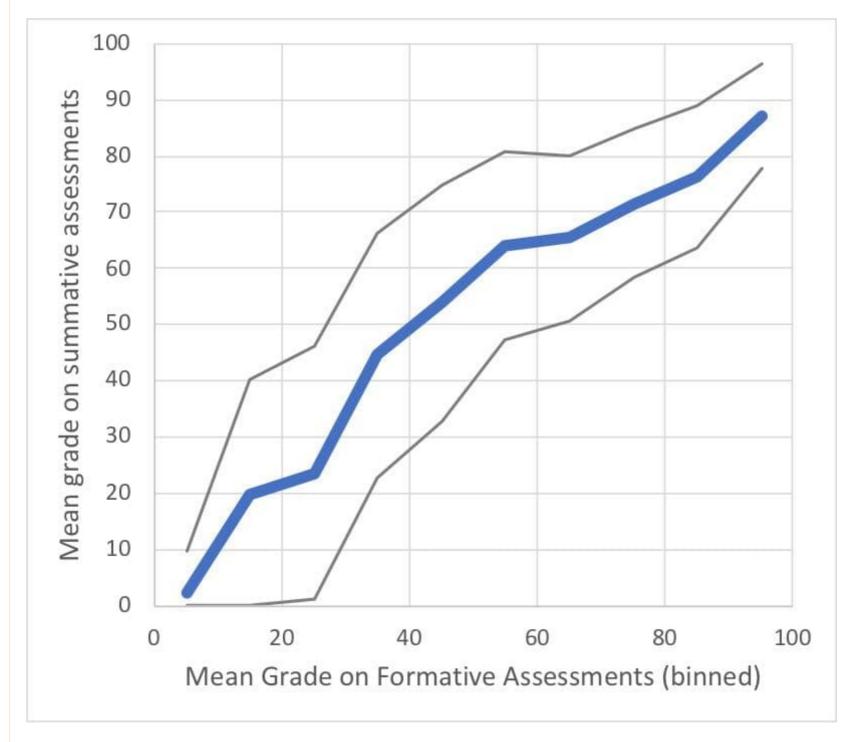
2. Do the data indicate a gap in course success for any of the ethnic groups as compared to other groups?

☑   yes

☐   no

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

Almost all non-success ties to student non-participation, and unfortunately in our society under-represented groups run into more barriers in general, more draws on their time and attention and more external challenges that interfere with classes. Daily and weekly formative assessments that include re-take opportunities - so students can learn from their mistakes - are highly weighted in my classes. However, shifting weight towards summative assessments would not change the situation - students who do not do continuous practice and skill development tend to not succeed at the summative assessments, as well (though with significant scatter, as seen in the plot of summative vs. formative assessment scores, with gray lines indicating the standard deviation in each 10-point bin).

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.

I already:

- theme each course around "big picture" questions to boost engagement,
- assign preparatory work before each class, to support in-class learning,

- use questioning throughout class to build reasoning skills,
- have students work with each other, and I circulate to assist groups,
- have daily and weekly post-class formative assessments with built in feedback and flexible deadlines,
- have students self-reflect on their attendance, performance in the course, and plan improvements.

Students who do those things are generally successful (i.e., 90% of passing students attend at least 70% of classes, while 90% of unsuccessful students miss at least 20%). I also:

- send assignment reminders,
- use timely soft-deadlines for daily and weekly work (deadlines set to maintain steady progress but with automatic extensions to account for outside events interfering), and
- contact absent students during the first three weeks to assist with habit formation.

I will more consistently contact absent students throughout the quarter, and will aim to do so immediately after class meetings.

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

The department is active in outreach, with faculty:

- giving guest talks at schools and local organizations,
- teaming up with computer science faculty to create publicly available, web-browser usable astronomy education simulations (Foothill AstroSims), and
- coordinating with the Peninsula Astronomical Society to operate the Foothill Observatory.

The observatory is currently used only twice per week (Friday evening and Saturday morning) with in-person visitors (aside from pandemic conditions, of course!). Upgrading the observatory for automated observations would allow for daily outreach, both through automatically posting observations online and enabling new modes of cooperation with local schools. This upgrade would also support modernization of the astronomy lab curriculum, a process that has been ongoing and is currently entirely dependent upon data kindly made available by other observatories.

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.