

## 2023-24 Program Review

Program Name: Astronomy

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Academic Year: 2023

Status:

Updated on: September 29, 2023

### **1. Description of Program (200-400 words)**

The Astronomy Department offers the following courses in astronomy:

ASTR 100 Introductory Astronomy, ASTR 115 Solar System Astronomy, and ASTR 125 Stars, Galaxies and Cosmology. These are offered at the 100 level.

The Astronomy Department also offers the following labs in astronomy at the 100 level: ASTR 101 Astronomy Lab and ASTR 103 Observational Astronomy Lab. The ASTR 103 lab is unique in that students have hands-on access to telescopes in CSM's observatory. They learn how to use these telescopes in their observation of the skies.

At the 200 level Astronomy offers a new, as of Fall 2020, math and physics-based course: ASTR 210 Introduction to Astrophysics. This is an advanced course where students learn the basics of astrophysics.

All of the courses and labs are UC and CSU transferrable.

In Fall 2020 two new degrees were offered: an Associate of Science in Astronomy and an Associate of Art in Astronomy. CSM is one of very few community colleges in California offering both an AS and an AA in astronomy.

The introductory courses and labs allow the student to get a basic understanding of the Universe and learn critical thinking skills that will aid them in their post-graduation careers. In addition, these courses satisfy general education requirements needed for transfer to UC and CSU schools.

The AA degree is specifically designed to be interdisciplinary and to draw a diverse set of students who are not necessarily STEM majors. The AA degree provides a broad overview of stars, galaxies, and the solar system, while providing opportunities for students to examine the ways that religion, language, art, and culture use and portray the stars. Students with an Astronomy Associates of Art Degree can find employment at local science museums and planetariums. The AA degree also provides an excellent background for students who want to pursue a career teaching science at local high schools.

More advanced students can obtain an AS degree by enrolling in ASTR 210 and taking supplementary courses in physics, math, and other natural sciences. These students will also use the observatory to pursue independent research on spectroscopy, photometry, and astroimaging. Students have the opportunity to obtain the spectra of stars, use photometry to ascertain the period of pulsation of certain stars as well as determining the size and period of extrasolar planets around their parent stars. ASTR 210 is a very specialized course and is similar to upper-level physics and math courses that attract very serious and dedicated students who go on to pursue advanced degrees in science. This class supplants our previous astroimaging courses ASTR 203 and 204.

The Astronomy Program is committed to attracting a diverse set of students drawing from all members of our community and all socioeconomic and ethnic backgrounds. Astronomy is a window onto the Universe at large and has links to all STEM disciplines. Study in this field can help students develop critical thinking skills, prepare students for their future careers or further academic study, and foster a wonder and inspire curiosity in science and the beauty of the Universe. To achieve these goals, we highlight and celebrate the many accomplishments of

astronomers from under represented communities, we invite speakers to campus from these communities, and we run many outreach events (Jazz Under the Stars, Project Star Gaze, Family Science Day, CSM and high school career fairs) to foster interest in astronomy and other STEM fields from grade school and high school students.

## **2. Results of Previous Program Review (200-500 words)**

### **a, b) Previous Goals and Results Achieved**

One of the previous goals was to enable students to be able to use the iclicker response system without having to incur any fees. IClicker enables students to collaborate and to work with one another on in class questions and, in general, inspires student confidence. The first two weeks are free, but a fee of \$15.95 is necessary to continue using iclicker. In this year's program review, Astronomy is submitting a request to purchase a 500 student site license for the department, so that students will no longer incur a fee for the usage of iclicker.

Another goal, was to get the observatory back in working order, since it was effectively shut down during Covid period. Our observatory has lots of equipment, that needed a tune-up, and that has been achieved by our technical staff. This semester is the first time, since 2020, that we have an excellent working observatory and the students of ASTR 210 are using it.

Yet, another goal was the purchase of planetarium shows, to enhance relevance to our minority and under served student population. The problem is in procuring funds to purchase these shows, which have multi-year licensing agreements.

The last goal, was to get ASTR 210 Foundations of Astrophysics class running again. It was always difficult to get 20 students to take such an advanced course. Since we can now have a class with 10 students, we were able to have ASTR 210 back with 16 students.

### **c) SLO Assessment and Course Outline Updates**

SLO assessment and course outline updates are not complete and the department hopes to make substantial progress this academic year. Astronomy has had a problem with students taking the ASTR 101 labs without the required math prerequisite. Our division curriculum specialist has been working with us to obtain a solution.

### 3. Current Program Review (200-400 words)

Below are the enrollment rates for the years 2022-2023 for the College as a whole and for the Astronomy Program for the years 2021-2022 and 2022-2023.

<b>College Stats 2022-23</b>	<b>Ethnicity</b>	<b>First Gen</b>	<b>Age</b>	<b>Gender</b>	<b>Total</b>
<b>Headcount (unduplicated)</b>	Latinx 32% White 26% Asian 20% Filipino 7% Multiracial 7% Black 3% Pacific Islander 2% Unknown 3% Native American 0%	45% of our students are the first in their family to go to college.	66% 24 yrs. and under 18% Ages 25-34 17% over 35 yrs.	49% Female 48% Male 3% Non-disclosed or non-binary	13,180 students
<b>Enrollments (duplicated)</b>	Latinx 35% White 26% Asian 16% Filipino 6% Multiracial 8% Black 3% Pacific Islander 3% Unknown 3% Native American 0%	47% of enrollments were by students who are the first in their family to go to college.	76% 24 yrs. and under 13% Ages 25-34 11% over 35 yrs.	48% Female 50% Male 2% Non-disclosed or non-binary	37,014 enrollments
<b>Astronomy Stats 2022-23</b>	<b>Ethnicity</b>	<b>First Gen</b>	<b>Age</b>	<b>Gender</b>	<b>Total</b>
<b>Enrollments (unduplicated)</b>	Latinx 35.4% White 28.0% Asian 14.5% Filipino 6.7% Multi Races 8.7% African American 2.7% Pacific Islander 2.2% Unknown 2.0% Native American 0%	45.2% of enrollments were by students who are the first in their family to go to college.	83.9% Under 22 yrs. 11.2% Ages 23-39 1.8% over 50 yrs.	44.3% Female 52.4% Male 3.3% Unknown	601 enrollments
<b>Astronomy Stats 2021-22</b>	<b>Ethnicity</b>	<b>First Gen</b>	<b>Age</b>	<b>Gender</b>	<b>Total</b>
<b>Enrollments (unduplicated)</b>	Latinx 34.5% White 25.2% Asian 16.9% Filipino 6.2% Multi Races 8.7% African American 1.8% Pacific Islander 4.0% Unknown 2.8% Native American 0%	48.6% of enrollments were by students who are the first in their family to go to college.	82.9% Under 22 yrs. 15.3% Ages 23-39 1.8% over 50 yrs.	50.2% Female 47.0% Male 2.8% Unknown	504 enrollments

**a) Student Population Equity**

Findings	Analysis	Resources	Plans to Address Opportunity Gaps
<p><b>1.</b> Enrollments in Astronomy have increased from 504 in 2021-22 to 601 in 2022-2023, a nearly 20% increase.</p>	<p>This increase was most likely due to returning to face to face modality, rather online. Students began to feel more engaged when they can return to class and can see their friends and professor in person.</p>	<p>None needed.</p>	<p>No plans necessary.</p>
<p><b>2.</b> African American enrollment increased 50% from 1.8% to 2.7% from 2021-22 to 2022-23.</p>	<p>This is a welcome increase from 2021-22 and approaching pre-pandemic levels.</p>	<p>None needed.</p>	<p>No plans necessary.</p>
<p><b>3.</b> There was a modest decrease in first gen students from 48.6% to 45.2% from 2021-22 to 2022-23.</p>	<p>This slight decrease may have to do with more first gen students having to return to work to help support their families.</p>	<p>None needed.</p>	<p>No plans necessary.</p>

b) **Modes of Delivery equity:** Discuss any gaps in student success, persistence, satisfaction, utilization or enrollment, and student population served across different delivery modes. Please comment on in person services/instruction vs hybrid services options/instruction vs completely online services/instruction.

- Changes since last Program Review: What has changed, in terms of gaps, since last program review?
- Analysis of gaps: What factors do you feel contribute to these gaps?
- Plans to address opportunity gaps: What has your program done to address these equity gaps? Include information on:
  - interventions implemented
  - any successes in closing gaps
  - ongoing challenges

## 2023-24 Program Review

Changes since last Program Review	Analysis of Gaps	Plans to Address Opportunity Gaps
<p><b>1.</b> It is difficult to adequately assess the success rate of face-to-face vs online, since excused withdrawal from a class could affect the success rate. With the above caveat in mind, it was found that African Americans had a success rate of 30.8% in the face-to-face modality but a success rate of 77.3% in asynchronous and synchronous modalities.</p>	<p>It is difficult to analyse such a discrepancy and there could be many factors. In my face-to-face classes, students have to complete their assignments and to use iClicker, a student response system. Iclicker is free for the first 2 weeks, but a student has to pay \$15.99 to use it the rest of the semester.</p>	<p>To address the fact that students have to pay for their iclicker usage after the 2 week grace period, I have submitted a requisition for a site license for Astronomy. Students would no longer have to pay and this might address part of the problem.</p>

(c) **Challenges and Opportunities:** Describe any **other** particular challenges, opportunities, or other factors that impact the success of your program (e.g., natural or health disasters, assessing whether a degree program is meeting its learning outcomes, developing new degree programs or courses, adapting to a changing student population, keeping a flagging program alive, starting a learning community, resources, etc.).

- A) A big problem is trying to get enough students to sign up for an advanced course in astrophysics. We were successful this semester in getting 16 students to take the course. This is the first time in three years that this course has run. This course is also important for the attainment of the AS degree in Astronomy. Hopefully, after having taken this course, there will be students who will be able to get their AS degree in Astronomy.
- B) Another problem is being able to purchase planetarium shows. The problem is obtaining funds to purchase a show that is licensed for a number of years. Would we pay yearly for such a license or could we purchase a show all at once.

## 4. Planning

a) **Discipline-level and SLO (Student Learning Outcomes) assessment/Student Services and SAO (Service Area Outcomes) assessment for 2023-2025:** Describe learning or area assessment plans for this Program Review cycle, **including any activities planned to address equity or delivery mode gaps.** Your summary should explain:

SLOs/SAOs	Assessment Plan	Resources for SLO/SAO assessment
<p><b>1.</b> Astronomy is behind in assessing SLOs for our courses.</p>	<p>SLOs will be assessed for each of our labs and classes during this academic year.</p>	<p>We will use PRIE data extensively in assessing SLOs.</p>
<p><b>2.</b> Astronomy is also behind in updating our course outlines.</p>	<p>An issue has appeared with some students being able to enroll in astronomy labs (ASTR 101) without having the math prerequisite. The original prerequisite was MATH 110, which has been discontinued and some students have been able to register, without their prerequisites being checked.</p>	<p>We will be working with our curriculum specialist to rectify the problem.</p>

### b) Program goals

A) Astronomy is planning a major renovation of the planetarium, which would include state of the art high resolution planetarium projectors, an elevator that would allow us to use our CHRONOS opto-mechanical projector, an enhanced and more inviting lobby for the planetarium, and a Foucault pendulum, that would demonstrate the Earth's rotation. Such a renovation would be fantastic for the department.