Comprehensive Program Review Report

Program Review - Astronomy

Program Summary

2023-2024

Prepared by: Francisco Banuelos and Marc Royster

What are the strengths of your area?: Astronomy has historically been very efficient. Since 2017/2018, the FTES/FTEF ratio has been over 20. During the pandemic, the ratio peaked at 27.50. For 2022/23, we were at 23.83. Excluding pandemic years, the success rates have increased year to year up to 66.2% for 2022/23. Anticipating the demand, we have increased the number of sections we offer each year. Pre-COVID (2017-2019) we offered two sections each year, one in the fall and another in the spring, serving an average of 100 students yearly. Now, the enrollment at census has nearly reached 150 students (without jeopardizing success rates) with six sections being offerred.

Besides our numbers, our students have formed an astronomy club, the Giant Astronomy Students (GAS) club. The club provides an opportunity to accelerate the growth of the program through outreach and can serve as a gateway to the STEM disciplines.

We have a full-time instructor in Physics, who teaches two sections of Astronomy, and an adjunct faculty who teaches one. During the summer, we also have an online adjunct faculty member available to teach, if needed.

Academic Year	17/18	18/19	21/22	22/23
Census Enrollment	93	106	124	143
Success Rate (%)	55	56	59	66
FTES/FTEF Ratio	23	27	21	24

What improvements are needed?: Astronomy is a science course for non-science majors without a lab component. However, it is still important for students to understand the relationship between observations and theory. Student field trips could improve the understanding and student learning experience. This could be done as an instructional supplement or via the GAS club.

A telescope that can be used during the daytime has the potential to be utilized during classroom time. We have listed obtaining a solar telescope as an actionable item. The dynamic engagement that a telescope provides can serve as a catalyst to increase interest in STEM majors in general. In addition, such a telescope presents an opportunity to capture COS students during potential outreach activities on campus (Club Rush, Mental Health Fair, etc).

Describe any external opportunities or challenges.: The Astronomy 10 course is presented for non-science majors but benefits being auxiliary to the Physics program. As such a number of resources available such as the MESA Program which has been funded by the State, creates an amazing opportunity for our students. Though MESA focuses on STEM, our Astronomy courses are taught within the same building, which gives non-STEM students an opportunity to explore the STEM fields.

This is particularly important because non-science majors historically struggle with mathematical reasoning and it is typically a barrier to success in Astronomy 10.

Overall SLO Achievement: For the 2019-2020 Outcomes Assessment Cycle:
Given Kepler's third law of planetary motion, students will be able to calculate the period of a planet based on its average distance to the Sun. Approximately, 50% of my students answered those two questions correctly.

Given the luminosity of two different stars, students will be able to calculate the relative temperatures of the given stars. 65% of my students answered the question on the test correctly.
Changes Based on SLO Achievement: No curriculum changes. Yet, there have been an increase of extracurricular activities.
Overall PLO Achievement: N/A
Changes Based on PLO Achievement: N/A
Outcome cycle evaluation: Outcomes are up for assessment in Spring 2024.

Action: Increase student engagement with daytime observation equipment

Purchase solar telescope with H-alpha filter.

Leave Blank:
Implementation Timeline: 2022 - 2023, 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Marc Royster
Rationale (With supporting data): A solar telescope provides a unique opportunity for students to observe dynamic activity occurring on the sun. This activity ranges from solar flares bigger than the Earth and prominences that can extend beyond the size of the Sun itself. In particular, such a telescope is used during the daytime which means it can be utilized during class or during events on campus, serving as an essential outreach tool. The engagement provided by the solar telescope has the potential to increase both FTES and success rates.

Below is an example of the type of telescope that will serve this need. After shipping, tax, and potentially other accessories we are requesting $4000.

https://cloudbreakoptics.com/collections/lunt-and-coronado/products/copy-of-solarmax-iii-70mm-double-stack-with-10mm-blocking-filter-324004

See attached.
Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2023 - 2024 10/11/2023
Status: Continue Action Next Year
We were not able to purchase the telescope. Due to increase in prices, we are now requesting $4500.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Equipment - Instructional - Solar Telescope (Active)
Why is this resource required for this action?: A solar telescope provides a unique opportunity for students to observe dynamic activity occurring on the sun. This activity ranges from solar flares bigger than the Earth and prominences that can extend beyond the size of the Sun itself. In particular, such a telescope is used during the daytime which means it can

be utilized during class or during events on campus, serving as an essential outreach tool. The engagement provided by the solar telescope has the potential to increase both FTES and success rates.

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Notes (optional):

Cost of Request (Nothing will be funded over the amount listed.): 4500

Related Documents:

solar_telescope.png

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Action: (Completed) Budget for Astronomy

We need to have a specific budget for Astronomy. I will work closely with our Department Dean, and the Division Chair to identify the specific needs of this course and agree on an adequate amount for equipment and supplies.

Leave Blank: Continued Action

Implementation Timeline: 2023 - 2024

Leave Blank:

Leave Blank:

Identify related course/program outcomes: All three course outcomes of Kepler's Third Law, Stellar Luminosity, and Einstein"s Equation could be improved once this action is completed.
District objectives #1 and #7 are linked to this action.

Person(s) Responsible (Name and Position): Shirin Sadeh(instructor) , Francisco Banuelos, Dean, and Ryan Froese, Division Chair

Rationale (With supporting data): There is currently no budget for the Astronomy course while there are many expenses for this 3 hour per week course. This course has its own specific needs which require resources allocation. Our success rate in this program has increased by 14% since the 2018-2019 academic year. Enrollment in this program proves to be consistently high and this necessitates a closer and more attentive response to the ever growing needs of this program.

Priority: Medium

Safety Issue: No

External Mandate: No

Safety/Mandate Explanation:

Update on Action

Updates

Program Review - Astronomy

Update Year: 2023 - 2024 10/11/2023
Status: Action Completed
Astronomy now has a budget augmentation of $3000/year.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Equipment - Instructional - Specific departmental budget. (Active)
Why is this resource required for this action?: The Astronomy program currently does not have a specific budget allocated to it.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 3000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years
District Objective 3.1 - By 2021, increase the placement rates into transfer-level English and transfer-level math for targeted groups that fall below the District Average.
District Objective 3.2 - By 2021, increase the percentage of students in targeted groups who complete transfer-level English (by 10 percentage points) and transfer-level math (by 5 percentage points) within their first year
District Objective 4.1 - Increase the use of data for decision-making at the District and department/unit level
District Objective 4.2 - Improve organizational effectiveness by strengthening operations of and communication between District departments, divisions, and constituents

District Objectives: 2013-2015
2013-2015: District Objective #1 - District Objective #1 for 2013-2015: Provide effective academic support services as measured by an increase in the rate at which students successfully complete courses.
2013-2015: District Objective #7 - District Objective #7 for 2013 - 2015: Allocate resources based on an accountable and systematic District-wide planning and budget development process that links this allocation to Institutional Program Reviews and the Strategic Plan.

District Objectives: 2015-2018
District Objectives - 1.1 - Increase overall enrollment by 1.75% annually
District Objectives - 2.1 - Increase the number of students who are transfer-prepared annually.
District Objectives - 2.2 - Increase the number of students who earn an associate degree or certificate annually.
District Objectives - 2.3 - Increase course success and completion rates in pre-transfer English, Math, and English as a Second Language courses annually.
District Objectives - 2.4 - Increase Career Technical Education course success rates and program completion annually.
District Objectives - 3.1 - Reduce the achievement gap of disproportionately impacted student groups annually, as identified in the Student Equity Plan.
District Objectives - 4.1 - Improve operational systems based upon data driven decision-making as described in the COS 2.0 manuals.

Program Review - Astronomy

District Objectives - 4.2 -Improve the efficiency, effectiveness and communication of human, physical, technological, and financial resources to advance the District Mission.

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.