Program Review and Planning

OVERVIEW OF PROGRAM REVIEW AND PLANNING FOR INSTRUCTIONAL PROGRAMS

Program Review is about documenting the plans you have for improving student success in your program and sharing that information with the community. Through the review of and reflection on key program elements, program review and planning identifies program strengths as well as strategies necessary to improve the academic discipline, program, or service to support student success. With our new Guided Pathways plan, this review becomes even more crucial for the success of our students and college.

We are using the Strengths, Opportunities, Aspirations, Results (SOAR) strategic planning technique to help us focus on our current strengths and opportunities, create a vision of future aspirations, and consider the results of this approach.

BASIC PROGRAM INFORMATION

Academic Year
2018-2019

Are you completing a comprehensive or annual PRP?
Comprehensive

Department Name
Earth, Space, and Environmental Sciences

Discipline Name
Astronomy (ASTR)

Department Chair Name
Wing Cheung

Division Name
Mathematics, Science and Engineering

Website address for your discipline
https://www2.palomar.edu/astronomy/

Discipline Mission statement
The mission of the Astronomy Program at Palomar College is educate our students in the fundamental science of astronomy as a way to understand our universe. We achieve this mission by providing high quality educational opportunities in astronomy for a diverse student population who wish to achieve general education science credit, earn a certificate of achievement, or to fulfill transfer requirements for a degree in astronomy at California universities. As one of the core STEM disciplines, our astronomy courses promote the understanding of basic science and physical processes to create a science literate society and encourage student participation in STEM disciplines and careers.

(click here for information on how to create a mission statement)

Does your discipline have at least one degree or certificate associated with it?
Yes

Are any of your programs vocational (CTE/CE)?
No

List all degrees and certificates offered within this discipline.
Certificate of Achievement (CA) - Astronomy

Please list the names and positions of everyone who helped to complete this document.
Mark Lane (Professor of Astronomy & Planetarium Director)
W. Scott Kardel (Assistant Professor of Astronomy and Assistant Planetarium Director)

Full-time faculty (FTEF)
2.0

Part-time faculty (FTEF)
0

Classified & other staff positions that support this discipline
ADA 20%; Instructional Assistant IV 10%

Additional hourly staff that support this discipline and/or department
None

PROGRAM INFORMATION

PROGRAM OUTCOMES

Begin this section by reviewing the Program Review reports for courses and programs in TracDat. All active course and program outcomes should be systematically assessed over a 3-year cycle.

- **Program** = Leads to a degree or certificate
- **Discipline** = A group of courses within a discipline

*Programs will be able to complete program completion and outcome questions.

How well do your program's learning outcomes communicate the scope and depth of the degree/certificate offered and align with employer and transfer expectations?
We believe that our program learning outcomes are comprehensive and communicate the scope and depths of our transfer courses and certificates. They are developed in consultation with our counterparts at key transfer institutions for our students (i.e. SDSU, CSUSM).

Describe your program's plan for assessing program learning outcomes.
We assess our program learning outcomes over a 3-year cycle by reviewing student performance in our key transfer classes. Changes in learning assessments are considered and made if they are not effective in summarizing outcomes.

Summarize the major findings of your program outcomes assessments.
Students have met or exceeded all of our program outcome assessments except one. We are struggling with getting students to pass the SLO on the seasons. We are currently working on a strategy that will better assess the students in a way that will more accurately quantify this outcome.

Reflecting on the major findings you summarized, what are some questions you still have about students' learning in your program that you have not yet been able to address with your outcomes assessments?
We would like data on how many students attempt the CA versus complete the CA. This will give us guidance on how to tailor the certificate to be more inviting while still having an acceptable level of integrity for achievement.

Depending on the degree or transfer goals of our students, they have the choice of three different GE pathways:

- Associate Degree GE Requirements
- CSU GE Requirements
- IGETC Requirements

Palomar College has identified a set of General Education/Institutional Learning Outcomes, which represent the overall set of abilities and qualities a student graduating from Palomar should possess.Click here for a link to Palomar's GE/ILOs.

How do the courses in your discipline support General Education/ Institutional Learning Outcomes? In your response, please specify which GE/ILO(s) your discipline supports.
A number of courses in the Astronomy discipline support the following General Education/Institutional Learning Outcomes:
1) Communication: Students enrolled in astronomy courses at Palomar College are required to accurately communicate their knowledge of astronomical content and thoughts about astronomical topics in order to successfully pass the course.

2) Computation:Some of the topics in astronomy have computation components that help students understand the underlying concept. Students are required to make simple calculations on assigned homework and on quizzes and exams.

3) Creative, Critical, and Analytical Thinking: The fundamentals of astronomy are concept oriented. Students are taught how to think critically about these topics and are assessed on their ability to do so on assigned homework and exams.

4) Community, Multicultural/Global Consciousness and Responsibility: The history of astronomy is multicultural. Efforts are made in class to have students understand the global effort throughout history to create our understanding of the universe. In the 20th Century, astronomy became more inclusive to women in science. Today astronomy enjoys near parity when it comes to astronomers that are women vs. men. Efforts are made in class to describe the contributions of women to the subject in astronomy, to make students aware that it is a gender-blind effort, and to encourage women to become astronomers in today's world.

5) Foundation Knowledge of Discipline: Successful students are required to demonstrate an understanding of astronomical concepts, principles, and processes, which entails a fundamental knowledge of the discipline.

Summarize the major findings from your course outcomes assessments that are related to the General Education/Institutional Learning Outcomes that your discipline supports.
Students are meeting all Astronomy 100 Lecture (except one described above), and all Astronomy 105L course assessments with scores above the 70% threshold. This shows us that students are meeting the course assessments that support the college GE/ILO.

PROGRAM COMPLETIONS

Student success is at the core of what we do in assisting students in achieving their goals.

The Chancellor’s Office Vision for Success stresses the importance of Program Completion as a major goal for our students. In addition, transfer and career readiness are key components of Palomar College’s mission statement. This year, our funding formula has also changed reflecting this emphasis, providing additional funding as a function of the number of completions.

In this section we will identify a program standard and a stretch goal (what you would like to move toward) for program completions.

The standards represent the lowest number of program completions deemed acceptable by the College. In other words, if you were to notice a drop below the set standard, you would seek further information to examine why this occurred and strategies to increase completions.

In this section we will identify a program standard and a stretch goal (what you would like to move toward) for programs.

List the number of completions for each degree/certificate for the previous year.
AS - ASTR (1 student)
CA - ASTR (2 students)

Have your program completions Increased, decreased, or stayed the same over the last 5 years?
Decreased

What factors have influenced your completion trends?
The astronomy CA stayed the same (2 students) but the astronomy AS completion decreased by 1. This is explained by the elimination of the AS degree in the 2017-18 school year.

Are the courses in your discipline required for the completion of other degrees/certificates?
No

Do you have programs with 7 or fewer completions in the last 5 years?
Yes

What steps are you taking to address these completions?
In 2017-18 school year the AS was eliminated.

To increase the number of CAs completed the requirements are being re-written to increase student success and to attract more students to the program.

What is your program standard for program completion?
2.0%

Why did you choose this standard?
Students who become astronomers earn advanced degrees in the subject. Most students at the community college level who are looking to earn a degree in astronomy will transfer to the university level without earning an AS degree or CA. Our subject discipline mostly serves students who are looking to satisfy their GE requirement in they physical sciences and are not looking to become astronomers. However, there are a few students who are interested in having some sort of official document of accomplishment in astronomy (for a variety of reasons) and so we offer the CA. We feel that the current rate of 2 per year is reasonable based on these factors.

What is your Stretch goal for program completion?
3.0%

How did you decide upon your stretch goal?
Increasing by one CA per year is a desirable stretch goal at this time.

ENROLLMENT TRENDS

Palomar College uses the WSCH/FTEF ratio as one indicator of overall efficiency in addition to the overall fill-rate for courses.

Although the college efficiency goal is 525 WSCH/FTEF and 85% fill-rate (minimal), there are many factors that affect efficiency (i.e. seat count / facilities / accreditation restrictions).

This information can be found by going to the "Program" page in the PRP Data Dashboard.

What was your efficiency trend over the last 5 years? Was it expected?
Over the last 5 years we have exceeded the efficiency goal by a healthy amount. 5 years worth of data shows no obvious trend upwards or downwards. The college has suffered an enrollment drop in recent years but it seems that astronomy is still a desirable subject choice for students looking to fulfill their GE requirements.

What factors have influenced your efficiency trends?
Mark Lane took a sabbatical during the Fall 2017 semester.

Are there particular courses or programs that are not getting sufficient enrollment, are regularly cancelled due to low enrollment, or are not scheduled at this time? What is contributing to this issue? Does this level of efficiency meet the needs of the program and the district?
No ASTR classes have been cancelled due to low enrollment. However, ASTR 105L night section has been struggling with low enrollment. We are considering moving the day/time the lab is offered to make it more attractive to students.

The Chancellor's Office Vision for Success stresses the importance of reducing equity gaps through faster improvements of underrepresented groups.

ACCJC also requires that colleges establish institutional and program level standards in the area of success rates. These standards represent the lowest success rate deemed acceptable by the College. In other words, if you were to notice a drop below the rate, you would seek further information to examine why the drop occurred and strategies to address the rate.

Click on this link to review the course success rates (A, B, C, or Credit) for your discipline.

In this section we will identify a course success rate standards and a stretch goal (what you would like to move toward) for programs.

Course Success Rates by gender, age, ethnicity, special population, location, and modality (You can access the Student Equity Plan on the SSEC website https://www2.palomar.edu/pages/ssec/)

COURSE INFORMATION

COURSE SUCCESS AND RETENTION

What is your program's standard for Discipline COURSE Success Rate?
50.0%

Why did you choose this standard?
Astronomy can be a difficult subject for many students. It requires students to have some K-12 science experience that many students are currently lacking. When choosing a general education course to take to fulfill their GE requirements, many choose astronomy not realizing that they will have to work harder than other non-science courses. Even with careful and patient instruction, many of these students perform at a

lower level than they otherwise would in non-science courses. It is important that our astronomy program at Palomar College adheres to the standards that CSU and UC schools demand in their astronomy courses if we are to maintain articulation agreements with the university system.

One development that is becoming apparent is an increase in the number of our students who are receiving financial aid. Although this allows them access to college that they might not otherwise afford, many of these students enroll in astronomy not expecting a subject that is rigorous and challenging. To keep their financial assistance, they must be enrolled at the end of the semester but many of them stop showing up to class and effectively drop out without officially dropping the course. Many "FW"s are assigned at the end of the semester which drags down our success rate.

For these reasons it is unrealistic to expect that the astronomy discipline will meet the standard for Discipline Course Success Rate that the rest of the college holds. The data provided by the Institutional Research and Planning database shows that a 50% success rate for the astronomy discipline is a realistic goal for astronomy. At this time we are averaging around 50% and we feel that we can keep a 50% rate a reality and a norm for the discipline.

Has your overall course SUCCESS rates increased, decreased, or stayed the same over the last 5 years?
Stayed the same

Was this expected?
Yes. Astronomy continues to be both an interesting and challenging course for most students.

What is your Stretch goal for COURSE success rates?
52.0%

How did you decide upon the goal?
We believe that we can increase our course success rate but our plan of action will take some time before results are apparent. We believe that a small increase to the existing rate is a reasonable stretch goal. If we are successful, we can increase the next stretch goal and so on.

Have your overall course RETENTION rates increased, decreased, or stayed the same over the last 5 years?
Increased

Was this expected? Please explain.
Yes. Our experience is that many students who are receiving financial aid are enrolling in the astronomy course and staying enrolled for the duration of the semester to keep their financial aid. Unfortunately, many of these students are not showing after the census date and are not passing the class - negatively affecting our success rate.

Are there differences in success or retention rates in the following groups? (choose all that apply)
When or where (time of day, term, location)

When or Where: Why do you think differences based on when or where the course is offered exists? What do you need to help close the gap?
We are seeing a drop off in our evening enrollments. This might be related to labor forces since a stronger economy means fewer students returning to school - many of these returning students are older and would normally prefer a night class.

Are there differences in success/retention between on-campus and online courses?
N/A

Do you have any best practice methods you use for online courses to share with the community?
We do not offer online courses in astronomy.

COURSE OUTCOMES

How is course assessment coordinated across sections and over time?
We assess our course student learning outcomes on a 3-year cycle by reviewing student performance on key questions on exams. The full-time astronomy professors at Palomar conduct the assessments and we assess all sections of ASTR100 and ASTR105L. Sometimes we enter SLO results more frequently than every three years. Results are entered into TracDat.

How have you improved course-level assessment methods since the last PRP?
Our last PRP was completed last year. SLO assessment methods have remained the same since then.

Summarize the major findings of your course outcomes assessments.
Overall our students are meeting or exceeding our minimum standards for SLO success with one nagging exception - the seasons. This has been a long standing failure in our SLOs and we have a strategy to change the way we assess the SLO questions regarding the seasons in a way that might raise the success rate for this outcome.

Reflecting on the major findings you summarized, what are some questions you still have about students' learning in your courses that you have not yet been able to address with your outcomes assessments?
- Even though we are having success getting our students to pass our outcome questions, we still struggle with overall success rate for our courses. As noted above, a major reason for this is the difficult nature of astronomy and the lack of preparedness the students bring to the subject. However, we feel that we can focus more attention on getting students to successfully comprehend additional topics that are not addressed through our SLOs.. In doing so, we feel that we could steadily raise the overall success rate. To be clear, we don't feel that we will ever have a success rate of 70% without lowering our standards for the course and for transfer.

- Another question we would like data on is do students struggle more when they take ASTR 105L lab class at a substantially later date than when they took the ASTR 100 lecture compared to students who are taking the courses concurrently?

- Will offering an online version of the ASTR lecture increase or decrease our success rate for the course?

What are some improvements in your courses that have been, or can be, pursued based on the key findings from your course learning outcomes assessments?
The two full time instructors meet from time to time to discuss best practices in teaching astronomy so that we can keep our SLO pass rates high. Different teaching methods are explored and some are implemented in areas where student comprehension is lacking. A change in the way we teach the subject of the seasons could increase the success rate for the SLO to a passing level. Additional methods of instruction, including additional homework, videos, and exercises related to the subject might help.

PROGRAM CURRICULUM ALIGNMENT, MAPPING, SCHEDULING, & PLANNING

The Chancellor's Office Vision for Success stresses the importance of decreasing the average number of units accumulated by CCC students earning degrees.

Palomar College's Guided Pathways plan includes clarifying paths for students by sequencing course offerings so that they support scaffolding and timely completion. Our goal is to ensure learning through:

- The mapping and assessment of clear program outcomes that are also aligned to employer and/or transfer institution expectations.
- Engaging and applied learning experiences.
- Effective instructional practices to support students in achieving success.

How do your course outcomes help your students achieve their program outcomes?
We work closely with our colleagues at CSUSM and other universities to ensure that our courses and programs are aligned with their requirements so that students are well-situated to succeed upon graduation.

How do your degree maps and scheduling strategy ensure scaffolding (how all parts build on each other in a progressive, intentional way)? How do you share the maps with students?
We regularly consult with our colleagues in other campus departments to ensure that classes are scheduled in a manner that students can progress through our program efficiently.

What is your departmental strategy on how you schedule your courses including the time of day you offer courses? Do you use fast track or block scheduling (putting required classes near each other) to organize required classes (Particularly to meet the needs of disproportionately impacted students)?
We offer day, night, on-campus, satellite campus, full-semester, and summer session courses in order to meet the needs of a wide variety of students. We offer some lecture and lab classes back-to-back for the most efficient use of student time.

How do you work with other departments that require your course(s) for program completion?
N/A

Does your discipline offer cross-listed courses?
Yes

How do you work with the other department(s) to ensure consistent curriculum per the COR and minimum qualifications? How do you coordinate course scheduling?
We try to schedule astronomy classes in typical block scheduling format so that they coordinate with other departments.

Are there curriculum concerns that need to be resolved in your department? What are they?
No.

Are there courses that should be added or removed from your program - please explain?
There are several legacy astronomy courses listed in the college catalog that need to be retired. These courses are from when we used to offer an AS degree in astronomy that provided options for students who needed additional units to complete the degree. Some of these courses were from a time when the administration used to be more lenient in allowing low enrollment courses to move forward. An effort is being made by the astronomy faculty to deactivate these legacy courses.

How is the potential need for program/course deactivation addressed by the department?
Full-time faculty regularly review course outlines of record as well as SLO results to determine the need for specific courses. We also consider the courses needed to earn the CA in astronomy. Any courses that

are no longer offered or needed are considered for deactivation.

Is your department pursuing non credit or not-for credit options at this time?
Yes

Are there areas you would like to expand?
We would like to offer a non credit or not-for credit option for astronomy. Years ago the college offered a series called "Lifelong Learning". We offered "Backyard Astronomy" and it was very successful until the College pulled the plug on the program. Please offer this again!

Click here for information about Noncredit and Community Education

Is your department offering online classes?
No

How do you consider student needs when determining which classes and how many classes should be offered online versus face-to-face?
N/A

Describe other data and/or information that you have considered as part of the evaluation of your program
Labor market data and degree/program offerings at the university level are considered when evaluating the astronomy program.

CAREER AND LABOR MARKET DATA

The Chancellor's Office Vision for Success stresses the importance of increasing the percent of exiting students who report being employed in their field of study. It is important for us to consider how ***all*** of our programs connect to future careers.

Go to this website https://www.onetonline.org/ and enter your discipline in the bubble on the top right for ideas about potential occupations. Click on an example to see more detail.

What kinds of careers are available for people who complete your programs (and/or transfer)? (Refer to link above) Are there any new or emerging careers and if so how would the new or emerging careers impact your future planning?
There are few careers in astronomy in the traditional sense. Compared to other sciences, professional astronomers are few and far between. However, astronomy (19-2011.00) is listed as having a "Bright Outlook."

Most astronomers need to get their PhD to be employed in the field working at a university or observatory working as an instructor or researcher. However their are also positions in public outreach at observatories and planeteria explaining astronomy to the general public.

Other related careers listed are:
19-1021.00 Biochemists and Biophysicists
25-1051.00 Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary
25-1054.00 Physics Teachers, Postsecondary
17-3029.01 Non-Destructive Testing Specialists

What are the associated knowledge, skills, abilities (KSA's) needed for the occupations listed above? (click examples in the link above to get ideas)
The KSAs needed for employment in the above fields are knowledge of astronomy, physics and

mathematics.

In addition to astronomy knowledge needed includes:
Physics
Mathematics
Computers and Electronics
English Language
Education and Training

Skills needed include:
Science
Active Learning
Critical Thinking
Reading Comprehension
Mathematics

Abilities needed include:
Deductive Reasoning
Inductive Reasoning
Mathematical Reasoning
Near Vision
Oral Comprehension

How does your program help students build these KSA's?
By completing courses in astronomy at Palomar College, successful students have a basic background in science and fundamental astronomical concepts that, when combined with the proper knowledge in physics and mathematics, will enable them to continue their education at other 4-year institutions. Many of these KSAs are fundamental items (English Language, Speech Clarity, Reading Comprehension) that a student learns in a variety of classes while obtaining a college degree.

The required lecture, lab exercises, writing and reading assignments should encourage students to acquire and/or enhance the KSA's listed above.

Have you incorporated work based learning (work experience, internships, and/or service learning) into your program?
No

Do you want more information about or need assistance integrating work-based learning into your program?
No

How do you engage with the community to keep them apprised of opportunities in your program?
Advertisement at Palomar College Planetarium. Community outreach.

Program Goals

In the previous sections, you identified opportunities for improvement. Using these opportunities, develop 3-year SMART goals for your department. Goals should be Specific, Measurable, Attainable, Relevant, Time-Specific. Ensure your goals align with the mission of your department and/or the College's strategic plan.

Please list all discipline goals for this three-year planning cycle. Click here for previous PRPs and goal information.

Goals

Goal 1

Brief Description
Revise program requirements for the Astronomy Certificate

Is this a new or existing goal?
New

How will you complete this goal?
The existing Astronomy Certificate essentially copies what was the AS degree, which is no longer offered. The requirements are quite extensive and are unlikely to be completed by anyone other than by the few students transferring on to a four-year school to major in astronomy. The plan is to Revise the astronomy certificate to place a greater emphasis on astronomy and less on advanced mathematics and physics.

Outcome(s) expected (qualitative/quantitative)
Expected outcomes are that students interested in astronomy should have a greater likelihood of completing the Astronomy CA, which should in turn boost enrollments in some of the astronomy classes.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?
The updated Astronomy CA should allow more students to successfully complete the certificate.

Expected Goal Completion Date
9/16/2019

Goal 2

Brief Description
Increase enrollments for the ASTR105L courses

Is this a new or existing goal?
New

How will you complete this goal?
In recent semester, we have had a difficult time reaching minimum enrollments for the night section of astronomy lab. We will advertise the course more effectively, and offer some hands on activities (using telescopes, etc.) that hopefully will encourage more students to enroll. We will move the night lab to a day timeslot as an experiment to see if enrollments become more robust.

Outcome(s) expected (qualitative/quantitative)
Increased enrollments in both lab sections with more robust enrollment numbers early on during open enrollments.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?
Our experience is that students who enroll in both the astronomy lecture and lab classes are more successful in the lecture class. Encouraging more students to take the lab class will allow us to serve more students providing a pathway for them to be more successful in the lecture sections increasing both success rates and retention rates.

Expected Goal Completion Date
8/24/2020

Goal 3

Brief Description
Offer an online version of the ASTR 100 course

Is this a new or existing goal?
New

How will you complete this goal?
Complete all necessary training and logistical requirements (Curriculum Review, etc.) necessary to offer an online ASTR 100 course.

Outcome(s) expected (qualitative/quantitative)
By offering an online version of the astronomy lecture course, we will serve students who are not geographically local who still want to earn credit from Palomar College. An online version of the course will offer students the flexibility of taking a course that will satisfy their GE requirements but might not be able to attend F2F lectures due to scheduling conflicts, etc.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?
Adding an online version of the course will allow us to serve a more diverse student body by being flexible to students with different learning styles, needs, and availability which will increase our enrollment numbers and perhaps even increase our success rates.

Expected Goal Completion Date
5/29/2020

STAFFING AND RESOURCE NEEDS

Instructions

1. Refer to Strategic Plan.
2. See Data.
3. See career info (In PRP)

Are you requesting additional full-time faculty?
No

Are you requesting additional Staff, CAST or AA?
No