FOOTHILL COLLEGE
ASTRONOMY Program Planning and Review [11-30-09] Version 2.0

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I. Department/Program Mission	
1. State the department name and everyone who participated in creating the comprehensive program plan.	Astronomy Department; Andrew Fraknoi (with advice from the Dean of PSME, Peter Murray)
2. State the program's mission. If you don't have one, create one.	To provide outstanding general education science and lab courses for non-science majors, to facilitate life-long learning in astronomy and related physics for members of our community through courses and community programs, and to assist high school students who are ready for college-level science.
3. Explain how the program/department mission is aligned with the college mission?	Through general education for vocational, transfer, and part-time students; through facilitating life-long learning; and through community service.

II. Department and Program Description & Data

1. What are your hours of operation?	Our offices open at: n/a Closed for Lunch: No ☐ or Yes ☐ If yes, when: Our offices closed at:			
2. What types of classes do you offer, at what locations, and at what times?	Times offered: X Morning (6AM-12PM) X Afternoon (12PM-4PM) X Evening (4PM-10PM)	Locations offered: X FH Main Campus X Middlefield ☐ Off campus	Types Offered: X In Person ☐ Hybrid ☐ Distance	Status Offered: X Credit ☐ Non-credit

3. List current positions and descriptions for all personnel in your area on the chart below (include position titles only, not individual names).

Faculty Positions by Discipline	**Full-time Headcount**	**Part-time Headcount**	**Brief Description of duties**
Astronomy Instructor	1	1	Teach astronomy
Position Title	0	0	
Position Title	0	0	
Position Title	0	0	
Position Title	0	0	
Position Title	0	0	
Management and Classified Positions	**Full-time Headcount**	**Part-time Headcount**	**Brief Description of duties**
Astronomy Assistant	0	1	Help with full astronomy program (including all goals discussed below)
Position Title	0	0	
Position Title	0	0	
Position Title	0	0	
Student Worker Positions	**Hours per Week**	**Months per Year**	**Brief Description of duties**
Position Title	0.00	0	
Position Title	0.00	0	

4. Given the data, describe the trends in enrollment, FTES, and Average Class size. What are the implications for your department?	Except for the year Fraknoi was on sabbatical, the enrollment in the astronomy program continues to grow, as does productivity. We have agreed to take more students in our labs as a way of helping with division productivity, and with the need to allow more nonscience majors to have an opportunity to take a lab science.
5. Student Achievement: Given the data, describe the trends in overall success rates, retention rates, and degrees and certificates awarded. What are the implications for your department?	Student success rates continue to be very good, particularly considering the population of students we serve. Astronomy is often the science class of last resort for non-science students who are afraid of science or have no background in it. It is, of course, hard to help those students who do little or nothing to help themselves (for example not attending regularly or not doing the homework). But among those who are willing to study for our courses, we have had remarkable success. One group we are especially proud of helping to succeed are older returning students, many of whom are convinced they will never succeed in science. In 2008-9, our retention rate was 96% and our success rate was 81%. The non-success rate also includes students who drop the class, because their jobs or other commitments make it impossible for them to put in the required effort that quarter. Since we have a lot of evening students who work full time and have family responsibilities, we get a lot of students who drop because their lives become too complex, not because they are not finding the course worthwhile.
6. Student Equity: Given the data, describe the trends with respect to underrepresented students. How will your program address the needs/challenges indicated by the data?	The astronomy program has made special efforts to become more accessible to students with physical limitations. The main lecture room we use was remodeled to make it completely wheelchair accessible. The Foothill Observatory has added facilities downstairs to show what the telescope is observing on a computer screen, so those who are unable to climb the stairs to the telescope are still able to see and appreciate what the telescope is looking at.

	Continuing the thinking about success rates begun in question 5, among ethnic groups that are traditionally under-served in science, our success rate is lower -- but again, a lot of these students are overwhelmed by other factors in their lives, not the astronomy course they are taking. In 2009, we have instituted additional tutoring through the Foothill Tutoring Center so that students who are struggling with the course can turn to peer tutors for assistance.
7. Given the data, discuss how the FTEF trends and FTEF/FTES ratio will impact your program. Include any need for increasing or reducing your program faculty. What are the implications for your department?	We have more capacity for handling students, particularly if the position of astronomy assistant were restored to the budget. (The newly refurbished lecture hall for astronomy is a jewel of a room, and can comfortably seat over 180 students.)
8. Given the data for distance learning, describe the trends related to success, retention, and student satisfaction. Discuss solutions to ensure that rates match or exceed those of comparable traditional format courses.	No distance learning. We have enough distance in astronomy already! For good learning, it is important for students and faculty to be in the same room, participating actively together.
9. Optional: Provide any additional data relevant to your program. (Indicate the source of the data).	We get between 400 and 900 people from the college and the community at each of our Silicon Valley Astronomy Lecture, which are public talks open to everyone. Thanks to work during a sabbatical, our program has an extremely rich library of astronomical images for education.
10. Are you seeing trends that are not reflected in the data cited above? If yes, please explain.	The preparation of non-science majors is getting less and less adequate. Their science backgrounds tend to be extremely weak and spotty, and we have to work extra hard to bring some students up to college level to be able to participate equally in the class.

Summary of Planning Goals & Action Plans				
11. Identify 3-6 operational goals and link them to one or more college strategic initiatives or to your operations.				
Department Operational Goals	**College Strategic Initiatives**			
Identify 3-6 operational goals	Building a Community of Scholars	Putting Access into Action	Promoting a Collaborative Decision-making Environment	Operations Planning
Offer accessible GE science classes for non-science majors (both lecture and laboratory)	X	X	☐	☐
Provide credit courses for those who want to pursue astronomy for life-long learning, regardless of science background	X	X	☐	☐
Continue to offer honors classes once a year to help sustain and expand the honors program at Foothill and provide honors students with a GE science experience	X	X	☐	☐
Expand community access to and respect for the college facilities by offering free Silicon Valley Astronomy Lectures and Observatory observing sessions each year	X	X	☐	X
Assist high-school students who need or want a college-level general science class while still in high school. Our evening courses provide a creative, mind-expanding opportunity for more advanced students to study astronomy and modern physics at the college level.	X	X	☐	☐
Be a national model for a community college astronomy program. Between the awards the faculty have won, our unique on-campus observatory (operated by a community	X	X	☐	☐

organization at very low cost to the college), our lecture series that are nationally podcast, and the role of our faculty in being a resources for local and national media, Foothill's astronomy program is looked up to by many other community colleges as a model. We want to continuing being worthy of that respect.					
12. What is your plan for accomplishing your goals?					
Department Operational Goals	**Activities**				
Goals 1 - 6 above.	We have made good strides in achieving these goals already, but there is still more to be done. Many of these goals support one another. For example, our work with the Silicon Valley Astronomy Lectures and the local media helps to encourage enrollment in our credit courses, among both those groups who are astronomy enthusiasts and those that are a bit afraid of the GE science courses in general. To the degree that we continue all these "balls in the air" (with our very limited number of faculty), we can continue to expand our program.				
Goal 6	Our department chair has won both the California Professor of the Year award and the Hayward Award for outstanding community college faculty in recent years. This has been good for the college and the program. But we can't rest on our laurels -- every year, we work on the introductory courses -- improving and updating the audio-visuals (in astronomy there are always new and better images), including the latest discoveries and ideas from the				

	research community (astronomy is in many ways the fastest changing science), trying new teaching methods to make the course as accessible and helpful to a wide range of learners as possible. We also make a strong effort to include the contributions of women and minorities to astronomy as part of our courses.	

13. Are additional resources needed to accomplish your department operational goals? If yes, identify the resource, as well as the purpose and rationale for each resource.

Identified Resource	Purpose	If requesting funding, provide a rationale of how each request **supports one or more college strategic initiative and/or supports student learning.**
Astronomy Assistant	Help instructor deal with 320 - 340 students per quarter and the continuing work on the above goals.	With the elimination of the Earth Science program at Foothill, astronomy is the key course for GE students who need a general science class. Both the Dean and I want to increase enrollment and productivity, even though our department's productivity is already the highest in the Division. But to be able to serve students well, the instructor clearly needs help. We need to reinstate the position of astronomy assistant. (Physics and Chemistry have staff assistant positions. Astronomy is alone in having no budget and no help.)
An annual budget	Equipment, supplies, materials	See above. We are the only department that does not have an annual budget, even though we have the highest productivity in the Division. Even if it is just a small amount, money should be set aside for astronomy needs each year.
A cafeteria that serves food for evening students	Help for students in evening	Our cafeteria, bad enough during the day, essentially serves very little food in the evening. Students often complain about this and that it is hard to be hungry during the hours of class.
Smaller lab sections	Make it easier to help students individually.	There has been a great deal of pressure from the administration to increase our enrollment in lab sections from the traditional 25 to 30 or more. While

		we understand the need for productivity, it detracts from the experience of both students and instructors to make lab classes so large that they become impersonal and individual attention to students becomes difficult. Lab sections of 25 should be the maximum in astronomy.	
More astronomy tutors in the college tutorial service	Help students who are struggling a bit with the material and will be more likely to show weakness with another student than an instructor.	In past years, the college tutorial office has been better financed and has been more aggressive in finding astronomy tutors.	

III. Curriculum	
Curriculum Overview	
1. How does your curriculum address the needs of diverse learners?	Astronomy courses at Foothill include ways of learning for a wide range of learning styles. Lecture courses involve Socratic dialogue, question periods, many audiovisuals, including music and images, analogies that relate subject matter to students' own experiences, and small-group activities that can be done in a large lecture hall. Lab courses are hands-on and involve many hours of small-group lab activities, which use a variety of innovative techniques to convey astronomical ideas and methods without getting bogged down in mathematical detail. Lab assignments are not merely "cookbook" recitation of required answers, but ask students to apply what they learned in lab to new situations and to everyday life.
2. How does your curriculum respond to changing community, student, and employer needs?	Employers and 4-year colleges tell us that they want students in science who can do more that regurgitate factoids. They want students who have learned to think about the methods of science, who can pursue inquiry on their own, who are good at working in teams, and who understand the broad themes of a particular science and that science's relationship to society. Between the lecture and lab courses in our program we actively encourage and assist students in mastering the above skills.
3. How does your curriculum support the needs of other certificates or majors?	Because there is no astronomy major at Foothill, our entire program is a service for supporting other majors, certificates, degrees, or life-long learning. Astronomy is one of the key lab science GE classes and one of the few that is also offered for honors students on a regular basis.
4. Do your courses for the major align with transfer institutions?	We have no majors. Those few students who do express an interest in majoring in astronomy, are encouraged to take a lot of physics and math during their time at Foothill, and are counseled one-on-one on the best 4-year institutions that fit with their goals and abilities.

5. Do your courses have appropriate and necessary prerequisites? Identify any challenges and plans to address the challenges.	n/a	
6. Review the attached curriculum report for currency. What is your plan to address the deficiencies? (Consider: Title V, course deactivation, updated prerequisites, cross-listed courses, measuring student learning outcomes, curriculum sheets, certificates and degrees).	The astronomy program has revised all its active courses in the last two years, updating and rethinking the lecture classes and completely revising the laboratory course. We are thus current and in good shape with curriculum. Indeed, astronomy instructors from around the country write to us for copies of our syllabi and curriculum materials.	
7. Does your program offer distance education courses?	No.	
8. If you offer distance education courses, list one or two short examples of how your distance education courses provide for effective interaction between students and faculty.	n/a	
9. If you offer distance education courses, list one or two short examples of how your distance education courses provide for effective interaction among students.	n/a	
College Skills (Pre-collegiate) Overview (Data Available Fall 2009-filling out this section is optional)		
10. What college skills should a student have before entering your program?		
11. Given the data, comment on the effectiveness of the assessment and placement of college skills students into your program. (For MATH, ENGL and ESL only).		
12. In what ways are you addressing the needs of the college skills students in your program?		
13. How are faculty in your program collaborating with other disciplines and services to meet the needs of college skills students?		
Program Mapping		
14. If applicable, identify any sequence of courses that are part of your program. List in the order that they should be taken by students.	An astronomy lecture class is a co-requisite for our astronomy laboratory.	

15. For your courses that are part of a sequence – are the student learning outcomes well aligned with the next course in the sequence? Please work with the college researcher to answer this question - once your sequence of courses is identified.	n/a		
16. If applicable, describe any capstone course, signature assignment (project, service learning, portfolio), or exam that demonstrates knowledge, skills, and abilities, indicating successful program completion?	n/a		
Course Scheduling & Consistency			
17. Given available data, describe the trends in the scheduling of morning, afternoon, and evening classes, as well as Friday, Weekend, and distance education classes. Comment on the feasibility of offering classes at non-standard times.	We offer classes both during the day, the afternoon, and evening, and have lots of students taking courses at each of these times.		
18. Are required courses scheduled in appropriate sequence to permit students to complete the program in the prescribed length of time? If yes, describe the rationale upon which the sequence is based. If no, what is the plan to change the scheduling pattern? What are the barriers that prohibit implementation of the changes? Explain.	n/a		
19. How does the department determine that classes are taught consistently with the course outline of record?	Not a problem in a program as small as ours. Syllabi are consistent with the course outline of record.		
Summary of Planning Goals and Action Plans			
20. What are your goals with respect to curriculum and how will those goals be measured?	To be able to keep up and expand the enrollment in the courses we have, and thus to serve the campus community with an accessible and effective set of GE science courses. And to keep current with the ever-changing scientific ideas and discoveries in the field.		
21. Are additional resources needed to accomplish your curriculum goals? If yes, identify the resource, as well as the purpose and rationale for each resource.			
Identified Resource	Purpose	If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.**	

Astronomy assistant	Help enroll the large number of students we already have and increase enrollment, while still providing the best service to students.	See discussion in other sections.	
A system of clickers (personal response system) in 5015 and the lab	To get instant feedback on how students are doing, to reduce the time used in taking attendance, to be able to adjust my teaching instantly based on what kind of problems students are experiencing with the material. We will need training on the system and some time to develop appropriate clicker questions and procedures.	I believe such a system is in the budget.	
A small astronomy department budget	Purchase tools and equipment to help instructional needs.		

IV. Student Learning Outcomes

Student Learning Outcome Assessment

1. **Be sure and complete your student learning outcomes assessment for each course online through the C3MS system. When the program review form is online, the resources that you tie to your student learning outcomes will be included here on this form.**
2. Are additional resources needed to accomplish your student learning outcome goals that were not included in C3MS report? If yes, identify the resource, as well as the purpose and rationale for each resource.

Identified Resource	Purpose	If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.**
Astronomy Assistant	Help for faculty	With 300+ students each and every quarter, it is hard to do the obtaining and evaluating of statistical information without help. This additional requirement is another reason we need to restore the astronomy assistant position in the budget.

V. Departmental Engagement	
1. What standing committees, if any, does your department maintain? What are the committee charges and membership?	The organizing committee for the Silicon Valley Astronomy Lectures, consisting of representatives from all four of the institutions that sponsor the lectures (which take place at Foothill College). The charge is to find excellent public speakers in astronomy who will speak effectively for large audiences without a fee, and to help us publicize the lectures.
2. What interdepartmental collaboration beyond college skills has your department been involved in during the past 4 years?	Astronomy faculty teach one physics course per year, Physics 12, a general education course which has the largest enrollment of any physics class on campus. A number of faculty and staff at the college have taken one of our evening courses. We also work with the Foothill drama department which makes the big college theater available for the Silicon Valley Astronomy Lectures, and the DeAnza broadcasting program, which puts the video of the lectures on their ITunes educational site.
3. What has your department done since its last program review to establish connections with schools, institutions, organizations, businesses, and corporations in the community?	a. We maintain a mailing list of high school teachers and college instructors in the Bay Area who teach astronomy and invite them to all Silicon Valley Astronomy Lectures and special astronomy events (such as star parties) at the college. Many of these offer extra credit to their students for coming to one of our lectures or, in some cases, actually bring their whole class. b. The Chair of the Department gives a number of public talks in the community each year. Since the last program review talks have been given to several service clubs in Los Altos, Palo Alto, and San Jose, at the Sunnyvale Library, at Kepler's Books, etc. c. The Chair of the Department appears on local radio programs explaining astronomy in everyday language. Since the last review, he has been a regular on the Gil

	Gross Program on KGO, the Forum Program on KQED-FM, and the syndicated Mark and Brian Show out of Los Angeles. He has also appeared on KCBS News Radio, Science Friday on National Public Radio, "We Are Not Alone" on public radio, on local station KALW, and several other stations. (See appendix 1 for some examples of interviews that remain available as podcasts on the Web.) d. Thanks to a grant from an anonymous donor, we are able to record the Silicon Valley Astronomy Lectures and put them on the Web as video and audio podcasts. The audio ones get 65,000 hits per month, for example. e. The Chair of the Department also shares information about astronomy and astronomy education on the World Wide Web, which is perhaps useful for the college's reputation. See some of his selected web resources in Appendix 2.
4. In what ways if any, are you or have you worked with area high schools to align curriculum from the high school to your course?	Many local high schools send promising students who need higher level general science work than the high school can provide to take our evening astronomy or Physics 12 courses.
5. In what ways if any, are you working with CSUs, UCs, private, or out-of-state institutions to align courses and develop articulation agreements?	All our courses continue to articulate with the state universities, and our articulation officer keeps us informed about any questions in this area, so we can straighten them out quickly.
Summary of Planning Goals and Action Plans	
6. What are your goals with respect to departmental engagement and how will those goals be measured?	To be able to continue all the above forms of engagement, even with growing enrollments and productivity -- and still have time to sleep sometimes.

7. Are additional resources needed to accomplish departmental engagement goals? If yes, identify the resource, as well as the purpose and rationale for each resource.

Identified Resource	Purpose	If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports**

		student learning.
Astronomy assistant	Assist faculty with engagement and outreach	Until recently, we had an astronomy assistant to help the full time faculty, a position that was promised to the department in a letter from the administration given our high enrollments and many outreach activities (for which faculty receive no remuneration). This position was arbitrarily taken away. It is very difficult to do all that our department does without some modest hourly help and the restoration of this help within the division or college budget is our single most important need.

VI. Professional Development	
1. List a sampling of professional development activities that faculty and staff have engaged in during the last two years.	1. Attend national meetings of the American Astronomical Society to keep up with the latest developments in astronomy 2. Attend national meetings of the Astronomical Society of the Pacific to keep up with the latest developments in astronomy education and outreach. 3. Attend lectures and colloquia on astronomy around the Bay Area (including our own Silicon Valley Astronomy Lecture series) 4. Read astronomy publications such as "Astronomy", "Sky & Telescope", "Astronomy Beat" and read astronomy education publications such as "Astronomy Education Review", "SPARK", and "The Physics Teacher." 5. Because astronomy is such a visual field, we make a special point of keeping up with astronomy images that have educational value. We try to stay abreast of the images that come from space telescopes and the world's largest observatories, although keeping us with the huge stream is not very easy. The Program Chair has published papers in this area in national publications.
2. What opportunities does your department take to share professional development experiences with colleagues?	We invite science colleagues to attend all the Silicon Valley Astronomy Lectures, and a number of them do. Some faculty from other departments have taken our "Innovation-of-the-Year" award-winning course on modern physics "for poets."
3. In what ways have faculty shared, discussed, and used professional development activities to improve program effectiveness?	N/A -- our department is very small
4. In what ways have staff shared, discussed, and used professional development activities to improve program	When we had a program assistant, he was part of the planning process that grew out of these learning experiences and also attended the lectures and some local meetings.

VI. Professional Development			
effectiveness? What professional development needs do you have in the coming years?			
5. Are there unmet or upcoming professional development needs among faculty in this program? If yes, then please explain a proposed plan of action for addressing this need and any necessary resources.		Being such a small department, we miss have colleagues to discuss teaching procedures with in astronomy. Some years ago, each subject department at Foothill and DeAnza met during the opening days of school to compare notes. This would be a very useful way to spend some part of opening days, instead of costume contests and some of the completely silly things that we now do. We've recommended this to the Academic Senate and to the Administration over the years, but so far, it has not found resonance there.	
Summary of Planning Goals and Action Plans			
6. What are your goals with respect to professional development and how will those goals be measured?		Astronomy is a very rapidly changing field, with many discoveries and new ideas each year. Keeping up takes a lot of effort, but we pride ourselves that the introductory astronomy courses at Foothill continue to be among the most up-to-date non-science-majors courses anywhere -- and course evaluations bear this out. What it takes is a lot of faculty time. One way to check how well we are keeping up is that we are sometimes asked to explain new astronomical developments on local and national radio, and that we must keep current to do this effectively.	
7. Are additional resources needed to accomplish professional development goals? If yes, identify the resource, as well as the purpose and rationale for each resource.			
Identified Resource	Purpose	If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.**	
Astronomy assistant	Allow faculty time to do professional development	As part of the professional development work he undertakes, the program chair attends the "Cosmos in the Classroom" meetings for Astro 101 instructors once every three years. No department in the U.S. that he is aware of serves as many students per unit faculty member (and does so much community outreach) without some assistance.	

VII. Support Services		
Support Services		
Consider the support services needed by your program when reflecting over the following questions		Comments or explanations of barriers and solutions.
1. Is there adequate clerical or administrative support for this program?	Yes | **No**	Need our astronomy assistant position back; need a budget
2. Are there sufficient college and departmental computer labs available to support this program?	Yes | No	
3. Are the library and media resources provided by the college sufficient to support up-to-date program instruction?	Yes | No	
4. Are adequate services provided in compliance with program needs for meeting health and safety guidelines?	Yes | No	Our lab room needs upgrading, but this will happen in the new science building.
5. Are the custodial services to this program in compliance with program needs for meeting health and safety guidelines?	Yes | No	
6. Are accommodations for students with disabilities adequate, including alternative media, testing, and tutorial?	Yes | No	But the staff at the disabilities center is often not capable of serving our students and faculty as well as you might hope. They also provide some misleading information to students, and offer accommodations to students that faculty cannot possibly carry out without consulting faculty first.
7. Are general tutorial services adequate?	Yes | No	The tutorial center needs adequate funding
8. Are academic counseling and advising services available and/or adequate to support students enrolled in the program?	Yes | No	Not sure
9. Do students have access to and can they effectively use appropriate information resources?	Yes | No	However, registration for adults at Foothill taking only one class is too cumbersome.
10. Specifically related to distance learning, do you have appropriate faculty support services and/or effective training for faculty teaching online?	Yes | No	n/A
Marketing & Outreach		

11. What impact do you feel the college catalog, class schedule, and online schedule of classes have on marketing your program? Does the marketing accurately reflect your program, requirements, and services available?		Yes, these are crucial and they work well. The Heights being sent out is an especially important service.
12. What impact does the college or departmental website have on marketing your program?		We have an astronomy website, kept up by an outside volunteer, and it is a very useful tool.
13. Is there any additional assistance from marketing that would benefit your program? If yes, explain.		Only that marketing seems to focus a lot on portraying the remedial and vocational parts of the school, and that they might perhaps give a little more emphasis to the academic and life-long learning aspects.
14. If you were to collaborate with the Outreach staff, what activities would be beneficial in reaching new students?		We've offered to give inspiring astronomy talks to large gatherings of incoming students, but so far have not been asked to do so.
Programs, clubs, organizations, and special activities for students		
15. List the clubs that are designed specifically for students in this program. Describe their significant accomplishments.		The Peninsula Astronomical Society (an amateur astronomy club) meets on the Foothill campus and some of our astronomy students go on (after taking a class) to join that club.
16. List any awards, honors, scholarships, or other notable accomplishments of students in this program.		Astronomy students mostly just take classes for GE; we have very few majors.
Summary of Planning Goals and Action Plans		
17. What are your goals with respect to support services and how will those goals be measured?		n/a
18. Are additional resources needed to accomplish your support services goals? If yes, identify the resource, as well as the purpose and rationale for each resource.		
Identified Resource	Purpose	If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.**
Astronomy Assistant	Assist with supporting student retention and community service and outreach	

IX. Resource Planning: Personnel, Technology, Facilities, and Budget	
Faculty	
1. How does your PT/FT ratio impact the program?	Not an issue
2. What staffing needs do you anticipate over the next four years. (Consider: retirements, PDL, reassigned time, turnover, growth or reduction of the program)	If the astronomy program continues to grow, we may want to offer another lecture course and hire a part time lab instructor.
Classified Staff	
3. What staffing needs do you anticipate over the next four years. (Consider: retirements, PDL, reassigned time, turnover, growth or reduction of the program)	We desperately need an astronomy assistant part time to be able to continue the vitality and growth of the program
Technology and Equipment	
4. Are the existing equipment and supplies adequate for meeting the needs of the instructional program?	Yes, for now. We do need a bit of a budget to pay for new equipment and supplies. Right now the astronomy budget is zero, which is not right for a program of its size. But the current lab instructor has worked hard to construct labs that can work on a very low budget and with home-made equipment. Should there ever be a change in lab instructors, the college will need to provide far more equipment for the labs than we currently have.
5. Do you have adequate resources to support ADA needs in your physical and/or online courses and classrooms?	Yes (see above; we have remodeled classroom and Observatory to be ADA compliant)
6. Is the technology used in your distance education courses appropriate to the nature and objectives of your courses? Please explain how it is appropriate or what changes are underway to make it appropriate. Explain.	No distance education.
Technology & Equipment Definitions	

• **Non-instructional Equipment and Supplies:** includes equipment for "office use" that is non-instructional and that is not used in a lab or classroom – it includes non-programmatic equipment for individual instructors and staff, such as a desktop computer for office use. Desktop technology (computers, printers, scanners, faxes) and software requests are processed through your Dean or Director.	
• **Instructional Equipment and Supplies:** includes technology, software, and supplies used in courses or labs, including occupational program equipment. Instructional program equipment requests are prioritized by the department and then by the Dean or Director.	
• **Durable Equipment and Furniture:** includes non-instructional, non-technology equipment (chairs, tables, filing cabinets, vehicles, etc.) necessary to improve the operational functioning of the program/department.	
• **Note:** It is recommended that divisions perform and maintain an inventory of all their technology and equipment.	
Facilities	
7. Are your facilities accessible to students with disabilities?	**Yes**
8. List needs for upgrades for existing spaces	It will be important that all new building near the observatory maintain the possibility of dark skies there.
9. List any new spaces that are needed	
10. Identify any long-term maintenance needs.	Keeping up maintenance on the observatory
11. Are available general use facilities, such as classrooms, laboratories, and faculty office/work space adequate to support the program? Please explain.	Yes, especially with the new science building.
12. Are work orders, repairs, and support from district maintenance adequate and timely? Please explain.	No, most things take a long time and often have to be requested twice. I suspect this is because they are now short staffed.
Budget	
13. Are the A-budget and B-budget allocations sufficient to meet student needs in your department?	No. We need an astronomy assistant position funded again and a small astronomy B budget.
14. Describe areas where your budget may be inadequate to fulfill program goals and mission.	**See above**
15. Are there ways to use existing funds differently within your department to meet changing needs?	I have obtained emergency funds from a private donor to help us in the current budget emergency, but we obviously can't count on this. The college needs to support our program adequately.
Summary of Planning Goals and Action Plans	
16. What are your goals with respect to resource planning and how will those goals be measured?	
17. Are additional resources needed to accomplish your resource planning goals? If yes, identify the resource, as well as the purpose and rationale for each resource.	

Identified Resource	Purpose	If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.**	
Astronomy Assistant	See above		
A small budget for astronomy equipment and supplies	See above		

X. Final Summary of Goals, Commitments to Action, and Resource Requests

1. Upon completion of this program plan, provide a summary of your goals and action plans for the next 4 years.

The astronomy program, which has the highest productivity rate of any of the PSME departments and gets very positive evaluations from students, plans to continue and expand its current programs (in a measured, reasonable way) to provide more access to college students, community members, and high school students in the next four years. Having upgraded our classrooms, laboratory computers, and Observatory in the last few years, we are in good shape physically to do this. We are proud of serving a very diverse group of students, in terms of science background, age, ethnicity, etc. The only thing that stands in our way is that the funding for helping the overworked faculty (in the form of an astronomy assistant) was taken from the budget and continuing to provide the kind of service we provide to such a large group of students and the wider community is not possible without it.

2. Final Resource Request Summary: **When the program planning and review form is online – the section below will automatically fill in with your responses from each section.**

Note: If you are requesting resources this year, these items have to be included in your current program review. If you want the college to understand your full range of need, then list every current and upcoming resource need in each section above.

Resource	Purpose	Rationale	Estimated Cost
Astronomy Assistant	**Help the faculty**	**See sections above**	$ 5,000 per year

Supervising Administrator Signature Andrew Fraknoi

Completion Date 10-19-09

Appendix 1: Some Podcasts or Interviews with Andrew Fraknoi -- Available on Web [as of Oct. 2009]

Interview with KQED Radio News about the LCROSS Mission Oct. 8, 2009 (roughly 5 minutes):
http://www.kqed.org/epArchive/R910081730

Interview about Galileo's 400th Anniversary on the *Are We Alone* Radio Show with Seth Shostak (Mar. 2, 2009):
http://podcast.seti.org/episodes/A_Man_A_Planet_A_Tenal_Panama_

Podcast on the 120th Anniversary of the Astronomical Society of the Pacific, part of the 365 Days of Astronomy series during the International Year of Astronomy (Feb. 6, 2009): http://365daysofastronomy.org/2009/02/06/february-6-the-120th-anniversary-of-the-astronomical-society-of-the-pacific-the-first-national-astronomy-organization-in-the-us/

KQED Forum Program on New Discoveries about Astronomy (an hour conversation with Michael Krasny), Dec. 11, 2008:
http://www.kqed.org/epArchive/R812111000

Point of Inquiry Webcast on "Your Body's Cosmic History", Sept. 12, 2008:
http://www.pointofinquiry.org/andrew_fraknoi_the_cosmic_history_of_your_body/

KQED Forum Program on Mars Exploration and Exploding Stars (also with NASA astronomer David Morrison), May 28, 2008:
http://www.kqed.org/epArchive/R805280900

Are We Alone Radio Show (SETI Institute) on writing a children's book for Disney (15 minutes in middle of show), Jan. 14, 2008:
http://radio.seti.org/past-shows.php#2008-01-14

Astronomy in Popular Culture: The Gemant Prize Lecture at the January 2008 American Astronomical Society Meeting (video):
http://video.google.com/videoplay?docid=6188229276235573918&q=aas+211th&ei=MK1rSMCwL6j0qgPbrPWhDw

KQED *Forum* Discussion on Discovery of an Earth-like Planet (also with planet-hunter Debra Fischer); 1 hr., Apr. 30, 2007:
http://www.kqed.org/epArchive/R704300900

Science and Society Podcast on "Pluto and the New Definition of a Planet" (Nov. 17, 2006):
http://www.scienceandsociety.net/podcasts/archives/2006/11/dr_andrew_frakn_1.html

Are We Alone Radio Show (SETI Inst.) on "A Skeptical View of Astrology" (Oct. 18, 2006):
http://www.seti.org/site/pp.asp?c=ktJ2J9MMIsE&b=2148619

Are We Alone Radio Show on "Science Fiction with Good Astronomy" (Aug. 23, 2006):
http://www.seti.org/site/pp.asp?c=ktJ2J9MMIsE&b=2026359

KQED *Forum* Interview/Debate on New IAU Definition of a Planet (1 hr, Aug. 17, 2006):
http://www.kqed.org/epArchive/R608170900

Science Friday (NPR) 20-min Interview on a Sightseeing Tour of the Solar System (Jul. 28, 2006):
http://www.npr.org/templates/story/story.php?storyId=5589630

KQED Forum Interview on a range of astronomy topics (1 hr, Jan. 19, 2006): http://www.kqed.org/epArchive/R601191000

Are We Alone Radio Show (SETI Inst.) on "The Secret Einstein" (Nov. 20, 2005):
http://www.seti.org/site/pp.asp?c=ktJ2J9MMIsE&b=1196491

Slacker Astronomy Interview about the Einstein Centennial (Oct. 11, 2005):
http://www.slackerastronomy.org/wordpress/index.php/archive/fraknoi-on-einstein/

Tech Nation Interview on the Discovery and Understanding of Planets (Sep. 6, 2005):
http://www.itconversations.com/shows/detail697.html

KQED Forum Discussion on the Deep Impact Mission and Other Astronomy News (1 hr, July 6, 2005):
http://www.kqed.org/epArchive/R507060900

KQED Forum Interview about Black Holes, Space Warps, Time Machines (1 hr. June 3, 2002):
http://www.kqed.org/epArchive/R206031000

Science Friday Short Interview on Leonids Meteor Shower and Meteor Observing (Nov. 16, 2001):
http://www.npr.org/templates/story/story.php?storyId=1133310

Science Friday Interview on Summer Astronomy (June 29, 2001): http://www.sciencefriday.com/pages/2001/Jun/hour1_062901.html

Science Friday Interview on the Leonids Meteor Storm (Nov. 13, 1998):
http://www.sciencefriday.com/pages/1998/Nov/hour1_111398.html

Science Friday Interview on Christmas Astronomy (Dec. 25, 1998):
http://www.sciencefriday.com/pages/1998/Dec/hour1_122598.html

Appendix 2: Some Web Based Articles and Resource Guides by Andrew Fraknoi (Oct. 2009)

1. Articles [some on astronomy, some on astronomy education]

An Ancient Universe (for teachers; on how we know the age of the universe is much longer than creationists claim; with B. Partridge, G. Greenstein, and J. Percy): http://www.aas.org/education/ancientuniverse.php (an earlier version, with activities can be found at: http://www.astrosociety.org/education/publications/tnl/56/index.html)

Astronomy Education in U.S. (a general review of the many arenas where it takes place): www.astrosociety.org/education/resources/useduc.html

Astronomy Textbooks, Used Book Chains, and Big Macs: A Perspective (in *Astronomy Education Review):* http://aer.noao.edu/cgi-bin/article.pl?id=152

Dealing with Astrology, UFOs, and Faces on Other Worlds: A Guide to Addressing Astronomical Pseudoscience in the Classroom (in *Astronomy Education Review):* http://aer.noao.edu/cgi-bin/article.pl?id=70

Enrollments in Astronomy 101 Courses: An Update (in *Astronomy Education Review):* http://aer.noao.edu/cgi-bin/article.pl?id=12

The Expanding Universe (brief introduction for the general public): http://www.pbs.org/soptv/400years/resources/delving_deeper.php (click on the title and the article expands into view)

Gamma-Ray Bursts (brief introduction for the general public): http://www.pbs.org/seeinginthedark/astronomy-topics/gamma-ray-bursts.html

How Astronomers Search for Intelligent Life in Space (brief article for beginners): http://www.pbs.org/soptv/400years/resources/delving_deeper.php (click on the title)

How Fast Are You Moving When You Are Sitting Still? (the motions of the Earth for teachers): http://www.astrosociety.org/education/publications/tnl/71/howfast.html

Insights from a Survey of Astronomy Instructors in Community and Other Teaching-Oriented Colleges in the United States (in *Astronomy Education Review):* http://aer.noao.edu/cgi-bin/article.pl?id=89

Introduction to Telescopes (brief guide for beginners): http://www.pbs.org/soptv/400years/resources/discover_your_universe.php (scroll down, click on title, and the article will expand)

Light as a Cosmic Time Machine (brief introduction for the general public): http://www.pbs.org/seeinginthedark/astronomy-topics/light-as-a-cosmic-time-machine.html

Lives of the Stars (a brief introduction for the general public): http://www.pbs.org/seeinginthedark/astronomy-topics/lives-of-stars.html

Mars (a brief introduction): http://www.pbs.org/seeinginthedark/astronomy-topics/mars.html

"Music of the Spheres" in Education: Using Astronomically Inspired Music (in *Astronomy Education Review):* http://aer.noao.edu/cgi-bin/article.pl?id=193

So You Want to Start a Project ASTRO Site (Q & A on program where astronomers adopt a classroom): http://www.astrosociety.org/education/astro/about/astrofaq.html

Steps and Missteps Toward an Emerging Profession (Education and Outreach in Astronomy): http://www.astrosociety.org/pubs/mercury/34_05/epo.pdf
Teaching Astronomy with Science Fiction (in *Astronomy Education Review):* http://aer.noao.edu/cgi-bin/article.pl?id=33
Teaching What a Planet Is: A Roundtable on the Educational Implications of the New Definition of a Planet (in *Astronomy Educat. Review):* http://aer.noao.edu/cgi-bin/article.pl?id=207
What's a Planet and Why is Pluto not in the Planet Club Anymore (brief introduction): http://www.pbs.org/seeinginthedark/astronomy-topics/planets-and-pluto.html
Your Astrology Defense Kit (a skeptical article to help educators respond to astrological claims): www.astrosociety.org/education/astro/act3/astrology3.html#defense

2. Resource Guides

Astronomical Pseudo-science: A Skeptic's Resource List (astrology, UFO's, creationist cosmology, etc.): www.astrosociety.org/education/resources/pseudobib.html
Astronomy and the Arts (poetry, music, and art): http://www.pbs.org/seeinginthedark/resources-links/astronomy-and-the-arts.html
Astronomy and Poetry: http://aer.noao.edu/cgi-bin/article.pl?id=10
Astronomy of Many Cultures: http://www.astrosociety.org/education/resources/multi.html
Environmental Issues & Astronomy (light pollution, observatory sites, frequency spectrum allocation, etc.): www.astrosociety.org/education/resources/environment.html
Exchanging Messages with Extraterrestrial Civilizations: www.astrosociety.org/education/family/resources/seti.html
Image Repositories for Astronomy Education: http://aer.noao.edu/cgi-bin/article.pl?id=278
Galileo: http://www.astronomy2009.org/static/resources/galileo_resources_guide.pdf
Kepler: http://www.astronomy2009.org/static/resources/kepler_resources_guide.pdf
Music Inspired by Astronomy (A Selective Listing): http://www.astronomy2009.org/static/resources/iya2009_music_astronomy.pdf
Science Fiction with Good Astronomy (a topical listing and brief review): www.astrosociety.org/education/resources/scifi.html
SETI (The Search for Extra-Terrestrial Intelligence): A Basic Reading List: http://www.seti.org/publications/bibliography.php
Teach Yourself Star Gazing (brief guide for beginners): http://www.pbs.org/soptv/400years/resources/files/Teach_Yourself_Star_Gazing.pdf
Websites on College Astronomy Teaching (teaching strategies, resources, labs, demos, etc.): www.astrosociety.org/education/resources/educsites.html
Women in Astronomy Bibliography (general references & specific readings for a few dozen women astronomers): http://www.astrosociety.org/education/resources/womenast_bib.html