ASTRONOMY PROGRAM REVIEW

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I. Overview

A. Description of Program

The Astronomy department offers course work in freshman-sophomore level astronomy, in both lecture and laboratory formats. These courses are offered primarily to satisfy students' needs for a science requirement – 76% enrolled for that reason. But a significant fraction (15%) enrolls for personal enrichment.

Two lecture courses are offered in the Planetarium classroom, Astronomy 20 [formerly 9] (The Solar System) and Astronomy 25 [formerly 10] (Stars and Galaxies). Laboratory courses are offered at the College Observatory (astronomy 12) and in the Telescope Making Laboratory (astronomy 13abc). All of these courses are offered in venues that "support innovative practices that enhance the educational experience" (ECC goal #3).

The astronomy department also is involved in a few activities of interest to the general public. Once a month, we host meetings of a local amateur astronomy group: the South Bay Astronomical Society. As time permits, the current faculty give planetarium shows and host public sky viewings (using several telescopes), which are open to the public and exhibit the wonders of the night sky, in real (and heavily light-polluted) and artificial (i.e. planetarium projected) environments. All of the full-time faculty and several others in the department play an active role in the annual Onizuka Space Science Day activities, including hosting and helping out with many activities. These activities help "Improve and enhance … external communication" (ECC goal #6). Also helping with this goal is Perry Hacking's continued coordination of the ScienceFEST program, which helps train future elementary school teachers about how to integrate science into their classroom. The program has been amazingly successful and continues to grow in popularity.

In the past, there were more public events and there were also events coordinated with local elementary schools. Without a planetarium manager, most public events have been canceled or scaled back dramatically because the full-time faculty cannot sustain such programs.

B. Status of Previous Recommendations

Twelve recommendations were made as "5 year goals" In March 1998. Those 12 recommendations are listed below, along with a brief summary of their status.

1. Maintain current high level of instruction in Astronomy.
    a. This continues to be a high priority item. While we have no direct measurement, we expect this recommendation has been and will continue to be fulfilled.
2. Hire a Planetarium Manager.
    a. The position was budgeted in 2004-2005, but placed in the 3rd (of 3) tiers for actual hiring. The current status of this position is unknown. The position was filled part-time (20 hrs/week) between November 2002 & May 2003. Budget constraints eliminated even the part-time manager.
3. The NS division needs to develop a "pre-science" course which would help poorly prepared students to be successful in our college-level science classes.
    a. The division has not made any progress on this goal. The idea could be re-recommended to the division council.

b. One potential alternate that has been explored (but not followed up on) is providing supplemental instruction to our courses. The division decided that this was one goal and started by identifying courses that have the lowest success/retention rates. Astronomy 20 & 25 were two of the divisions worst classes. However, the division has not pursued anything about SI since those courses were identified.
c. For Fall 2005 & Spring 2006, one of our night assistants is offering telescope and mirror-making tutoring, a service never provided before. This is a pilot program – it remains to be seen if it is cost effective and helpful for the students.

4. Develop the ability to recruit and hire outstanding astronomy instructors, both full and part-time, when they become available.
    a. It is unclear what, specifically, needs to be done to satisfy this recommendation. The program and facilities available here are outstanding. The Astronomical Society of the Pacific surveyed community college astronomy instructors and asked them for "wish list." El Camino's astronomy department had everything on this wish list. If this information is available to job applicants, we should have little trouble recruiting. However, part-time recruitment remains difficult, probably due to a small job applicant pool and maybe due to the compensation rates. Perhaps we need to be more vocal about our facilities.
5. Incorporate astronomical software into instructional programs.
    a. Contemporary Labs Exercises for Astronomy (CLEA) software has been implemented in some sections of astronomy 12. Computer simulated planetarium software is incorporated into Vince Lloyd's sections.
6. Offer more tutoring in astronomy.
    a. In 2004-2005, a second tutor was hired and our tutoring hours (and tutoring attendance) doubled. After 11 years, Dennis Thompson announced his retirement in July 2005, and as this document is prepared, the tutoring situation is uncertain, but likely to be staffed throughout Fall 2005 and Spring 2006. Dennis's experience will be missed, but hopefully we can train some tutors that will be here for a while. We will need to investigate finding a long-term tutor.
7. Develop and offer a more advanced astronomy course.
    a. No progress has been made towards this goal. The need for such a class was re-assessed on the survey. See below.
8. Develop a formal (paid) mentoring program for new instructors.
    a. No formal program exists; all training is done voluntarily and as needed or requested. This process should be implemented at the college level, not the department level.
9. Develop a summer or year-around teacher-training program for local area science teachers.
    a. A program called ScienceFEST (Science for Future Elementary School Teachers) was developed by Dr. Perry Hacking and Dr. Judy Kasabian. This program has been in operation for 2 years and has continually grown, in both student enrollment and outreach into local schools. While ScienceFEST is not year-around or offered during the summer, nor does it directly train local *current* science teachers, it does train pre-service teachers and these students apply what they learn as student teachers in local classrooms. Thus ScienceFEST is reaching out directly to local teachers.
10. Develop and offer a short course in astrophotography.

    a. There has been no progress on this recommendation. It's not clear if this is still something the department wishes to do. This issue was not raised in the survey of our students. As the night lab class begins to include digital photography, the need for an astrophotography class will likely be obviated.
11. Contribute to design and implementation of a physical science course: "The Design of a Colony on Another Planet."
    a. There has been no progress on this recommendation within the past 5 years.
12. Expand the public planetarium program to offer additional school shows and more evening shows.
    a. This recommendation can only be accomplished if a full-time Planetarium Manager is hired.

In addition to these 12 specific "5 year goals", 5 specific "future oriented goals" were listed. Those focused on "maintaining the high level of astronomy education." The goals and their status are:

1. Timely maintenance of existing facilities
    a. Maintenance of facilities has been almost entirely done by night assistants, occasional calls to the retired Planetarium Director, and occasionally by the full-time faculty. The department suffers from not having a full-time planetarium manager.
2. Continual upgrading of equipment.
    a. The department installed a new GOTO Chronos planetarium projector in February 2005. The dome was painted in Summer 2005 for the first time since construction. We have also obtained 5 new computer-driven NexStar 8-inch Celestron telescopes to supplement and/or replace our 10 Celestron C8's. Several other telescope accessories have been added (e.g. solar filters). It is likely that within the next few months, the computer and audio/visual system in the planetarium will be upgraded to match the equipment in most of the new Natural Science classrooms.
3. Timely replacement of retiring senior faculty
    a. Two recent retirements (Bruce Fitzpatrick in 1998 and Dave Pierce in 2004) have been replaced by one full-time instructor: David Vakil. There was less turnover in the astronomy faculty than what was anticipated in March 1998.
4. Timely involvement of faculty in decisions
    a. All 3 of the current full-time faculty have been involved in most, if not all, major department decisions. It's not clear what this goal was referring to. However, more involvement of the faculty in material taught would be helpful.
5. Course development which is consistent with changing student and community needs.
    a. The current student need seems to focus on fulfilling the science lecture and lab requirements. Our course offerings match those needs, but perhaps not optimally.

Previous equipment recommendations were:

1. Upgrade video-computer projector in planetarium
    a. Done in 2000, and likely to be done again (Winter 2006).
2. New planetarium projector
    a. Done in February 2005.
3. Computerize the 16-inch telescope

    a. No progress. This is a major undertaking and would be expensive. With our recent purchase of computerized 8-inch scopes, this may not be necessary.
4. GPS station – see next item.
5. Hand-held GPS instruments
    a. Neither of the two above have been mentioned within the past 5 years.
6. Computers for faculty offices
    a. Done in 1998-2000, as part of a school-wide process.

Facility recommendations:

1. New flood lights for the Observatory
    a. There is adequate lighting on the observatory now.
2. More accessible parking
    a. This is a campus-wide issue.
3. Upgrade electrical wiring inside the planetarium building
    a. The wiring is definitely in need of upgrade. This will be implemented as part of the Measure E funded renovation, but this isn't expected to be done for several years.
4. Replace old, leaky building at the Observatory]
    a. The very old observatory and associated buildings do not currently leak.
5. Better student access to scientific computers
    a. Not clear what specifically is needed. The division will soon have multiple computer labs, so this would appear to be moot soon.

II. Program Statistics

A. Demand: FTES by Course/Program

Instructions: Analyze the **FTES by Course/Program** using 1st census data and answer the following questions. At a minimum, your analysis must include a 3-year cycle comparing like semesters.

Course	Year 1 (Term and year)	Year 2 (Term and year)	Year 3 (Term and year)
Astro 9 / Astro 20	35.7 – Spring 03	30.1 – Spring 04*	28.0 – Spring 05
Astro 10/ Astro 25	16.9	24.0	15.6
Astro 12	12.6	12.2	10.2
TOTAL	66.4	67.6	54.7

* One *less* section of astro 9 was offered in Spring 04 compared to Springs 03 & 05.
** One *extra* section of astro 10 was offered in Spring 04 compared to Springs 03 & 05.
Spring semesters were chosen because of an unusually low enrollment in Fall 2004, likely due to confusion and poor publicity about renumbering astro 9 & 10 into astro 20 & 25, respectively.

	Spring 2003	Spring 2004	Spring 2005
Course	FTES ratio	FTES ratio	FTES ratio
Astr 9/20	0.416%	0.354%	0.360%
Astr 10/25	0.197%	0.282%	0.200%
Astr 12	0.147%	0.143%	0.131%
Total*	0.773%	0.794%	0.704%
* includes astro 13	FTES astro / FTES ECC	FTES astro / FTES ECC	FTES astro / FTES ECC

1. Given the data, can you recognize any trends in course demand in any of the Program's courses?

Astro 20 (formerly 9) experienced a steady decline in enrollment. Spring 04 can be explained by offering one fewer section. But the fill rate in Spring 05 was only 88%, compared to 107% & 105% in Spring 03 & 04.

Astro 25 (formerly 10) experienced noticeably lower enrollment in Spring 05. In spring 04, even considering the extra section in Spring 04, it had a significantly higher fill rate (119%) than other years (106%, 98%).

Astronomy 12 experienced slightly lower enrollment in Spring 04 and a significant decrease in Spring 05.

Overall, the astronomy department had a low semester in Spring 05 (20% less). This may be a lingering effect of changing the course numbers from 9 & 10 to 20 & 25. However, there was also a drop in school-wide enrollment in Spring 05. In Spring 05, the college had a 92% fill rate and 7773 FTES. Compare this to Spring 04, when the college had a 98% fill rate and 8506 FTES. (ECC FTES Spring 03 = 8588 according to the Chancellor's office.) The Natural Science division as a whole also had a lower fill rate in Spring 05 than in Spring 04. (However, the division had approximately constant FTES.) The

college only dropped 5%, so our 20% drop may not be caused by whatever caused the college's lower enrollment. (Noteworthy: astronomy students aren't the typical community college student.). Clearly indicated by the tables above is that in Spring 2005, astronomy enrollment dropped noticeably both in absolute and relative (to the entire school) terms. However, without more data, no clear trend or explanation is obvious.

2. What are you doing to respond to trends?

We were more active and continue to be active in promoting the course number changes. Even after a year, some students, counselors, and ECC programs are not aware of the change. In general, we expect to do more promotion of the astronomy program. Also, if other people on campus distribute information in writing about the astronomy programs, we need to make sure those documents are up to date regarding course numberings.

Due to the lower enrollment in astro 12, one section has been canceled for Spring 06. That section has been replaced with a nighttime tutor that can also help the lab students. This experiment will continue from Fall 2005 until at least the end of Spring 2006.

3. Should a recommendation be written addressing the data? ___X__ Yes __ __ No
(If yes, list.)

Astronomy courses need more promotion. One potential source of promotion is planetarium shows geared towards students. These need not be promoted to the general community.

B. Offerings: Fill Rate*

* Percent of fill of each classes at census.

Instructions: Review and analyze the **fill rate data** (including the fill rate per course for both day and evening), provided by Institutional Research for this program for a three year cycle and answer the following questions: [evening is defined according to the schedule of classes, starting after 6pm]

Average fill rate of courses in program: Spring 03 = 104%, 04 = 107%, 05 = 88%
How does this program compare to:

	Year 1 (Spring 03)	Year 2 (Spring 04)	Year 3 (Spring 05)
Day classes	108%	114%	101%
Evening classes	101%	97%	72%

1. Given the data, is the program in a growth mode? _____ Yes __X___ No

   The trend of the program enrollment is unclear. The recent drop may be due to a college-wide drop in enrollment or residual drop from renumbering the two lecture courses. The nighttime classes are almost exclusively lab classes (which have a lower fill rate) or taught by part-timers (also a lower fill rate).

2. What adjustments are indicated?

   It appears that the lab & night courses need to be given more attention.

3. Should a recommendation be written that addresses the data? __X_ Yes ____ No

Full-time teachers should be more active in the night courses, either by teaching the courses or by mentoring and/or monitoring the faculty.

C. Scheduling: Student Satisfaction with Scheduling

Instructions: Complete the chart below. Indicate the time when sections of courses in the program are currently scheduled to start. Analyze the data provided by Institutional Research on student satisfaction with scheduling in the program and answer the questions.

Course	During the early morning before 10 am	During the late am/early pm 10am –1:55 pm	During the late afternoon 2 pm -4:25 pm	During the evening 4:30 & later	During the weekend	During the summer	Via Telecourse	Via Online
Astro 20	2 (90% fill)	1 (102%)	2 (92%)	2 (90%H, 54%)	0	GET DATA	0	2 – fill NA
Astro 25	1 (93% H)	1 (125%)	1 (113%)	1 (60%)	0	DATA	0	0
Astro 12	0	0	0	4 (3@ 93%, 1@ 40%)	0	0	0	0
Astro 13	0	0	0	0	1 (53%)	0	0	0

H = honors

1. What (if anything) is indicated by the student satisfaction with scheduling?

Only 12% were dissatisfied with our morning offerings. However most of the students surveyed were morning students and historically those have been the sections that fill the most and the most quickly. In the student surveys 33% wish we had more classes between 2-4:25pm. Conflicting with this is that these sections tend to be those that do not fill, so it's not clear if we need to adjust our offerings. Experience tells us that these afternoon classes tend to be those that fill the least. Also, 41% wish we had more classes after 4:30pm, and 51% wish we offered classes on the weekends. 23% indicated dissatisfaction with the summer schedule, 32% wished we had more online courses, and 40% wish we had telecourses. The survey results may not be as informative as was planned. They should be reevaluated.

From this, it appears we should consider offering a weekend course as well as more evening sections. Online instruction and telecourses are not something the current full-time faculty are willing to do. The two current online section are taught by the recently retired, and now part-time instructor, Dave Pierce.

2. Are there time periods of high student demand which are not being addressed? _X_ Yes __ No
   How could such demand be addressed?

We could address the demands by offering more courses in the morning and on the weekends – those sections have been canceled or reduced in the last few years. However, despite the results of the student surveys, we do not think we need more classes in the early afternoon. The survey we administered indicates a strong preference for Monday-Wednesday or Tuesday-Thursday sections.

3. Should a recommendation be written addressing this area? __X___ Yes _____ No
   (If yes, list.)

The astronomy department should alter its schedule to offer more classes between 2-4:25pm twice a week, as well as a weekend lecture and/or lab course. Saturday classes would seem to be a better approach considering that the 2-5pm classes traditionally haven't filled very well (including Fall 2005).

D. Retention and Success

1. Retention

Instructions: Review and analyze the data on **retention (course completion with a grade other than W)** over a three-year cycle comparing day to evening classes, term to term (e.g. fall to spring, spring to summer, etc.), and course levels.

1. Given the data, what trends are observed?
   Comment.

Our retention and success rates are essentially constant, at 70% and 48% respectively. These numbers are lower than neighboring schools (e.g. Mt. Sac, Santa Monica) and the statewide average (82% & 65%). This was discussed by the faculty, and our suspicion was that we have more rigorous courses than the typical astronomy program. However, we also agreed that this could be checked by examining other schools' exams. One of our department's objectives is to maintain a high level of instruction. Therefore, if our exams are more rigorous than neighboring schools, it's not clear what to adjust to increase our success and retention rates. (It may not even be clear that we should do so.)

2. Should a recommendation be written addressing the data? ___X__ Yes _____ No
   (If yes, list.)

The astronomy department should do a survey of other schools' exams and/or course materials to determine if our lower-than-average success and retention rates are, in fact, caused by offering more rigorous and comprehensive courses. Adjustments to instruction may be necessary pending those results.

The department should also try active measures to increase success and retention without sacrificing rigor. This could be done by doing more interactive activities and by coordinating and developing classroom activities as a faculty group, rather than individually, as is primarily done now.

2. Success Rate

Instructions: Review and analyze the data on **success rate (students who earned a grade of A,B,C, or Credit)** over a three-year cycle comparing day to evening classes, term to term (e.g. fall to spring, spring to summer, etc.), and course levels and answer the following questions:

1. What trends are observed?

See above.

2. Should a recommendation be written addressing the data? __X___ Yes _____ No
   (If yes, list.)

See above.

III. Curriculum

A. Course and Content

1. Courses Not Offered

Instructions: Indicate the total number of courses in the program and list all courses in the program which are in the catalog but have not been offered in the last three years. Refer to this list to answer the following questions:

1. Given the data, are there courses that should be inactivated? _____ Yes ___X__ No
   Comment.
   The only courses that have not been utilized in the last 3 years are independent study programs (Astro 50 & 99). These should remain as options for students.

2. If there are courses not offered in the last three years that you do not wish to inactivate, what reasons are there to keep them active?

3. Should a recommendation be written addressing the data? _____ Yes __X___ No
   (If yes, list.)

2. Course Revisions and Additions

Instructions: Utilize the Course Review Chart from the Curriculum Office to answer the following:

1. Are there course outlines that should be revised? _____ Yes __X___ No
   (If yes, list.)

2. Are there courses inconsistent with current practice in the field? ___ Yes _X__ No
   Explain.

3. Should new courses to be added to the program? __X___ Yes _____ No
   Explain.

26% of those surveyed indicated that they would be interested in "an algebra-level Astronomy or Astrophysics course." This need is currently not being met.

Additionally, 43% of those surveyed indicated that they would be interested in "an elementary Astronomy course at a more basic level than" our current lecture courses. This need is also not being met. This course might not articulate to 4-year schools, however, so the true need and desire for this class is not known.

Lastly, 36% of students indicated that they would prefer to take an astronomy course that has a lecture and lab component combined.

4. Are adjustments necessary to the conditions of enrollment (Prerequisite, Corequisite, Recommended Preparation, and Enrollment Limitations) for a specific course to increase student success?
____ Yes ____ No _X___ Uncertain **Comment.**
In the past, we have discussed the idea of having a science prerequisite course, or a placement exam as a means to increase success and retention. The benefit of such a requirement seems clear, but the impact on our enrollment would likely be negative.

5. If the program offers a degree and/or certificate, list them and indicate when the requirements were last reviewed? **(If not applicable, skip to Question 7.)**
Not applicable.

6. Are these degree and/or certificate requirements inconsistent with current practice? __ Yes ___ No
Explain. **NOT APPLICABLE**

7. Is there a need to create or delete a degree and/or certificate? ____ Yes __X__ No
Explain.

8. Should any recommendations be written that address the above responses? ___X__ Yes ___ No
(If yes, list.)

a. An algebra level astronomy or astrophysics class should be developed. Such classes exist at other community colleges (e.g. City College of San Francisco.). However, transferability should be investigated and the needs surveyed more rigorously before such courses are proposed.
b. A combined lecture-lab course should also be developed.

B. Articulation

Instructions: Using the California Articulation Number (CAN) Guide, answer the following questions:

1. Should any of your courses not currently included in the CAN Guide be articulated?
Astronomy is not currently supported by CAN.

2. What problems, if any, are there in articulating courses?

3. Should a recommendation be written addressing above responses? _____ Yes __X___ No
(If yes, list.)

C. Instruction and Assessment

1. Learning Methods

1. What learning methods are incorporated inside and outside the classroom in the program to promote student success? **Explain.**

Activities In class: standard lectures, lecture tutorial activities, think-pair-share, student-completed handouts, and in the near future, we hope to have personal electronic response systems (commonly called "clickers") available. Clickers allow for easier engagement of students and can instantly assess understanding. This will allow for immediate feedback and immediate course adjustments to meet the needs of the students.

Outside the class: answering critical thinking questions from tests, completing planetarium-software activities at home

2. Should a recommendation be written addressing above response? ___X__ Yes _____ No
(If yes, list.)

Several recommendations are possible. First, implement more of the activities listed in "Learning Methods" question #1 above. These have been proven, through independent research, to be effective. Second, implementing those recommendations will necessitate covering less topics. Courses should be adjusted accordingly, while sticking within the bounds of the course outlines (or revising those outlines). Third, astronomy professors should work together more to develop classroom materials and content

presentations that follow the established learning methods above. Currently there is little interplay between any of the instructors (full or part time). Teaching courses in similar ways, rather than drastically different ways (as is done now) could help the department improve as a whole.

2. Assessment

1. How do you evaluate the extent to which the learning objectives, skills, and competencies are being met?
   A) Courses
      This is done primarily through examinations, lab reports (formal and informal), and other miscellaneous homework assignments.
   B) Program – there are no program competencies or skills.

2. How do you use the results of the above evaluation to improve student learning and the quality of the program?

Assessment tools and instruction are continually adapted based on students' performances on the above activities. Also, new activities (e.g. "clickers" and "lecture tutorials") are used to address diagnosed problems.

3. Should a recommendation be written addressing this area? __X__ Yes _____ No
   (If yes, list.)

Continue to follow through with the activities listed III.C. 1 & 2. This will also help the department develop and revise Student Learning Outcomes for the courses.

IV. Program Requirements
A. Instructional Support

1. Identify key instructional support areas used by the program.

Libraries & Programs:

X	Library		Special Resource Center		Basic Skills Study Center		Library Orientation
	Music Library		Puente Program	X	Honors Transfer Program		Other (Please list.)
	Learning Resource Center Media Materials Collection		Assessment/Testing Office	X	Counseling		
X	EOP&S/CalWORKS	X	Transfer Center	X	First Year Experience		
	Learning Communities		Project Success	X	Honors Transfer Program		

Computer Labs & Tutoring:

X	LMTC Computer Commons		SRC High Technology Center		Other Computer Lab: Please list.		Writing Center
	CAI MAC Lab	X	Writing Lab			X	LRC Tutorial Program
	CAI Windows Lab	X	Math & Science Lab				Math Tutoring
	TOP Lab		Keyboarding Center				SRC Tutorial Program
	Hawthorne BTC						EOP&S Tutoring

	Inglewood Center						

Faculty Support Services:

X	Graphic Arts	X	Copy Center		Distance Education		Other (Please list.)
	Media Services AV Production	X	Tech Services Help Desk		Teleconferences		
	Media Services AV Equipment Distribution		Support Staff		Webconferences		
	ECC Vehicles	X	ECC hosted Websites	X	Staff Development		
X	ECC E-mail						

2. Do you have some instructional support needs that are not being met? ____ Yes _X___ No
   Comment.

3. Should a recommendation be written to address your needs? ____ Yes __X__ No
   (If yes, list.)

B. Facilities and Equipment

1. Does the program make effective use of its facilities and equipment? **Explain.**

Yes, the newly installed planetarium is becoming a regular part of instruction by most instructors. The telescopes are used in most lab sessions.

2. Are adequate facilities, equipment and supplies available for the program? _X__ Yes and _X__ No
   Explain.

Astronomy has 2 dedicated classrooms: physics 102 & the planetarium. Physics 102 is new, while the planetarium continues to be supported by the school. The recent upgrade of the planetarium projector, the painting of the interior dome, and the soon-to-be completed upgrade of the audio-visual equipment indicate that our classroom facilities are well maintained. However, the rooms on the roof of the math building are less well maintained. The doors all have extensive termite damage and the floor of the dome will soon need replacing, as it is coming up and apart. Currently it is patched with duct tape to prevent tripping hazards. These have been reported on numerous occasions.

Also, as the lab program incorporates more technology, the facilities on the roof will need to be upgraded to allow for computer and digital camera involvement. This will likely require an upgrade to the electrical work and may also require internet support if a wireless network is not available. Storage areas will need to be adapted which may or may not involve assistance from others.

3. Are the facilities and equipment adequately maintained? ____ Yes __X__ No
   Explain.

What little maintenance that is done, is currently performed by the full-time faculty during their free time and also by lab assistants, as time (or their generosity) permits. There is nobody specifically assigned to routine maintenance. This will become an increasing problem as the new planetarium projector has parts routinely wear out (e.g. fans, lights). This has been a consistent problem for our telescopes since Jim Lund retired from the planetarium manager position. For Fall 2005 & Spring 2006, one of our night assistants is maintaining our observatory facilities on Wednesday nights since the lab class for that night has been canceled. He is also offering telescope and mirror-making tutoring, a

service never provided before. This is a pilot program – it remains to be seen if it is cost effective and helpful for the students.

4. Should a recommendation be written addressing the data? ____X_ Yes _____ No
(If yes, list.)

The astronomy department needs to hire a full time Planetarium Manager to assist with the routine maintenance of equipment and to help integrate new technologies into the astronomy program.

C. Staffing

Instructions: Analyze the data on **FTEF, adjunct FTEF, and the FT/PT ratio** for the most recent fall semester and answer the following questions:

SPRING 2005 WAS USED FOR REASONS STATED ABOVE (ANOMALOUS FALL 2004 ENROLLMENT).

			FT/PT load
Spr 2005: # of full-time FTEF: 2.10	# of adjunct FTEF: 1.25	Total: 3.35	Ratio 62.7%
Spr 2004: # of full-time FTEF: 2.45	# of adjunct FTEF: 0.70	Total: 3.15	Ratio 77.8%
Spr 2003: # of full-time FTEF: 3.00	# of adjunct FTEF: 0.35	Total: 3.35	Ratio 89.6%
Spr 2002: # of full-time FTEF: 3.00	# of adjunct FTEF: 0.75	Total: 3.75	Ratio 80%

1. How do the program numbers compare to a like semester (Fall to Fall) three years ago or the previous program review?

The current FT/PT ratio is significantly lower than in years past. This is due to two things: 1) the recent retirement of one full-time faculty that has only been partially replaced by shifting David Vakil from 50%-50% physics-astronomy into all astronomy, and 2) increased release time for Perry Hacking and David Vakil

2. What do the program data indicate? Comment on any trends or unusual data.

The data do not indicate anything.

3. How does the FT/PT ratio benefit or harm the program?

The current overall ratio is slightly below the average of the college (68%) and significantly below the state's goal of 75%. However, in future semester, David Vakil will be teaching more astronomy courses than he has in previous Spring semesters, so that ratio will rise.

4. Do you have a faculty mentoring program? _____ Yes ___X___ No
Describe.

5. How do faculty maintain currency in their field?

The full-time faculty actively maintain their currency by reading astronomy literature and news articles, and by attending local meetings of various astronomical societies.

6. Fill in the faculty status data below and answer the questions that follow.

Name	Reassigned time (how much in %)	Currently on leave (check)	Retired in last 2 years (check)	FT hired last 3 years (check)	Anticipated to retire in next 3 years (check)
David Vakil	20%				

Perry Hacking	35%				
S. Vincent Lloyd	0%				
Dave Pierce			X		

6a. How does this data impact the program?
There is no obvious impact on the program.

6b. Will this data affect the program in the future?
The reassigned time appears to be semi-long term (at least 1 year more) so the program will remain as is.

7. From this information, can you identify present and future staffing needs? _ X_ Yes ___ No
Explain.
To support our public outreach programs, as well as the maintenance of equipment mentioned above, the astronomy department needs to hire a full-time planetarium manager.

No needs are evident for instructional faculty other than a need to maintain a pool of qualified part-time applicants.

8. What is the department doing to address any future staffing needs?
The planetarium manager has been approved and budgeted. However, it is in the lowest tier of classified employees to be hired.

We are actively recruiting new part-time instructors.

9. Should a recommendation be written addressing the data? ___X__ Yes _____ No
(If yes, list.)
The planetarium manager needs to be hired as soon as possible.

D. Planning

1. Do the program faculty and other personnel have a clear idea of what is happening in the program, where it is headed, what external changes are affecting it, and what changes need to be made in order to enable the program to adapt and continue to be successful? **Explain.**

At this time, the program enrollment appears steady or in decline – we are not sure at this time. The faculty are involved in teaching innovations and student-centered classrooms in an attempt to improve retention and therefore increase enrollment. Some activities include developing and using recently published learning-centered activities and incorporating clickers into classes.

2. What data, not currently provided, would be needed in order to improve planning for the development of the program? **Explain.**
Astronomy enrollment has fluctuated a lot during the last 3 years, and may be on the decline. It is not clear what reasons might be behind this nor is it clear that the effect is real or permanent. To investigate this, data should be collected from students and people who recommend courses to determine the nature of any changes or potential changes. The department has considered that the change may be related to changing our course numbers. Recently some teachers have asked their students, but no new information

has become available. Specific tools and questions should be developed by the experts to determine what trends really are present and what their underlying causes are.

Also, since we are piloting a new tutoring experience, it would be helpful to know how, in general, the effectiveness of tutoring programs are evaluated, particularly in areas with small attendance. This same tool could also be used to determine the effectiveness of the astronomy tutors in the Learning Resource Center.

Survey results indicated students would be interested in an "an elementary Astronomy course at a more basic level than" our current lecture courses. The transferability of such a course should be investigated and the students re-surveyed to determine if such a need really exists. Similar recommendations exist for combined lecture/lab courses and algebra-based courses.

Lastly, when surveying our students, the survey results contradicted those of the faculty. For example, the survey indicated a desire for more late afternoon (pre-evening) courses, but experience tells us that these courses do not fill well. This kind of result does not instill confidence in the data-gathering process.

3. What major external changes or trends do you expect to be of particular relevance to your discipline in the next five years?
More technology will be available for the lab courses. The lab courses could then shift their focus to digital photography and data processing. More internet applications and displays are being developed all the time, which can help all courses. Also "clickers" are already becoming affordable.

4. What will the implications of these changes or trends be for the program and how will the program need to respond?
Digital photography equipment and supplies will need to be purchased and new activities will need to be developed.

5. Based upon the information above, how would you like the program to evolve within the next five years?
No evolution is necessary, as long as the faculty maintain their active approach to incorporating newly available technologies into their classes.

6. Should a recommendation be written addressing the data? _____ Yes __X___ No
(If yes, list.)

V. Conclusion

1. Prioritized Recommendations
    1. Hire a Planetarium Manager.
        a. This has been a high priority for this department for over 7 years.
    2. The department should also try active measures to increase success and retention without sacrificing rigor. This could be done by doing more interactive activities and by coordinating and developing classroom activities together, rather than individually, as is primarily done now.

3. The astronomy department should alter its schedule to offer more classes on weekends and the mornings. Perhaps include a lab course in these new/restored offerings.
4. Maintain current high level of instruction in Astronomy.
5. Students should be resurveyed at the end of the semester to re-examine whether an algebra level astronomy or astrophysics class should be developed or not.
6. Evaluate current tutoring experiences, including the new night opportunity. Revise according to findings.
7. A combined lecture-lab course should also be developed pending survey results/other data.
8. Develop the ability to recruit and hire outstanding astronomy instructors, both full and part-time, when they become available.
9. Full-time teachers should be more active in the night courses, either by teaching the courses or by mentoring and/or monitoring the faculty.
10. Expand the public planetarium program to offer additional school shows and more evening shows.
11. Develop a formal (paid) mentoring program for new instructors.
12. The astronomy department should do a survey of other schools' exams and/or course materials to determine if our lower-than-average success and retention rates are, in fact, caused by offering more rigorous courses.
13. Develop a science pre-requisite course and/or an elementary astronomy course.
14. Find a new long-term tutor or two for the Learning Resource Center.

2. Major Needs

Hire a planetarium manager. Having this position filled will restore our public programs and allow the school to recruit new students. The manager would also be able to maintain all equipment and do the general upkeep of the facilities. This would help students in all instructional sections.

3. Strategies

Our primary goal has been to hire a planetarium manager to increase our planetarium shows and do equipment maintenance and upgrades. Thus far, we have been able to take care of our planetarium maintenance and equipment needs with a variety of sources: I-grant, some funds from the Natural Science division, and funds from the ScienceFEST program's grant. However, these were largely one-time sources of funds that mostly came from private organizations. This is not a long-term solution to our needs. We note that we have made significant equipment upgrades, such as cleaning and repainting the interior of the planetarium dome, which hadn't been done since construction in 1969, and installing a new LED energy-efficient lighting system (expected January 2007). As can be seen, the astronomy department has worked diligently to maintain and improve its technology.

There is still a strong need for a planetarium manager to perform equipment maintenance and to provide public outreach to local schools, the public, and to support the requests from the ScienceFEST program (which was part of the reason the ScienceFEST program was able to contribute funds to the astronomy department). While private donors have been willing to donate money for equipment upgrades that improve our classroom and teaching, they have not been willing to fund a permanent position for the planetarium. While we have looked for external funding, we now feel this funding must come from ECC.

To help facilitate hiring a planetarium manager, we note that revenue generated from planetarium shows would partially offset (approximately 20-35% of) the salary & benefits costs of the planetarium manager.

Further we have developed the following proposal. Since the division lost the Lab Technician supervisor position when that person retired, there has not been a full-time replacement. The division council was receptive to the idea of combining the planetarium manager and the lab technician supervisor position into one position. This would be a comprehensive solution to several division needs, and combined from the revenue generated by the planetarium shows, is an inexpensive solution to several long-standing staffing problems.