#13

COMPLETE

Collector:	Email Invitation 1 (Email)
Started:	Friday, February 08, 2019 2:03:15 PM
Last Modified:	Sunday, February 10, 2019 10:51:48 PM
Time Spent:	Over a day
First Name:	Miriam
Last Name:	Simpson
Email:	miriam.simpson@gcccd.edu
Custom Data:	Physics, Physical Science, and Astronomy
IP Address:	160.227.129.234

Page 1: I. Program Overview and Update

Q1 Department(s) Reviewed:

Physics, Astronomy, and Physical Sciences

Q2 Lead Author and Collaborators:

Miriam Simpson (Physics), Glenn Thurman (Astronomy)

Q3 Dean:

Pam Kersey

Q4 Program Update (Required): Please summarize the changes, additions, and achievements have occurred in your program since the last program review. To access last year's program review, visit the IPRPC Intranet Page, accessible here.

1. Enrollment Still Strong
Even as enrollment for the college has slowed, physics continues to grow. Over the last three years we have averaged in the low around 52 FTES (we averaged in the 40s the previous three years and in the 30s before that). We are currently at 59 FTES for Spring 2019 indicating that we are still experiencing some slow growth. We are now seeing growth in both our engineering series (PHYC 190/200/210) and our health sciences series (PHYC 190/200/210). Excellent retention in both these series means our enrollment numbers remain high as students advance.

2. Lab Technician Crisis
As a result of years of sustained growth we have dramatically increased the workload of the single lab technician shared with Physics, Engineering, Astronomy, and Earth Sciences. Although we have demonstrable demand for additional sections for new and existing courses, we cannot add any sections without further technician support.

3. Wrap-around student support
We are working hard to provide resources for students including additional math support, exciting project-based learning, and an ongoing video project for recording lectures and detailed office-hours style examples for students to access from anywhere.

4. New and/or Improved Courses!
Stay tuned for a complete revamp of Physics 130/131 starting Fall 2019! Also, now that we have better staffing, we are looking to add Physics 110 back into the rotation, providing a quality exploratory class for students undecided on a major with an emphasis crossover of physics with music and art. We continue to build, assess, and improve Physics 190/200/210.

Page 2: IIB. Student and Program Learning Outcomes

Q5 Do you have an assessment plan on file with SLOAC? If you have not already done so, you can submit your program's assessment plan to SLO Coordinator, Tania Jabour, at tania.jabour@gcccd.edu.	**Yes**

Q6 Please provide an analysis of your student learning outcomes (SLO) findings and what changes, if any, were made as a result.

Physics 190/200/210 - Series SLOs have all been updated in the last two years. The old and new versions of SLO1 were similar enough in these courses that we were able to simultaneously assess both versions and compare over the last few years.

Lab Assessment (See Figure 1) – Development and improvement of labs in PHYC 190 and 200 seems to have made a permanent impact. New lab manuals for students were developed in 2014/2015 with extra instructor manuals added around 2016/2017 led to better scores across all sections. New equipment for broken and poorly designed labs added in the last two years has also helped as demonstrated by a permanent rise in scores. Currently we are implementing equipment purchased last year and hope to see some additional score rise. PHYC 210 has been a little more difficult to manage. Clearly training in data analysis from previous courses has been effective. Historically, however, 210 has had low enrollment and its lab equipment is disproportionately more expensive than PHYC 190 and 200, so only enough equipment for about 24 students was purchased for many of the labs. As we have fixed this enrollment problem (leading to increasingly full classes, waitlists, and a growth section) we have seen some marked dips in the lab comprehension stemming from lab groups shifting from 2-4 students to 5-7 due to equipment shortages. The particularly low points in lab concept assessment tend to be in years the class is full, higher years are from low enrollment. Last year we were able to get funding and fix this problem for several labs, and there was a corresponding uptick in scores even as the class remained large.

Lecture Assessment (See Figures 2-4) –
PHYC 190 – additions of lecture demos, comprehensive materials for part time instructors, improvement of content, and additional math support have led to upward trends in the SLOs for this class.
PHYC 200 – SLOs 1&2 are quite challenging for students and depend a great deal on prerequisite math knowledge. We are hoping that the change in the math prerequisite that just went though curriculum will improve the scores on these, we have also added some more active learning and additional outside support (video and extra practice problems) for these topic this semester. We also plan to check the assessment of these topics on the final to compare (these were assessed on an early midterm and this concept repeats throughout the class). SLO3 is generally strong, we use it to gauge new part-time instructors.
PHYC 210 – this data is difficult to assess as the number and ability of incoming students fluctuated pretty wildly. Generally students struggle with relativity so the content of that part of the course is under review to see if we can improve outcomes.

Physics 130/131 - Series SLOs were rewritten and went into effect Fall 2017. Since these SLOs were very different from the previous version, there is not much comparison that can reasonably be done. This course is scheduled for a major content restructuring starting Fall 2019 (topics, curriculum, and SLOs will remain the same). In order to effectively compare before and after the change, all new SLOs were assessed last year. The results of the SLO assessment have underscored the need for redesign of the course to better engage the students with the material.

Q7 Review your PLOs. Are the listed PLOs an accurate reflection of the program's current learning objectives? **No**

Q8 Are the PLOs mapped onto the course SLOs? **Yes**

Q9 Discuss your assessment plan for the PLOs.

PLOs are severely outdated and need to be changed (table 2). We have just updated all SLOs with curriculum so we are currently in the process of drafting new PLOs based on our program redesign which includes updating our courses and degrees in a guided pathways framework as well as collaboration with chemistry, math, engineering and our physics counterparts at Grossmont. Doing this well will take some time. Currently all PLOs that can be assessed by physics have been assessed.

Page 3: IIB. Student Achievement

Q10 How has the program's success rate changed over the past year?

Physics – Our success and retention rates have remained relatively flat over the last 5 years (see figure 5) even as we have increased our sections by over 30%. These success and retention rates are abnormally high for physics (Grossmont, by comparison, is generally in the 60-70% range for both success and retention) and if you refer to our SLO data, you can see that we are also managing to maintain academic rigor. This success rate is can be attributed to three key elements that are central to our program: (1) High-quality, student-centered instructors who are rigorously vetted and assessed, but also supported with quality shared materials. (2) Excellent support services from both instructors and tutoring, and (3) great content with student engagement built into both lectures and labs.
Astronomy – Also good. See Figure 6.

Q11 The College has set a 2024 goal of reaching a 77% course success rate (students passing with a grade of A, B, C, or P out of those enrolled at census) for the College as a whole. Consider how your will program help the College reach its long-term goal of increasing the course success rate to 77%. This is intended to provide a goal for improvement only; programs will not be penalized for not meeting the goal. What is your program's one-year goal for success rate across all courses in the program?

Physics – We are already above this number, we plan to continue the work we are doing.
Astronomy – Same.

Q12 Which specific groups (by gender and ethnicity) have success rates lower than that of the program overall?

Gender
Women have equal success rates with men, but remain heavily underrepresented (figure 7). This means that the problem begins before women even enter our courses and is part of a larger national trend in which women's enrollment in the physical sciences has ceased growth and remained flat even as other STEM majors have reached or exceeded gender parity (figure 8). Some improvement has been made closing this gap in astronomy (figure 9).

Ethnicity
The chart (figure 10) includes shows success rates as a percentage difference from the average success rate in physics. As you can see from the previous chart, some of the wild fluctuations are attributable to small student counts such as the black, non-Hispanic students, but for the largest groups, white and Hispanic, it is clear that white students have been doing consistently better than the average success rate, while Hispanic students have remained generally below the average. Astronomy also sees lower Hispanic enrollment but has not investigated success gaps (figure 11).

Q13 What program (or institutional) factors may be contributing to these lower rates of success for these groups of students?

For women enrolled in physics, this is part of a wider national problem (figure 8). For our underrepresented minorities, our numbers are actually better than the national average. These factors indicate that we are doing something right. Although this issue is not necessarily an institutional problem, we will continue to address these gaps as best we can.

Q14 What specific steps will the program take to address these equity gaps in the 2019/20 academic year?

In Physics we are starting a project to make videos of all the lectures for the 190/200/210 series and put them online for students with work, health, or childcare issues so they do not get behind. (Goal 8)

Q15 How do these activities align with the goals set forth in your last comprehensive program review?

Gender - To address this we plan to create programs that address this issue at all level.
• Supporting and retaining the women we have by generating equitable, quality materials and adequate support systems (Goal 4, New Goal 2)
• Recruiting from within
• More flexible courses for women (and men) with childcare constraints (Goal 8)
• Development of a gateway, general education course (Goal 7)
• Recruiting upstream
• Outside publicity through webcast lectures (New Goal 4)
• K-12 Outreach (Goal 1)
Ethnicity - Supporting the Hispanic, Black, and Filipino students who fall below the average performance
• By creating equitable, quality materials and adequate support systems (Goal 4, New Goal 2)
• Creating more accessible course materials that help students who have difficult work or childcare schedules (Goal 8)

Q16 OPTIONAL: If you would like to attach any charts or additional documentation (aside from the program review report prepared by the IESE Office), please upload it using the button below. You can upload PDF, Word, and image files.

PHYC ASTR PR 1819 Figures (SLOs and Equity).pdf(7.1MB)

Page 4: Distance Education

Q17 Does your program offer any courses via distance education (online)?	**No**

Page 5: Distance Education Course Success

Q18 Are there differences in success rates for distance education (online) versus in-person sections?	**Respondent skipped this question**
Q19 If there are differences in success rates for distance education (online) versus in person sections, what will the program do to address these disparities?	**Respondent skipped this question**

Page 6: IV. Previous Goals: Update (If Applicable)

Q20 Would you like to provide an update for your previous program review goal(s)?	**Yes**

Page 7: Previous Goal 1

Q21 Previous Goal 1:

Add Full-Time Faculty

Q22 Link to College Strategic Goal(s):	**Guided Student Pathways** , **Student Validation and Engagement** , **Organizational Health**
Q23 Goal Status	**Completed**

Q24 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

We will be assessing changes in enrollment as well as SLOs over the next few years to see the impact.

Q25 Please provide the rationale for this goal:	**Respondent skipped this question**
Q26 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**
Q27 Do you have another goal to update?	**Yes**

Page 8: Previous Goal 2

Q28 Previous Goal 2:

Finish Lab Updates (PHYC 190/200/210)

Q29 Link to College Strategic Goal(s):	**Guided Student Pathways** , **Student Validation and Engagement**
Q30 Goal Status	**In Progress**

Q31 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

Further assessment of lab SLOs.

Q32 Please provide the rationale for this goal:

We would like to run the labs in a consistent and engaging manor across multiple sections in order to (1) integrate basic skills (2) engage students (3) provide prepackaged content with clear instructions to part-time instructors (4) streamline set-up and takedown for the lab technician(s). THIS WILL HELP RESOLVE THE PHYC 210 SLO ISSUES.

Q33 Please provide the goal action steps for the year (previously "Activities"):

(1) Standardize and make available digital Lab manuals – 33/33 labs offered in this series have been substantially updated with full student guides. These have now been implemented in the courses for several semesters and adopted by all physics instructors. (2) Instructor Guides – 30/33 student lab manuals now have instructor guides with additional notes to instructors and full solutions to the problems/questions. (3) Group sizes – After receiving 11 new computers that replaced 8 outdated computer stations, we are now able to run just over 80% of the labs with lab groups of 3 students or less (our goal size). We will need some supplemental equipment purchases to get this number from 80% to 100%. (4) Replace broken or outdated equipment.

Q34 Do you have another goal to update?	**Yes**

Page 9: Previous Goal 3

Q35 Previous Goal 3:

Update Math Prerequisite

Q36 Link to College Strategic Goal(s):	**Guided Student Pathways**
Q37 Goal Status	**Completed**

Q38 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

We will be evaluating SLOs of math-heavy topics.

Q39 Please provide the rationale for this goal:	**Respondent skipped this question**
Q40 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**
Q41 Do you have another goal to update?	**Yes**

Page 10: Previous Goal 4

Q42 Previous Goal 4:

Improve Student Support

Q43 Link to College Strategic Goal(s):

Guided Student Pathways

Student Validation and Engagement

Q44 Goal Status

Completed

Q45 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

Collaboration with tutoring to see if we can correlate tutoring usage data with increased success in physics courses/SLOs. Student feedback surveys.

Q46 Please provide the rationale for this goal:

Respondent skipped this question

Q47 Please provide the goal action steps for the year (previously "Activities"):

Respondent skipped this question

Page 11: V. New Goals (If Applicable)

Q48 Would you like to propose any new goal(s)?

Yes

Page 12: New Goal 1

Q49 New Goal 1:

Acquire daytime Physical and Natural Sciences Technician to support Physics, Engineering, Astronomy and Earth Science

Q50 Link to College Strategic Goal(s):

Guided Student Pathways

Student Validation and Engagement

Organizational Health

Q51 Please provide the rationale for this goal:

Currently the shared lab technician that supports Physics, Engineering, Astronomy and Earth Science is woefully overburdened by the massive growth of these departments resulting in inevitable unpaid and potentially dangerously under-supervised work by both the technician and faculty. In addition, this technician works in the evenings, leaving unsupported any morning labs or field trips at great hazard to participating students and instructors, and prohibiting further growth in disciplines where support for labs is absolutely required.

Q52 Please provide the goal action steps for the year (previously "Activities"):

(1) Get approval for new hire (2) Hire new technician (3) Train new technician

Q53 How will the goal be evaluated?

Student impact will be assessed via lab SLOs while faculty impact will be assessed via follow-up survey.

Q54 Do you have another new goal? **Yes**

Page 13: New Goal 2

Q55 New Goal 2:

Concurrent Remediation project for Math in Physics

Q56 Link to College Strategic Goal(s): **Guided Student Pathways** , **Student Validation and Engagement**

Q57 Please provide the rationale for this goal:

Physics has run a three-year study on assessing prerequisite math-skill deficits in PHYC 190 in order to provide customizable, just-in-time interventions for at-risk students (New Goal 2 in Program Review). Initial results show a 40-50% increase in success for at-risk students. We are collaborating with Math and the campus research office to improve and expand this model. This next step will be very labor intensive and requires an intimate understanding of the connections between physics and math.

Q58 Please provide the goal action steps for the year (previously "Activities"):

(1) Collect data on student math assessment, background, and subsequent course performance in Physics 190 (2) Add interventions for at-risk students and assess results (3) assess initial data and use to design better interventions that can be used in all physics courses by collaborating with the Math department and the research office.

Q59 How will the goal be evaluated?

Evaluation is the plan. (See figure 12)

Q60 Do you have another new goal? **Yes**

Page 14: New Goal 3

Q61 New Goal 3:

Lecture Webcast Project

Q62 Link to College Strategic Goal(s): **Guided Student Pathways** , **Student Validation and Engagement**

Q63 Please provide the rationale for this goal:

Webcast lectures have become standard practice at larger institutions and provide a valuable tool for students to review at their own pace in the comfort of their own homes. They are also incredibly useful for: students with disabilities (who can use captioning or work at a slower pace), work conflicts that cause them to miss class, unexpected or chronic illness and parents with daycare issues.

Q64 Please provide the goal action steps for the year (previously "Activities"):

(1) make recorded audio available (2) Research video hardware and software (3) Begin recording video with Camtasia and screen capture, editing in Camtasia for post production

Q65 How will the goal be evaluated?

Look at success and retention data

Q66 Do you have another new goal? **Yes**

Page 15: New Goal 4

Q67 New Goal 4:

In-Classroom and Portable Instructor Presentation Resources

Q68 Link to College Strategic Goal(s):	**Student Validation and Engagement**

Q69 Please provide the rationale for this goal:

With a large number of Part-time instructors, quality, pre-packaged, user-friendly materials will free up time for instructors to engage with students, grade, and enjoy teaching. It also provides continuity between instructors maintaining the overall quality and consistency of course offerings and provides incentive to stay at Cuyamaca.

Q70 Please provide the goal action steps for the year (previously "Activities"):

(1) Develop content – mostly done (2) Distribute content – difficult because of different operating systems, software on individual computers. Need classroom computer.

Q71 How will the goal be evaluated?

Retention data and SLOs

Page 16: VI. Resources Needed to Fully Achieve Goal(s)

Q72 Is the program requesting resources this year to achieve this goal?	**Yes**

Page 17: V. Faculty Resource Needs

Q73 Are you requesting one or more faculty positions to achieve this goal?	**No**

Page 18: Faculty Position Request(s)

Q74 Please remember to complete the Faculty Position Request Form (accessible here, under Staffing Request Information) for this position that you are requesting and upload it using the button below.The Faculty Position Request Form (In Word) can be located here (under Staffing Request Information).Brief Description of the Position Requested:	**Respondent skipped this question**
Q75 Faculty Position Request 1 - Related Program Goal(s):	**Respondent skipped this question**

Q76 Faculty Position Request Upload 1: Please upload the completed faculty request form for the above position using the button below. You can access the Word version of the Faculty Position Request Form here (under Staffing Request Information).

Respondent skipped this question

Q77 Faculty Position Request 2 (if applicable): Please remember to complete the Faculty Position Request Form (accessible here, under Staffing Request Information) for this position that you are requesting and upload it using the button below.The Faculty Position Request Form (In Word) can be located here (under Staffing Request Information).Brief Description of Position Requested:

Respondent skipped this question

Q78 Faculty Position Request 2 - Related Program Goal(s):

Respondent skipped this question

Q79 Faculty Position Request Upload 2: Please upload the completed faculty request form for the above position using the button below. You can access the Word version of the Faculty Position Request Form here.

Respondent skipped this question

Page 19: VI. Classified Staff Resource Needs

Q80 Are you requesting one or more classified positions to achieve this goal?

Yes

Page 20: Classified Staff Position Request(s)

Q81 Classified Staff Position Request 1: Please remember to complete the Classified Staff Position Request Form (accessible here, under Staffing Request Information) for this position you are requesting.Brief Description of Position Requested:

Physical and Natural Sciences Technician

Q82 Classified Staff Position 1 Related Program Goal(s):

Goals 2, 6, 7 and New Goal 1 and 4

Q83 Classified Staff Position 1 Request Upload: Please upload a completed Classified Position Request Form for this request using the button below. You can access the Word version of the Classified Position Request Form here.

2018-19 Classified Position Request Form.docx (408.9KB)

Q84 ***OPTIONAL*** Please use the button below to upload the position classification description (obtained from HR).

Science Lab Technician III.doc (102.5KB)

Q85 Classified Staff Position Request 2: Please remember to complete the Classified Staff Position Request Form (accessible here, under Staffing Request Information) for each position you are requesting.Brief Description of Position Requested:	**Respondent skipped this question**
Q86 Classified Staff Position 2 Related Program Goal(s):	**Respondent skipped this question**
Q87 Classified Staff Position Request 2 Upload: Please upload a completed Classified Position Request Form for this request using the button below. You can access the Word version of the Classified Position Request Form here (under Staffing Request Information).	**Respondent skipped this question**
Q88 ***OPTIONAL*** Please use the button below to upload the position classification description (obtained from HR).	**Respondent skipped this question**

Page 21: VII. Technology Resource Needs

Q89 Are you requesting technology resources to achieve this goal?	**Yes**

Page 22: Technology Request(s)

Q90 Technology Request 1: Please remember to complete a Technology Request Form for each request you are submitting. You can access the online Technology Request Form here: Technology Request Form

Description:	**Instructor Laptop**
One time or On-going	**One time**
Amount Requested $	**$1350**
Related Program Review Goal(s):	**New Goal 3 & 4**

Q91 Technology Request 2: Please remember to complete a Technology Request Form for each request you are submitting. You can access the online Technology Request Form here: Technology Request Form

Description:	**A printer that works**
One time or On-going	**one time**
Amount Requested $	**$1153.98**
Related Program Review Goal(s):	**All Labs**

Page 23: VIII. Perkins and Strong Workforce Resource Needs

Q92 Are you requesting Perkins and/or Strong Workforce resources to achieve this goal? **No**

Page 24: Perkins Request and Strong Workforce

Q93 Perkins Request and Strong Workforce 1: Please remember to complete the Perkins Request Form and submit it via the annual Perkins/Strong Workforce request process/cycle. **Respondent skipped this question**

Q94 Perkins Request and Strong Workforce 2: Please remember to complete the Perkins Request Form and submit it via the annual Perkins/Strong Workforce request process/cycle. **Respondent skipped this question**

Page 25: IX. Supplies/Equipment Resource Needs

Q95 Are you requesting supplies and/or equipment resources to achieve this goal? **Yes**

Page 26: Supplies/Equipment Request(s)

Q96 Supplies/Equipment Request 1: In the boxes below please provide information on your request. Supplies/Equipment requests will be considered on a one-time funding basis.

Description:	**Rocket Project (project-based learning)**
Amount Requested $:	**$1089.75**
Related Program Review Goal(s):	**New Goal 5**

Q97 Supplies/Equipment Documentation 1: Please upload any supplies/equipment quotes or additional documentation for this request.

Table 6.png (416.7KB)

Q98 Supplies/Equipment Request 2: In the boxes below please provide information on your request. Supplies/Equipment requests will be considered on a one-time funding basis.

Description:	**Cigar Box Guitar (project-based learning)**
Amount Requested $:	**$418.52**
Related Program Review Goal(s):	**New Goal 5**

Q99 Supplies/Equipment Documentation 2 : Please upload any supplies/equipment quotes or additional documentation for this request.

Table 5.png (450.5KB)

Page 27: X. Facilities Resource Needs

Q100 Are you requesting facilities resources to achieve this goal? **No**

Page 28: Facilities Request

Q101 Facilities Request 1: Please provide the information below and remember to complete a Facilities Request Form accessible here: Facilities Request Form **Respondent skipped this question**

Q102 Facilities Request 2: Please provide the information below and remember to complete a Facilities Request Form, accessible here:Facilities Request Form **Respondent skipped this question**

Page 29: XI. Professional Development Resource Needs

Q103 Are you requesting professional development resources to achieve this goal? **No**

Page 30: Professional Development Request

Q104 Professional Development Request 1: Please provide the information identified below and follow the process for requesting professional development funds, outlined here. **Respondent skipped this question**

Q105 Professional Development Request 2: Please provide the information identified below and follow the process for requesting professional development funds, outlined here. **Respondent skipped this question**

Page 31: XII. Other Resource Needs

Q106 Are you requesting any other resources to achieve this goal?	**Yes**

Page 32: Other Resource Requests

Q107 Other Resource Requests 1: Other resource requests will be considered on a one-time funding basis. Please fill in the information below.

Description:	**210 Lab Replacement Equipment**
Amount Requested $:	**$11,973 plus shipping and Tax (any subset of this equipment is acceptable)**
Related Program Review Goal(s):	**Goal 2**

Q108 Other Resource Requests 2: Other resource requests will be considered on a one-time funding basis. Please fill in the information below.	**Respondent skipped this question**

Page 33

Q109 Are you ready to submit your program review? If you click "No," you will be redirected to the start of the program review module.	**Yes**