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OVERVIEW OF PROGRAM REVIEW AND PLANNING FOR INSTRUCTIONAL PROGRAMS

Program Review and Planning is about evaluating and assessing programs and documenting plans for improving student success rates. Through review of and reflection on key program elements, Program Review and Planning identifies program strengths and strategies necessary to improve the academic discipline, program, and/or services to support student success.

The College also uses Program Review and Planning as the conduit to request resources (human, technology, facilities and funding) to further help improve and support programs.

BASIC PROGRAM INFORMATION

Academic Year

2021-2022

Are you completing a comprehensive or annual PRP?

Annual

Division Name

Mathematics, Science and Engineering

Department Name

Physics/Engineering

Department Chair Name

Hector Garcia Villa

Discipline Name

Physics (PHYS)

Department Chair email

hgarciavilla@palomar.edu

Please list the names and positions of everyone who helped to complete this document.

Hector Garcia Villa, PHYSENGR department Chair.

Website address for your discipline<https://www2.palomar.edu/pages/physics/>**Discipline Mission statement**

The Department has not developed an agreed on mission statement for this discipline. This will be a goal for the coming year after we have hired several new faculty. A suitable stand-in is presented here:

Physics lies at the core of all scientific and technical disciplines. Our mission is to provide students with an outstanding learning experience in which they develop strong analytical, quantitative, and problem solving skills with a deep appreciation of the role physics plays in technical innovations and understanding the world we live in. We strive to provide an engaging teaching and learning environment for students of diverse origins, experiences, needs, abilities, and goals. We support and encourage students who intend to transfer as well as students pursuing career and technical training. We seek educational empowerment in all we do. We provide students with rigorous and comprehensive courses that allow them to perform at a high level while also fostering curiosity and excitement about the physical world. We also provide an exciting learning opportunity for non-physics and non-science majors that provides basic understanding of physics and problem-solving skills.

[\(click here for information on how to create a mission statement\)](#)

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

No

Are any of your programs TOP coded as vocational (CTE/CE)?

No

BASIC PROGRAM INFORMATION: FACULTY AND STAFFING RESOURCES

In this section, you will identify how many faculty and staff support your discipline's programs. This information is considered when you request permanent staff and faculty hires. It is also useful as you evaluate your program and the human resources and talent you have to support our students.

To help you answer questions in this section, you will need the two links below. An arrow will appear in the spreadsheet pointing to the data you will enter.

1) [Permanent Faculty and Staff Count](#)

2) [FTEF LINK](#)

How many permanent or full-time faculty support your discipline (program)?

3

For this past fall semester, what was your Full-time FTEF assigned to teach classes?

2.73

For this past fall semester, what was your Part-time FTEF assigned to teach classes?

3.93

List the classified and other permanent staff positions that support this discipline.

ADA: Abby Corona, 10% time, 12 month

ISA: Tony Kopec, 25% time, 12 month

List additional hourly staff that support this discipline and/or department

PROGRAM INFORMATION

In this section, you are asked to consider and evaluate your programs, including their program learning outcomes, the annual number of completions, goals for completions, and enrollment and efficiency trends.

PROGRAM LEARNING OUTCOMES

Begin this section by reviewing the Program Review reports for programs and courses in [Nuventive Improve](#) (TracDat). All active course and program learning outcomes should be systematically assessed over a 3-year cycle. First, look at program learning outcomes.

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

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

How do they align with employer and transfer expectations?

The vast majority of our students seek transfer to a 4-year institution, to complete a B.S. degree in Science or Engineering. Very few are interested in an A.S., since it would require more GE credits than they need to complete their major.

Our SLOs have been recently revised and assessed. We feel confident that our SLOs reflect the transfer requirements and expectations our students need.

Program Information Summary

In this section you are asked to evaluate your programs by considering their program learning outcome assessments, the annual number of completions, goals for completions, enrollment and efficiency trends and any other internal or external factors that had an impact on your program.

What factors have contributed to the success of your program(s)? Describe how they have contributed.

- We hired two new full-time faculty, they are starting their 3rd year. They have been developing new curriculum, which greatly helps our students succeed.

- We have a strong pool of part-time faculty, from different fields of physics. They bring private sector and research experience as well as a vast teaching experience.

- The College has provided resources in the past few years to update the laboratory curriculum in several of our classes (some of the equipment dated from the 1980s). This is helping our students learn the skills they will need to transfer, and to join the workforce.

What factors have presented challenges for your program(s)? Describe the impact of these challenges.

- The greatest challenge, no doubt, has been the COVID-19 pandemic. It has impacted all aspects of our teaching, but has been most deeply felt in the lab portion of our classes. It is obviously very hard to teach an experimental science without the possibility of conducting real lab experiments.

- Another challenge has been the lack of a dedicated ISA (lab technician). We share Tony Kopec 50% with the Earth Sciences department, which gives Physics and Engineering 25% each. Currently, our full-time faculty spends many unpaid hours taking care of the labs, equipment and organization of the lab rooms. This is not sustainable long term, especially as our programs grow and we move back to campus for F2F teaching.

COURSE INFORMATION

In this section, you will review how students perform in the courses you offer as part of your program. The Chancellor's Office Vision for Success stresses the importance of reducing equity gaps through faster improvements of underrepresented groups.

Data are provided to help you examine differences in course success rates (C or better) across student demographic categories (e.g., gender) and course type (e.g., face-to-face, online).

After you complete your review of course success data, you are asked about the assessment of student learning outcomes at the course level, progress you have made in these assessments, and changes you have implemented as a result/

COURSE SUCCESS AND RETENTION

ACCJC also requires that colleges establish institutional and program level standards and stretch goals for course success rates.

Program-set standards for course success rates represent the lowest success rate deemed acceptable by your discipline. In other words, if you were to notice a drop below the rate, you would seek further information to examine why the drop occurred and strategies to address the rate. The College's institution-set standard for course success rates is 70%

Program-set stretch goals for course success rates represent the success rates you aspire your students to achieve.

Link to **Course Information**

The data includes overall success (% C or better) and retention rates (% No Ws) . The data tables include course rates by gender, age, ethnicity, special population, location, and modality (You can access the Student Equity Plan on the SSEC website <https://www2.palomar.edu/pages/ssec/>)

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

70.0%

Why did you choose this standard?

We feel is a good compromise between two factors: on the one hand, our students have completed several pre-requisites and are therefore better prepared to do difficult college-level work. On the other hand, our courses are usually demanding, since they are required for all STEM degrees, and tend to count towards the students' major.

What is your stretch goal for course success rates?

80.0%

How did you decide upon the goal?

For the same reasons stated above, it is important that we provide a welcoming and accessible offering of courses for those seeking careers in STEM. We feel it is important to make careers in STEM available to the community we serve, especially to groups that have been under-represented in those fields.

We believe that the current enthusiasm for promoting STEM and the continued student support services being offered by the College (STEM center, MATH center, etc.) should allow us to meet this target.

COURSE STUDENT LEARNING OUTCOMES (SLOs)**Summarize the major findings of your course level student learning outcomes assessments.**

PHYS 101:

73% of students passed the final exam. This went fairly well considering we are currently in an online modality and in the middle of a pandemic

PHYS 121:

This SLO was demonstrated using the course comprehensive final exam on a pass/no pass basis.

83% of students passed the comprehensive final exam. The comprehensive final is a good means of assessing this SLO, even during pandemic.

PHYS 201:

This SLO was demonstrated using the course comprehensive final exam on a pass/no pass basis.

88% of students passed the comprehensive final exam. The comprehensive final is a good means of assessing this SLO, even during pandemic.

PHYS 230:

Students were asked to solve a problem involving a perfectly inelastic collision in two dimensions. 76% of students were able to solve it. This results reflect an assessment given during the COVID-19 pandemic, so these students did not have hand-on lab experience. A better result could have been obtained if labs had been available.

PHYS 231:

Students were asked to determine the electric field created by a uniformly charged rod. 87% of students scored 70% or more. Students did well, but results were affected by the COVID-19 pandemic.

Excluding courses that haven't been offered in the last three years, confirm that all of your courses have been assessed in the last three years.

Yes

This section is intentionally blank for annual PRPs. Please click "Next" to continue.

This section is intentionally blank for annual PRPs. Please click "Next" to continue.

CAREER AND LABOR MARKET DATA

Do you want more information about or need assistance integrating work-based learning into your program?

Yes

Please list any questions and describe what you need to integrate work-based learning.

We have never done this in the department, so the first thing would be to know who to talk to about it.

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

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

What kinds of careers are available for people who complete your programs (and/or transfer)? (Refer to link above) Are there any new or emerging careers? If so, how would the new or emerging careers impact your future planning?

Physics majors are widely employed throughout industry. In addition to having specific knowledge and skill-set, physicists bring a systems-thinking lens to projects and solving problems. Physicist work in all fields of science and technology.

The three major employers of career physicists are academic institutions, laboratories, and private industries, with the largest employer being the last. Physicists in academia or government labs tend to have titles such as Assistants, Professors, Sr./Jr. Scientist, or postdocs. As per the American Institute of Physics, some 20% of new physics Ph.D.s holds jobs in engineering development programs, while 14% turn to computer software and about 11% are in business/education. A majority of physicists employed apply their skills and training to interdisciplinary sectors (e.g. finance). Job titles for graduate physicists include Agricultural Scientist, Air Traffic Controller, Biophysicist, Computer Programmer, Electrical Engineer, Environmental Analyst, Geophysicist, Medical Physicist, Meteorologist, Oceanographer, Physics Teacher/Professor/Researcher, Research Scientist, Reactor Physicist, Engineering Physicist, Satellite Missions Analyst, Science Writer, Stratigrapher, Software Engineer, Systems Engineer, Microelectronics Engineer, Radar Developer, Technical Consultant, etc.

What are the associated knowledge, skills, abilities (KSA's) needed for the occupations listed above? (click examples in the link above to get ideas)

KNOWLEDGE

Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.

See more occupations related to this knowledge.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

See more occupations related to this knowledge.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

See more occupations related to this knowledge.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

See more occupations related to this knowledge.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

SKILLS

Science — Using scientific rules and methods to solve problems.

See more occupations related to this skill.

Mathematics — Using mathematics to solve problems.

See more occupations related to this skill.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

See more occupations related to this skill.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

See more occupations related to this skill.

Speaking — Talking to others to convey information effectively.

ABILITIES

Mathematical Reasoning — The ability to choose the right mathematical methods or formulas to solve a problem.

See more occupations related to this ability.

Number Facility — The ability to add, subtract, multiply, or divide quickly and correctly.

See more occupations related to this ability.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

See more occupations related to this ability.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

See more occupations related to this ability.

Fluency of Ideas — The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).

How does your program help students build these KSA's?

Through a combination of lecture, lab exercises, reading assignments, projects, and internships. We believe that our courses and programs encourage students to acquire and/or enhance the KSA's listed above. For example, our lab courses students to work as a team on labs and semester projects. These projects reinforce the students' knowledge in physics, engineering, mathematics, computing, technology, design, and fabrication.

They also enhance students' skills in reading comprehension, critical thinking, troubleshooting, speaking, coordination, as well as judgement and decision making. Lastly, students develop abilities in inductive and deductive reasoning as they learn to analyze and interpret data.

Work Based Learning

Applied and work-based learning (WBL) allows students to apply classroom content in professional settings while gaining real-world experience. WBL exists on a continuum that reflects the progress of experiences from awareness-building to training. Students often cycle back through the continuum many times throughout college and throughout their career. Faculty play a critical role in ensuring these experiences are embedded into curriculum and support learning.

Have you incorporated work based learning (work experience, internships, and/or service learning) into your program?

No

How do you engage with the community to keep them apprised of opportunities in your program?

This is an area where we need to increase our efforts. Occasionally we have participated in public service events and showcase our student projects. We have given physics demonstrations at local middle schools and reached out to high-school teachers to recruit for the Promise program.

We need to make these efforts more consistent.

Program Goals

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

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

If you require any additional resources beyond your exiting budget, please be sure to request those resources in the next section titled "Resources".

Goals

Goal 1

Brief Description

Recruit and hire highly qualified faculty, and guide them through the probationary process.

Is this a new or existing goal?

Existing

Goal Status

Ongoing

How will you complete this goal?

Two years ago we hired two new faculty. They are undergoing the probationary process successfully, even during this COVID-19 pandemic.

Outcome(s) expected (qualitative/quantitative)

Increase faculty contact, presence, stability, and resource for students.

Expand our curriculum: offer new physics and engineering courses, to be aligned with CSUSM.

Improve our curriculum: some of the curriculum we are using is old (especially in the lab sections), we need to update it.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?

Provide students with an outstanding learning experience including an engaging teaching and learning environment for students of diverse origins, experiences, needs, abilities, and goals. Help support and encourage students who intend to transfer as well as students pursuing career and technical training. Update courses, modernize curriculum, create guided pathways.

Expected Goal Completion Date

5/26/2023

Goal 2

Brief Description

Update and modernize curriculum

Is this a new or existing goal?

Existing

Goal Status

Ongoing

How will you complete this goal?

We need both time and money to complete this goal. Faculty need to put time to think of new lab activities, experiments, etc. Then the department needs money to purchase new lab equipment (some of it dates back to the 1960s), that better reflects current pedagogy and technology.

Outcome(s) expected (qualitative/quantitative)

We would have better articulation with our 4-year partners (CSUSM, CSUSD, UCSD, etc.).

Students would learn experimental techniques that are more current and would prepare them better to join the workforce and/or transfer.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?

This is essential in order to provide students with reliable transfer opportunities.

Expected Goal Completion Date

5/26/2023

RESOURCES

Congratulations! You are nearing completion. In this section, you will consider the resources you need to implement your three-year program review plan and/or address any findings from your assessment of your discipline.

The section is organized into the following four parts:

PART 1: Staffing Needs (Faculty and Additional Staff)

PART 2: Budget Review

PART 3: Technology and Facilities Needs

PART 4: One Time Request for Other Needs (NonTechnology Equipment, Supplies, Operating Expenses, Travel)

PART 1: STAFFING NEEDS

Requests for faculty will follow the prioritization process currently in place in IPC, and the IPC SubCommittee. Requests for new staff positions will be prioritized at the division level and reviewed at Exec.

Are you requesting additional full-time faculty?

No

NOTE: If you are requesting full-time faculty, you must go back to the Labor Market section of the form to complete that section. It is required when requesting additional faculty positions.

Are you requesting new Classified, CAST or AA positions?

Yes

REQUEST FOR ADDITIONAL CLASSIFIED, CAST, AA

Staff, CAST, AA request 1

Title of position

ISA - Lab technician

Is this request for a full-time or part-time position?

Full Time

How does the position fill a critical need for current, future, or critical operations? e.g. accreditation, health and safety, regulatory, legal mandates, institutional priorities, program trend analyses of growth/stability

We need a full-time, dedicated ISA to serve as our lab technician. Currently we have one (Tony Kopec), shared 50% with Earth Sciences. Thus, Physics gets about 25% of his time and Engineering another 25%. We have three Physics labs, and it is impossible for our current ISA to serve all three. Therefore, our full-time faculty is spending lots of unpaid time to clean, resupply, purchase equipment and maintain the lab facilities.

This is untenable in the long run, as faculty are already feeling burned out having to spend all this time in lab upkeep on top of their contractual obligations.

Additionally, having a clean, well-maintained lab equipment would make the lab room environment healthier and safer. There are electrical and mechanical instruments that can be hazardous if not maintained and stored properly.

Does the position assist in establishing more efficient District operations through either of the following: reorganization/restructuring OR use of technology?

No.

Is there funding that can help support the position outside of general funds?

No

Describe how this position helps implement or support your three-year PRP plan.

It would allow faculty to devote their time to create and update the lab curriculum, which is in dire need right now in the Physics department.

It would allow the full-time faculty in the department to have more time to coordinate courses and programs with our transfer partners.

Strategic Plan 2022 Objective

1:3	1:4	1:5	2:1
2:2	2:3	2:4	3:2
3:4	3:5	4:1	4:3

If the position is not approved, what is your plan?

We do not have a back up plan. Possibly internal discussion within the department, and request release time to take care of the lab rooms or cancel classes due to lack of lab maintenance.

PART 2: BUDGET REVIEW

Review your Budget/Expenditure reports for fiscal year 2019, 2020, 2021. Consider your three-year PRP plan.

Click on the link below to access directions to the *Available Budget Report* to complete this section.

[How to Request the Available Budget Report](#)

Reflecting on your three-year PRP plan, are there any budget considerations you would like your dean/supervisor to be aware of for the upcoming year?

No

NOTE: PARTS 3, 4 and 5 – TECHNOLOGY, FACILITIES AND OTHER NEEDS

1. One-Time Fund Requests. The college is implementing a process for prioritizing and allocating funds for one-time needs/requests tied to Program Review and Planning. Prioritization will take place through participatory governance in planning councils and the Budget Committee. Then, a recommendation will be made to Exec for funding of request utilizing various funding sources.

For more information about funding sources available, see [IELM BLOCK GRANT, LOTTERY, PERKINS AND STRONG WORKFORCE GUIDELINES](#).

Consider submitting one-time requests only if you have verified that you cannot fund the request using your general discretionary funds or other funds.

2. Technology and Facilities Review. From now on, ALL requests for technology will go through an institutional review process. If you request technology here, you will see a description of the process below.

PART 3: TECHNOLOGY AND FACILITIES NEEDS

Will you be requesting any technology (hardware/software) this upcoming year?

No

Part 4: Facilities Requests

Do you have resource needs that require physical space or modification to physical space?

No

PART 5: OTHER ONE-TIME NEEDS

For more information about funding sources available, see [IELM BLOCK GRANT, LOTTERY, PERKINS AND STRONG WORKFORCE GUIDELINES](#). Please check with your department chair on the availability for this cycle.

Do you have one-time requests for other items (e.g., Non-Technology Equipment, Supplies, Operating Expenses, Travel) that your budget or other funding sources will NOT cover?

No

I confirm that all full-time faculty in this discipline have reviewed the PRP. The form is complete and ready to be submitted.

Yes

Enter your email address to receive a copy of the PRP to keep for your records.

hgarciavilla@palomar.edu