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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

Engineering (ENGR)

Department Chair email

hgarciavilla@palomar.edu

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

Hector Garcia Villa, Associate professor and 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:

Engineering includes the application of science, mathematics, and empirical evidence to create technologies that improve the world we live in. Our mission is to provide students with an outstanding learning experience in which they develop strong analytical, quantitative, and problem solving skills to prepare them for a career in one or more of the various fields engineering. 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 a technical certificate. 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 creativity and excitement about applied science and engineering.

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

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

Yes

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

No

List all degrees and certificates offered within this discipline.

AS

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)?

1

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

0.53

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

1.13

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

Abby Corona, 10% (20% for Physics and Engineering combined)

Tony Kopec, ISA 25% (50% for Physics and Engineering combined)

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 well do your program's learning outcomes communicate the scope and depth of the degree/certificate offered?

Fairly poorly as of now. We are working on improving our Program learning outcomes, and implement suitable assessment methods. Those should provide results that better inform of our program goals and scope.

How do they align with employer and transfer expectations?

Despite the poorly written program learning outcomes, it does not affect much our students transfer or employability. The main reason is that most of our students do not seek an AS degree, because it would require more lower division work than their major requires upon transfer. Most of our students transfer successfully to 4-year institutions for a degree in engineering.

Describe your program's plan for assessing program learning outcomes.

All of our SLOs have been assessed, and we feel confident the outcomes are satisfactory. The SLOs outcomes are helping us improve our curriculum, and improve our articulation with our partner 4-year institutions. We are in a three year assessment cycle

Summarize the major findings of your program outcomes assessments.

Students met the outcomes to our satisfaction. The outcomes themselves are in need of update.

PROGRAM COMPLETIONS

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

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

In this section, you will reflect upon the number of completions students earned for EACH degree/certificate you offer. As required for accreditation, you are also asked to set a standard which represents the lowest acceptable number of completions and a stretch goal for increasing the number of awards.

Link to [Program: Completions](#)

Copy and paste five years of completion data for each of your discipline's degrees and certificates.

20/21: 3

19/20: 5

18/19: 7

17/18: 3

16/17: 4

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

Stayed the same

What factors have influenced your completion trends?

Most of our students seek to transfer to a 4-year institution to earn a BS in engineering. Since completing the AS would force them to take more GE and lower division classes than required for their major, they opt to save time and money and transfer without an AS degree.

Our accrediting body, ACCJC, and the Federal Department of Education requires that colleges establish standards and goals for student success and completion.

A program-set standard for completion represents the lowest number of program completion you deem acceptable for your program. In other words, if you were to notice a drop below the set standard, you would seek further information to examine why this occurred and strategies to increase completions.

A program stretch goal for completions is the number of completions you aspire to award for each program in your discipline.

To determine your stretch goal, consider the number of annual completions you typically award over time, then consider strategies or efforts you are making to increase completions in your program. Then identify the NUMBER you want to set as your goal.

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.

- Talented faculty. We hired a full-time engineering instructor, and this is helping our program, part-time faculty and students achieve better results and have a more cohesive curriculum.

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

- COVID-19 pandemic. It is very hard to teach certain engineering courses without a proper lab experience.

- Decrepit facilities: Students are currently working in cramped quarters using old and often malfunctioning equipment, making it difficult to make accurate measurements.

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 chose the College standard. Our students are very well prepared by the time they take engineering classes (they have completed Calculus, Physics, etc.), but the difficulty of the curriculum balances that out.

What is your stretch goal for course success rates?

80.0%

How did you decide upon the goal?

It is important to make careers in engineering available to the community we serve, especially to groups that have been under-represented in the various engineering 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.

ENGR 126: 81.25% of students scored at least 70% on this assessment Successful students will keep a detailed engineering lab notebook while completing working analog and digital circuits. The engineering lab notebook will follow engineering standard formats, and will require entries during every scheduled lab meeting.

Assessment: A lab notebook describing all lab work performed in each class will be evaluated on format and contents.

ENGR 210: 78.57% of students scored at least 70% on this assessment.Resource Needs Equipment Students are currently working in cramped quarters using old and often malfunctioning equipment, making it difficult to make accurate measurements. Successful students will be able to design non-trivial passive electronic circuits. Students will have a basic understanding of circuit analysis methods including DC Transistor Circuit, Superposition, Thevenin/Norton techniques, and determination of Maximum Power Transfer

Assessment: Students will be asked to analyze and design, non-trivial passive circuits, using combinations of all common passive circuit analysis techniques.

Criterion: 70 % of students will score at least 70% on this assessment.

ENGR 235: Derive and apply expressions or equations from the mechanical free-body diagrams in order to solve engineering problems. 24/38 earned 70% or higher in assignments

63% students met this criteria. Department will assess and modify this criteria to reflect the current teaching.

ENGR 245: 93% of the students met the criteria based on the examsStudents successfully grasped the fundamentals of analyzing and calculating the atomic dimensional structures. These skillsets can be applied to their upper division courseworks.

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

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?

Most of our students seek to earn a BS in Engineering. This is the initial degree required for many different engineering careers, such as:

- Architectural Engineering
- Electrical and Electronic Engineering
- Mechanical Engineering
- Chemical Engineering
- Computer Engineering
- Industrial Engineering
- Environmental Engineering
- Civil Engineering
- Engineering Teachers, Postsecondary
- Automotive Engineering
- Bioengineers and Biomedical Engineers
- Nanotechnology Engineering
- Petroleum Engineers
- Aerospace Engineering
- Ship Engineers
- Sound Engineering

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

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.

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

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

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.

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

SKILLS:

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

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

Science — Using scientific rules and methods to solve problems.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

ABILITIES:

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

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

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

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 engineering, physics, mathematics, computing, technology, design, and fabrication.

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

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.

Since we have never implement something like this, we would like to know who to talk to, to start the process.

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

We need to improve on this area. In the past we have given talks, performer outreach and demonstrations at local schools. We need to make this 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

Hire a full time faculty member

Is this a new or existing goal?

New

How will you complete this goal?

Searching, finding and recruiting an outstanding faculty member, preferably with a background in Electrical Engineering (or related).

Outcome(s) expected (qualitative/quantitative)

Being approved to hire a new full-time member.

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

This is very important to establish a curriculum and a program in electrical engineering, especially now that CSUSM offers a BS in EE.

Expected Goal Completion Date

5/26/2023

Goal 2

Brief Description

Revise Curriculum.

Is this a new or existing goal?

Existing

Goal Status**How will you complete this goal?**

By allotting time and resources. We need time to develop new curriculum (a new full time hire would help), and money to purchase new equipment to support the new curriculum.

Outcome(s) expected (qualitative/quantitative)

Revised curriculum and COR that articulates across the state and country.

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

This is an essential requirement to satisfy our mission.

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?

Yes

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.

REQUEST FOR ADDITIONAL FULL-TIME FACULTY

Faculty Request 1

Title of Full-Time Faculty position you are requesting

Professor of Engineering

How will this faculty position help meet district (Guided Pathways, Strategic Plan, Strategic Enrollment Management etc.), department and/or discipline goals? Please be sure to tie this back to your PRP goals and three year plan.

This faculty member would help the department meet our program goals in Engineering. Right now we do not have a full-time engineering faculty member with a background in electrical engineering. By adding a faculty member in this field, we would be able to develop new curriculum in our electronics courses, and be able to successfully transfer those students.

This is especially true as the demands for engineers are rapidly increasing in San Diego's North County, and as CSUSM has started an Electric Engineering BS degree.

Is there a scarcity of qualified Part-Time Faculty (for example: Specialized degree/experience, emerging/rapidly changing technology, high demand)?

Engineering is a very diverse field (from civil to nuclear, and everything in between). To support our Engineering program, we need experts in two fields: mechanical and electrical engineering (EE). It is impossible to find someone with enough background in both, and with teaching experience. Right now we have a probationary full-time faculty member, with a background in mechanical and aerospace engineering. We need another faculty member, with a background in EE (or related), to develop and implement curriculum in our EE classes.

Are you requesting this position for accreditation, regulatory, legislative, health and safety requirements? Please explain.

This position would help in many of those areas:

- Accreditation: we need a fully developed electrical engineering program, with current curriculum and equipment.
- Regulatory and Safety: Having a full-time faculty member supervise the maintenance and purchase of electrical equipment is very important to ensure its safety for students and staff.

Utilizing your PRP data, please summarize the discipline productivity, efficiency, and any regional career education needs for this discipline.

Our discipline has an efficiency somewhat below the College target. One reason for this is that, with our current resources and equipment, we are limited to lectures with 36 students. Our goal would be to have enough lab resources, so that the lab sections can be larger and support larger lectures.

Regionally, there is a huge need for engineers. This is clearly reflected in CSUSM decision to start an electrical engineering program. They will start accepting transfer students soon, and we need to be ready to serve our students and our region. This is why it is fundamental that we get to hire a full time faculty member to develop the curriculum, and the personal connections with the CSUSM faculty.

Is your department affected by faculty on reassigned time? If so, please discuss.

Yes, currently one member (Aundrea Tavakkoly, Physics) has release time. She is serving as SLO coordinator for the College.

Are you requesting new Classified, CAST or AA positions?

Yes

REQUEST FOR ADDITIONAL CLASSIFIED, CAST, AA

Staff, CAST, AA request 1

Title of position

ADA

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

Historically, we had an ADA shared with the Chemistry department (40% for Physics and Engineering). She was already overworked, since the needs of our department needed more than 40% of her time.

Recently, the Earth Sciences ADA retired, and the College did not replace her. Therefore, now our ADA is serving three departments (Chemistry, PhysEngr and Earth Sciences). The workload is brutal, and not sustainable for her long-term.

Additionally, our department has been growing in the last several years, so we would need more than the traditional 40% to cover our needs.

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

Yes, by having an ADA with more allocated time, we would be able to manage the department in a more efficient way.

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.

The increase in ADA time would greatly help implement all of our programs.

Strategic Plan 2022 Objective

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

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

We would have to scale back in many of our plans, and perhaps decrease our program growth. The amount of workload that our ADA currently has is not sustainable long term, much less if we increase it.

Staff, CAST, AA request 2

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

PHYSENGR needs a full-time dedicated ISA (lab technician). Right now PHYSENGR has an ISA with 50% time for our department (the other 50% is for Earth Sciences). That means that the Engineering program get about 25% of his time.

It is impossible that he can fulfill all his responsibilities with only that amount of time. Engineering has labs in very different topics: electronics, materials, etc. It takes a lot of time to maintain, replace and purchase equipment for each lab, and to make sure things are stored properly.

Right now a lot of those tasks are falling in the hands of full time faculty, who are completing them without any pay, on top of their regular contractual obligations. This is not sustainable long term, as faculty are already over-stretched, and performing unpaid tasks in addition to their normal workload does not help. This problems is going to get worse as we move back to campus for F2F labs.

Additionally, there are many safety concerns: electrical equipment, mechanical devices, etc. need to be constantly maintained and cared for in order to be in working condition. Failure to do so can create hazards for students and faculty. We need an ISA that can do those things on a regular basis.

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

Yes, the department would be more efficient, and faculty could focus on developing and implementing curriculum.

Additionally, having a dedicated lab technician maintain and care for all the equipment would ensure its longevity.

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.

This position would help ALL of our programs and courses, since virtually all of our classes have a lab component. On top of that, our students could learn a lot of hand-on knowledge from a dedicated ISA (they already do with a 25% assigned time one).

Strategic Plan 2022 Objective

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

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

We do not have a back-up plan for this. This has been a need we had for a while now.

Probably there will be discussion within the department (there is already some debate about this). Possible outcomes are: asking for release time to maintain the labs, cancelling the labs due to a lack of maintenance (that would impact our accreditation and transferability).

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