

Status: **Read** Status: **Reviewed**

Entry #: 39

Date Submitted: 10/18/2021 11:58 AM

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

Computer Science and Information Systems

Department Chair Name

Tony Smith

Discipline Name

Computer Science and Information Systems - Computer Science (CSCI)

Department Chair email

awsmith@palomar.edu

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

Professor Duy Nguyen

Professor Tony Smith

Website address for your discipline<https://www2.palomar.edu/pages/csit/computer-science-as-ca/>**Discipline Mission statement**

The mission of the Computer Science program at Palomar College is to present our students with up-to-date computer science curricula and pedagogy, ensure they have a solid foundation in the core computer science concepts, equip them with problem solving and decision-making skills, and provide a strong foundation for transfer into a four year program, as well as lifelong learning in the field of computer science.

(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.

Computer Science AS, CA

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)?

2

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?

5.87

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

Department ADA 30%

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?

Our Computer Science program remains strong and current and our program learning outcomes communicate the depth of our degree/certificate program. We place students into internships, when available, and the program provides a strong foundation for students entering the workforce. However, as the field of Computer Science is very competitive, the main focus of our discipline is to encourage our students to enter a college or university to obtain a 4-year Computer Science degree.

How do they align with employer and transfer expectations?

Employers expect our students to be able to maintain existing computer programs, and to be able to design, code, test and deploy new computer system solutions. Our transfer institutions have similar expectations of skills, with an additional requirement for theoretical depth and understanding. Our program learning outcomes are designed around all of these requirements, and cover this range of expectations.

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

There are 4 CSCI program level SLOs. We have planned to evaluate one of these program SLOs per year. This year we will be assessing the "Hardware and software" program learning outcome, where students will be able to understand the hardware and software aspects of computer systems that support application software development.

Summarize the major findings of your program outcomes assessments.

Exams, homework assignments, and/or computer programming assignments are used to assess the success of course SLOs and we believe that our methods for assessing course and program SLOs are effective and working well. Assessment results indicate that our courses and programs are quite effective. We find that our students who transfer to 4-year Computer Science degree programs are routinely praised by their new schools (per CSUSM Computer Science faculty and several other 4-year schools across the state).

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.

Degrees and Certificates Awarded (Count)

Row Labels 2015-16 2016-17 2017-18 2018-19 2019-20 2020-21

AA/AS

Associate in Arts Degree 1

Associate in Science Degree 15 7 14 22 15 22

AA/AS Total 16 7 14 22 15 22

Certificate

Certificate of Achievement 16 15 24 22 18 33

Certificate of Proficiency 3 1

Certificate Total 16 18 24 22 18 34

Grand Total 32 25 38 44 33 56

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?

Refined our program course offerings.

* The pandemic has reduced completion trends across the entire college.

* All of our courses were forced 100% online, some at extremely short notice to instructors and students. Meeting this challenge was occasionally rocky in the beginning, especially amongst students who would not normally choose an online class, and had little previous experience in the format.

* At the same time we lost access to the department-based tutors provided for many of our courses by the department's computer lab manager. This position was transferred to Information Services.

* Aligning our program with a Computer Science STEM pathway.

* We are working with other STEM departments in our new division.

* One factor that will negatively impact our completion rate is the Computer Science program mapping that was completed for the STEM grant with CSUSM. The mapping did not allow enough coursework for completion of a Computer Science degree/certificate before transfer. Administration was notified about the issue but a response has not yet been forthcoming.

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.

Students and instructors in our program have been more able than most to adjust to all our courses moving online during the pandemic.

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

The pandemic has presented challenges for all programs. Enrollments have reduced.

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?

The College institutional standard

What is your stretch goal for course success rates?

70.0%

How did you decide upon the goal?

The College institutional standard

COURSE STUDENT LEARNING OUTCOMES (SLOs)

Summarize the major findings of your course level student learning outcomes assessments.

Major findings of our student learning outcomes assessments for our five CSCI required courses are encouraging:

- the best overall assessment results are for our introductory CSCI 112 Programming Fundamentals I and the advanced CSCI 210 Data Structures courses, each at around mid-90s% in our most recent findings
- overall assessment results of our CSCI 212 Machine Organization and Assembly Language course is the lowest, but at around 70%, this is felt to be an acceptable result for a challenging, very technical course
- the two remaining required courses have overall assessment results of around mid-80s%, which is acceptable

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?

Students with a computer science degree have a wide range of career options. For those who complete the B.S. in computer science, they can join the defense sector at companies like General Atomic, Northrop Grumman, Boeing, Raytheon, Lockheed, L3-Harris, Leidos, Booz Allen Hamilton, etc. and at commercial companies like Qualcomm, Apple, Microsoft, Facebook, Amazon, Google, etc... These companies are actively hiring software programmers/engineers, algorithms developer - data analytics, data science - to process big data.

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

To be successful at these companies, students have to be good at developing software in a variety of computer programming languages like C/C++, Java, Python, etc.. Students who pursue the software development jobs will need skills in embedded processing that require knowledge such as assembly programming (CSCI 212), VHDL programming for Field Programmable Gate Array (FPGA), C++ CUDA programming for Graphical Processing Units (GPUs), etc. Students who wish to pursue careers in algorithm development - data analytics, data science - will need to learn the programming languages listed in addition to such tools as machine learning and artificial intelligence.

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

The computer science program prepares students with knowledge of the programming languages including C, C++, Java, and Assembler. Our data structure class prepares them to apply their knowledge of programming languages to implement algorithms to store and process big data. Our new courses in Artificial Intelligence and Machine Learning will prepare the students to pursue a career track in data analytics and data science.

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?

No

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

The computer science department actively work with some of the big defense companies such as Boeing, Raytheon, and Northrop Grumman. Twice a year, Northrop Grumman interview our students for 12-week internships where our students will continue in school full-time while working at a Northrop facility on a part-time (10-120 hours/week) basis. Numerous companies have also actively seek out our department with job openings for our students. Our department is engaged with the local IEEE chapter, and work collaboratively with CSUSM and Mira Costa College, to get our students involved in IEEE memberships and expose them to companies that actively seek our computer science students during IEEE career fairs. We also actively go out to give presentations at career fair day at some of the local high schools to introduce high school students to the Palomar Computer Science Department. We hold regular meetings with our collaborators at CSUSM and Mira Costa College to discuss course offering and articulation to develop a curriculum that maximizes our students transferability to a CSU/UC.

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

Purchase faculty computers and tablets to replace old, out of warranty equipment

Is this a new or existing goal?

Existing

Goal Status

Ongoing

How will you complete this goal?

Submit Resource Request.

Outcome(s) expected (qualitative/quantitative)

Strengthen current program by providing up-to-date computers and tablets for faculty. Current faculty equipment are old and out of warranty.

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

Faculty require up-to-date computers and tablets to be able to create and make available teaching materials, and to support student learning.

Expected Goal Completion Date

5/31/2022

Goal 2

Brief Description

To share in the Palomar College funding resources in an appropriate and equitable manner that provides the Computer Science program with the financial capability to continually upgrade and maintain its equipment and laboratory environments in a status which effectively meets the need to provide compatibility with the constant and rapid change that is occurring in the world of computer technology.

Is this a new or existing goal?

Existing

Goal Status

Ongoing

How will you complete this goal?

Submit Resource Request.

Outcome(s) expected (qualitative/quantitative)

While other departments utilize computers to supplement their curriculum, computers are the essence of the Computer Science curriculum. It is a fact that our curriculum is literally defined by the laboratory environment in which it is offered. Without this support, the department's ability to accomplish its goals is significantly diminished.

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

To best serve our students and meet their preparation needs at the highest level of competence, we must provide a learning environment that effectively mirrors the current technology of the real world. In order to be able to develop and support a viable, relevant and innovative curriculum that attracts and retains students, the Computer Science discipline must have the necessary, on-going financial support to maintain state-of-the-art laboratories. Achieving this goal will will empower students to succeed in their chosen field and will cultivate an appreciation of learning.

Expected Goal Completion Date

8/31/2024

Goal 3**Brief Description**

Purchase educational Matlab licenses for the computer lab for student to use as part of the new data science program

Is this a new or existing goal?

New

How will you complete this goal?

Submit Resource Request

Outcome(s) expected (qualitative/quantitative)

Strengthen the new data science program between the computer science and math department by teaching students to use an industry standard software package. Knowing how to write programs in Matlab will help students obtain summer internships at many technology companies as well. Without Matlab licenses in the computer laboratory, the students will face an upward battle to learn the data science concepts.

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

To best serve our students and meet their preparation needs at the highest level of competence, we must provide a learning environment that effectively mirrors the current technology of the real world. In order to be able to develop and support a viable, relevant and innovative curriculum that attracts and retains students, the Computer Science discipline must have the necessary, on-going financial support to maintain state-of-the-art laboratories. Achieving this goal will will empower students to succeed in their chosen field and will cultivate an appreciation of learning.

Expected Goal Completion Date

12/31/2022

Goal 4**Brief Description**

Purchase Raspberry Pi Robotic Kits for the laboratory

Is this a new or existing goal?

New

How will you complete this goal?

Submit Resource Request

Outcome(s) expected (qualitative/quantitative)

The robotic kits will be used to give students hands-on experience in interacting between computer software with hardware, while learning important skills in electronics, robotics, and artificial intelligence. These skills will help students obtain internships as well as help them in their future careers. Many technology companies highly value employees with both software and hardware skills to fill important roles in the company.

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

To best serve our students and meet their preparation needs at the highest level of competence, we must provide a learning environment that effectively mirrors the current technology of the real world. In order to be able to develop and support a viable, relevant and innovative curriculum that attracts and retains students, the Computer Science discipline must have the necessary, on-going financial support to maintain state-of-the-art laboratories. Achieving this goal will will empower students to succeed in their chosen field and will cultivate an appreciation of learning.

Expected Goal Completion Date

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?

No

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?

Yes

Technology Request

Technology Request 1

What are you requesting?

Apple iPad

Provide a detailed description of the item requested. What is it, and why do you need it? Please be as descriptive as possible. Include in your description how the requested item aligns with your discipline's PRP goals, analysis of PRP data, SLO/SAOs.

Necessary to replace almost 7-year old iPad Air 2 for Tony Smith. Device is essential for student contact. Old device is failing.

Estimated Amount of Request.

\$1,200.00

If any, list ongoing costs for the technology (licences, support, maintenance, etc.)

Do you already have a budget for this request, or will you need additional funds?

No

What PRP plan goal/objective does this request align with?

Goal no. 1

What Strategic Plan 2022 Goal/Objective does this request align with?

1:2

1:5

2:3

4:1

If you have multiple requests for technology and had to prioritize, what number would give this? (1 = Highest)

1

Do you think that your request for technology will require changes to a facility?

No

Technology Request 2

What are you requesting?

Matlab educational licenses for one of the computer laboratory

Provide a detailed description of the item requested. What is it, and why do you need it? Please be as descriptive as possible. Include in your description how the requested item aligns with your discipline's PRP goals, analysis of PRP data, SLO/SAOs.

Educational Matlab software license purchased through Mathworks. This software will be critical to support our students develop skills in a new data science program. Furthermore, having knowledge of Matlab will dramatically improve their chances of obtaining internships with many technology companies.

Estimated Amount of Request.

\$2,000.00

If any, list ongoing costs for the technology (licences, support, maintenance, etc.)

Do you already have a budget for this request, or will you need additional funds?

No

What PRP plan goal/objective does this request align with?

Goal no. 3

What Strategic Plan 2022 Goal/Objective does this request align with?

1:2

1:5

2:3

4:1

If you have multiple requests for technology and had to prioritize, what number would give this? (1 = Highest)

2

Do you think that your request for technology will require changes to a facility?

No

Technology Request 3

What are you requesting?

Robotic Kits for the laboratory

Provide a detailed description of the item requested. What is it, and why do you need it? Please be as descriptive as possible. Include in your description how the requested item aligns with your discipline's PRP goals, analysis of PRP data, SLO/SAOs.

Educational robotic kits that can be programmed using the Raspberry Pi. We need the robotic kits to help teach students hands-on experience interacting between computer software and hardware. This skill is in high demand in the technology industry and will help our students obtain internships as well as help them in their future careers.

Estimated Amount of Request.

\$3,500.00

If any, list ongoing costs for the technology (licences, support, maintenance, etc.)

Do you already have a budget for this request, or will you need additional funds?

No

What PRP plan goal/objective does this request align with?

Goal no 4

What Strategic Plan 2022 Goal/Objective does this request align with?

1:2

1:5

2:3

4:1

If you have multiple requests for technology and had to prioritize, what number would give this? (1 = Highest)

3

Do you think that your request for technology will require changes to a facility?

No

Note about technology requests:

Note about technology requests.

All technology requests will now go through a review process before prioritization.

- Your dean/director will send you a Technology Request Checklist (aka Technology Proposal Analysis Checklist).
 - You must complete this checklist and return it to your dean no later than 11/19/2021.
 - Once the dean approves the form and the request, the dean will send the document to the Technology Review Committee to determine IS resources needed, any integration issues, and/or potential overlap with existing technology.
 - The results of the review will be sent to the dean and chair with feedback.
 - The dean will determine whether or not the request moves forward for prioritization and/or implementation.
 - Requests for one-time funding will move forward for prioritization.
 - Requests that use funding from your department budget may move forward for purchase.

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.

dnguyen@palomar.edu