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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?

Comprehensive

Division Name

Mathematics, Science and Engineering

Department Name

Earth, Space, and Environmental Sciences

Department Chair Name

Sean Figg

Discipline Name

Earth Sciences (ES)

Department Chair email

SFigg@palomar.edu

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

Dr. Lisa Yon

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

The Earth Science discipline at Palomar College functions as a multiple mission program. Through our ES 100 course, we promote Earth Science literacy and fulfill the general education natural and physical science requirements for degree or transfer. Specifically, the ES 100 course is an approved course for transfer into the CSU San Marcos Liberal Studies Elementary Subject Matter (ESM) option. Producing well-educated science students who pursue teaching careers will ultimately improve K-12 science instruction.

The Earth Science curriculum is designed to provide the fundamental knowledge and skills to students interested in increasing their understanding of the complex interactions among Earth's geosphere, hydrosphere, atmosphere, and biosphere.

The curriculum also includes the connection of humans to Earth for natural resources and the impact of Earth processes (such as earthquakes, volcanic activity, and other natural hazards) on the distribution and development of human populations. The influence of human activities on Earth's surface processes is also addressed. The overall mission of the program is to develop an Earth-science-literate community that is aware of the current and accurate scientific understanding of our planet. Such a population is critical to the promotion of Earth stewardship, sound public policy, and expanded international cooperation.

Describe how your mission statement aligns with and contributes to the College's Vision and Mission.

The mission of the Earth Science discipline is aligned with Palomar College's Mission Statement through our focus on providing a high-quality science education for a diverse student population. Our coursework thus addresses the Core Values of access, diversity/equity/inclusion, and academic excellence as part of the Palomar Mission Statement.

Students who complete coursework within the Earth Science discipline not only satisfy requirements for transfer in general education or Earth-science -related majors, but the Earth Science discipline also strives to promote the development of an overall Earth-science-literate community. Students are prepared to become responsible and effective global citizens with an accurate scientific understanding of our planet. Students are encouraged to engage with our local and global communities in a way that supports growth, improvement, and an overall better future for Earth and its inhabitants thus embracing the idea to "think globally but act locally." This is in complete alignment with the recently updated Palomar College Vision Statement of "Transforming lives for a better future."

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

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)?

1

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

0.6

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

0

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

Abigail Corona, Academic Department Assistant, 6.67%

Tony Kopec, Instructional Support Assistant IV, 10%

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

None

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

Depending on the degree or transfer goals of our students, there are three different GE pathways to choose from:

- [Associate Degree GE Requirements](#)
- [CSU GE Requirements](#)
- [IGETC Requirements](#)

Palomar College has identified a set of General Education/Institutional Learning Outcomes (GE/ILOs), which represent the overall set of abilities and qualities a student graduating from Palomar should possess. [Click here for a link to Palomar's GE/ILOs.](#)

Next, review your course outcomes as they relate to Palomar's GE/ILOs.

How do the courses in your discipline support GE/ILOs? In your response, please specify which GE/ILO(s) your discipline supports. You should refer to the GE/ILOs your program outcomes are mapped to in Nuventive.

Earth Science is essentially a single course (ES 100 lecture) discipline. ES 115 (Natural Disasters and Environmental Hazards) is offered on occasion, but is cross-listed as GEOG 115 and all learning assessments occur within that discipline.

With this information in mind, the ES 100 course supports the designated General Education/Institutional Learning Outcomes (ILO) in the following ways:

Written Communication:

Students enrolled in ES 100 are required to accurately communicate their knowledge of core concepts in Earth Science in order to successfully pass the course. Students may demonstrate this knowledge through completion of assignments as well as topic essays on section exams (major topics include plate tectonics, mineral/rock resources, climate patterns/climate change).

Creative, Critical, and Analytical Thinking:

As a science course, students are required to use critical thinking skills to successfully complete the course requirements. This involves analyzing scientific data using critical thinking and information literacy. One example used in class is the critical analysis of how the scientific method was used to develop the Plate Tectonic Theory from older, incomplete models through the incorporation of new technologies and the resulting new data sets.

Information Literacy/Inquiry and Analysis:

As a scientific discipline, students enrolled in ES100 must learn how to analyze scientific data. Much of Earth Science involves the understanding of large data sets encompassing whole Earth processes. Thus successful students become familiar with the reading, analysis, and understanding of graphs and charts summarizing this information. Specific sections utilizing numerical data are included in topics such as geologic time and the calculation of radiometric ages.

Civic Knowledge and Engagement:

Successful students are required to develop an understanding of the role of earth processes in generating natural hazards (such as earthquakes, volcanic eruptions, changing climate patterns) and the impact of these hazards on humans. Students must also recognize the role of humans in resource management (for example mineral use and exploitation) and the choices we make in land development (for example water resources and water security). Thus students should be aware of the intimate relationship we have with our planet. Students who successfully complete the course will be able to make informed and responsible decisions regarding the Earth and its resources.

GE Foundational Knowledge of Discipline:

ES 100 is a survey course providing an overview of the fields of geology, geography, oceanography, and astronomy. The topics are approached from the perspective of Earth as a system where interconnected components interact with each other and are thus interdependent. Areas of study include those related to plate tectonics, earthquakes, volcanoes, mineral/rock resources, geologic time, landscape development, weather systems, ocean circulation, climate change, and Earth's place in the solar system. Successful students are required to demonstrate a broad understanding of Earth science concepts, principles, and processes, which entails a foundational knowledge of the discipline. Students are also tasked with questioning their role (as humans) in these Earth processes.

Summarize the major findings from your course outcomes assessments that are related to the GE/ILOsducation/Institutional Learning Outcomes that your discipline supports. You should refer to the GE/ILOs your course outcomes are mapped to in Nuventive.

Students in ES 100 are meeting all course assessments with scores above 70%, which is the SLO standard that is being used by the discipline. ES 100 currently assesses three SLOs:

- Midlatitude Cyclone - Describe the frontal components, weather patterns, and general motions of a midlatitude cyclone.
- Earth's Seasons - Describe the production of Earth's seasons as they relate to the tilt of the planet on its axis and the resulting distribution of solar energy across the Earth's surface.
- Plate Tectonics - Describe the dynamic processes involved in tectonic plate motions, including the characteristic processes and landforms associated with tectonic plate boundaries.

All three SLOs address the following GE/Institutional Outcomes:

- Written Communication
- Creative, Critical, and Analytical Thinking
- Information Literacy/Inquiry and Analysis
- Civic Knowledge and Engagement
- GE Foundational Knowledge of Discipline

Overall student success rate for comprehensive assessments is above 70%. Comprehensive assessments include multiple choice/matching questions, completion of diagrams, and short answer essay questions which are embedded in the exams for each section.

An interesting trend continues to be noted related to the SLO assessments. Prior to exams/SLO assessment, several activities both in-class and online are given to students to complete as part of the discussion of the topic and to enhance their understanding of the topic. Students who fully and successfully complete these activities score well above 70% on the assessment. In contrast, students who fail to participate in and complete these in-class and online activities also fail to pass the SLO assessment. Obviously students who participate in the learning activities do much better on assessments, which is certainly not surprising. The question becomes, however, how does one enforce the full participation of all students in the completion of these activities? Students make the choice of whether or not to fully participate in a course and thus their grade will be a reflection of their level of participation.

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?

Earth Science is essentially a single course (ES 100 lecture) discipline. Although ES 100 lab existed on the books, we have not been able to offer the course for over 6 years due to general course offering reductions. As a result, the companion lab course (ES 100L) has been slated for deactivation beginning Spring 2022. ES 115 (Natural Disasters and Environmental Hazards) is offered on occasion, but is cross-listed as GEOG 115 and all assessments occur within that discipline.

Earth Science is not a program as it does not lead to a degree or certificate. As a discipline, Earth Science 100 may be used to satisfy Associate Degree General Education requirements Area B (Natural Sciences), as well as CSU-GE Area B (Scientific Inquiry and Quantitative Reasoning) transfer requirements or IGETC Area 5 (Physical Science) transfer requirements.

Falling into these categories, the learning outcomes align with transfer expectations related to the belief that students should be provided with a "well-rounded education" regardless if their chosen course of study. This is obviously part of the Mission Statement for Palomar College where we are expected to prepare students to engage locally and globally. Students require a diverse skill set in order to lead productive lives, be knowledgeable citizens, and to be able to communicate ideas as a useful member of a global society.

ENROLLMENT AND EFFICIENCY TRENDS

Your courses and offerings represent the path students take to complete their goals. Palomar has a very diverse set of programs and offerings and students have many paths they can take to earn a degree, certificate, or transfer.

In addition to student success and completion, enrollment trends, resources (FTEF), and efficiency metrics like FTES/FTEF are factors reviewed by the college when considering needs for staffing and program support. Evaluating these metrics also helps the College when developing class schedules to meet the needs of students.

Palomar College uses the WSCH/FTEF ratio as one indicator of overall efficiency in addition to the overall fill-rate for courses.

Although the college efficiency goal is 525 WSCH/FTEF and 85% fill-rate (minimal), there are many factors that affect efficiency (i.e. seat count / facilities / accreditation restrictions).

In this section, you will examine your enrollments over time and resources (FTEF) utilized to support or generate those enrollments.

This information can be found by looking at enrollment efficiencies.

Link to [Program: Enrollment Trends](#)

Have your enrollment trends increased, decreased, or stayed the same for your discipline over the past five years? (check box)

Decreased

Have your efficiency trends increased, decreased, or stayed the same for your discipline over the past five years? (Check box)

Increased

Were these trends expected? Please explain.

Enrollment numbers have declined due to reduction in the number of sections offered. The numbers of sections offered has declined due to general reduction of classes offerings by the College as well as the loss of one full-time faculty member due to their retirement. ES 100 had typically offered 4 sections per semester with fill-rates of 95%. Semesters with only 3 sections have fill-rates at/over 100% but with one less section, we have had to turn students away.

The WSCH/FTEF trended at an average of 652 for semesters with 4 sections; an average of 683 for semesters with 3 sections. These trends are well above the desired College efficiency goal of 525 WSCH/FTEF or 85%.

Despite the fact that ES 100 is not tied to a degree program, it is a strong General Education science course. Students have an interest in a course that provides them with a broader survey of topics.

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.

Earth Science is a single course (ES 100 lecture) discipline (not a program) thus there are no program learning outcome assessments.

That aside, the ES 100 course is a popular course for students to complete their General Education requirements.

As a "survey" course, ES 100 provides a taste of each of the other disciplines within the ESES Department. This often leads to students' further exploration of more focused courses within the ESES Department.

From the past five years of data, the ES discipline Fall WSCH/FTEF average 664, well above the desired College efficiency goal of 525.

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

Earth Science 100 (lecture and lab) were originally designed to satisfy requirements associated with the CSU-San Marcos Liberal Studies Elementary Subject Matter (ESM) option. The lecture-lab combo was developed at the specific request of CSU-SM as an option for Palomar students transferring to CSU-SM. Due to yearly cuts in class offerings at Palomar, the ES 100 lab has never been offered and, regretfully, the process to delist the lab course has now been initiated. The ES 100 lecture-lab combo had been selected by Anthropology as part of their AA-T option and students were being left without the opportunity to complete the requirement since the College was not including the ES 100 lab course as part of the regular semester offerings.

This lack of support from the College has led to the slow, but steady, decline in the discipline offerings. One full-time faculty member associated with the development of the course (Patty Deen) retired in Dec. 2018. The second full-time faculty member (Dr. Lisa Yon) responsible for running the program and authoring the in-house lab manual expects to retire by Dec. 2022. At this time, there is no full-time faculty member available to take over the program.

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 70% course success rate is considered to be an appropriate standard for discipline course success rate, which is consist with SLO rates. This is also consistent with the College's institutional standard of 70% (March 2021 Accreditation Report).

Have your overall course success rates increased, decreased, or stayed the same over the last 5 years?

Stayed the same

Was this expected? Please explain.

Excluding Fall 2020 data, the overall course success rates stayed about the same, fluctuating around an average of 68%.

The decision to remove the Fall 2020 data is based upon the fact that all prior semesters were face-to-face classes and Fall 2020 was a "forced online" due to the COVID pandemic. Success rates for the online sections for Fall 2020, were slightly lower than what is typically seen, though not unreasonably so (64%). Many stuents struggled with the online format and continue to do so.

What is your stretch goal for course success rates?

71.0%

How did you decide upon the goal?

According to Palomar's Accreditation Report (March 2021), the campus-wide Stretch Goal for the college is 71%. Since ES 100 has reached this goal several times in the past, this is considered to be an achievable goal.

The College overall success rate has not risen over the 70% Institutional Standard the past 6 years, averaging 69.3%.

Have your overall course retention rates increased, decreased, or stayed the same over the last 5 years?

Stayed the same

Was this expected? Please explain.

The overall course retention rates hover around 91%, ranging from a low of 88% to a high of 95% with no discernable pattern. Even the Fall 2020 "forced" online semester saw a retention rate of 91.2%.

Are there differences in success or retention rates in the following groups? (choose all that apply)

Gender

Age

Ethnicity

Gender: Why do you think gender differences exist? What do you need to help close the gap?

Gender is a difficult group to evaluate since the data is self-reported and students may identify outside of their birth gender. That being said, there appears to be some differences that manifest themselves from the data.

In terms of enrollment trends, over the past five years, students identifying as female have constituted 57% of the enrollment in ES 100 compared to 43% identifying as male. At the College level, the five year average is about 48% female vs 52% male, though there has been a steady trend in female enrollment rates increasing and male enrollment rates decreasing at the College level. This trend was not evident in the ES 100 enrollment, perhaps due to the fact that the ES 100 course is specifically used to satisfy a requirement for the CSU Liberal Studies Elementary Subject Matter option towards a Teaching Credential, a career path often favored by females in the past.

Regarding retention rates, students identifying as female have typically averaged 92% over several years of data. Students identifying as male have a five year average of about 90% though looking at individual years there has been a steady decline in male student retention that is not seen in the data for females. At the College level, the retention rates for self-identified male and female students is about the same (92%, male; 91%, female) and thus consistent with overall values noted for ES 100.

For students who stay in the class, success rates have stayed about the same over the past five years, but there is a distinct difference with females showing an average success rate of 71% as opposed to the average success rate for males being only 63%. One could speculate that females are more focused, show more attention to detail, are better organized, etc. Although this is very much an "old-school" and outdated style of thinking, there may be some level of relevance to the statement. In a traditional setting, there may be more diverse demands on a female student related to obligations outside of the classroom perhaps generating a student more skilled at organization and time management.

The only evidence I can offer is within the data for Fall 2020 in which students being forced online in a mandated health emergency faced additional challenges. In this semester, the success rate between gender groups not only flipped, but did so dramatically with female success rates plummeting to only 58% while male success rates rose to 71%. I received numerous emails from female students indicating increased demands related to homeschooling their children as well as caring for ill family members. These were challenges they had not previously faced and many were ill-equipped to do so. Hopefully with the eventual return to pre-COVID conditions (as much as possible), we will also see student success rebound for students who identify as female. Perhaps students who identify as male will recall lessons learned from increased success rates and retain these positive educational habits.

I would also suggest that when students meet with Academic Counselors that the counselors encourage the students to work within their pre-determined time commitments. A student with prior commitments to family (caring for young children or older family members) or with a rigorous work schedule (an existing full-time job or several part-time jobs) should not be encouraged to carry 15-18 units. Students may still be considered full-time at 12 units. I understand financial aid awards may be different for different levels of unit enrollment, however if the student ultimately fails or withdraws from the course due to issues related to over-commitment, there was ultimately no benefit at all in adding the extra units to the student course load.

Ultimately, without knowing for sure what affected these students and their performance, there is no clear path to closing the gap other than making sure that all students (regardless of gender identification) recognize the rigors associated with a college education and are prepared to make that commitment.

Age: Why do you think age differences exist? What do you need to help close the gap?

Using the data provided by the College IRP, enrollments in ES 100 are highest (54%) in the "typical college age group" of 20-24 years old. This is not surprising as it mirrors the College-wide data, though College-wide this age group is dominant at a lower 40%.

Retention in ES 100, however, is highest in the 25-49 age group (93%) though the 20-24 age group is still 91%. Compared to College-wide data, both age groups average 90-91% with the less than 19 age averaging College-wide 93% retention compared to ES 100 value of 90%. Overall, retention rates are good across the board.

Where the biggest difference is seen is in the success rates. ES 100 has its highest success rates in the 25-49 year olds at 81%. This value drops to 67% for the 20-24 year olds, and 63% to students younger than 19 years old. These values are distinctly different when compared to the College-wide data where the success rates range from a high of 72% for the 25-29 year olds, to 69% for the 20-24 year olds, and 68% for the younger than 19. At the College-wide level, there is essentially little difference seen in success related to age categories.

This is obviously not the case for success in the ES 100 course. In previous years of PRP assessments where access to data included information at the Division level, data for ES was consistent with values for success as seen for other science courses. The sciences (including math) require different skill sets than humanities or social sciences. Thus, the higher success rates in the 25-49 age category for ES 100 (and other sciences) can be easily tied to a more mature, more focused group. Typically an older student has refined their basic math/ reading comprehension skills and developed better study habits, better life skills and time management skills. And, they often have a better understanding of the value of their education and goals.

One could suggest that young, first-time college students need to be better educated on the rigors of college and the importance of time management. Younger students are more familiar with the high school model of education where the majority of work is completed during a seven-hour school day in which classes meet daily. They are often unprepared for the college setting where the majority of the work occurs outside of the scheduled class time and the motivation to complete the assigned work must come from the student themselves. Typical college-level science courses require a commitment of at least nine hours of work per week outside of the classroom, but many students appear unready to make that kind of time investment. This became especially apparent during the Fall 2020 semester with classes "forced online" where ES 100 success rates in the 25-49 age category soared to 88% while the younger ages dropped to 60%.

Closing the gap will be difficult as younger students tend to believe they already have it all "figured out"...with age and experience comes wisdom. I offer advice and provide online links to guide students to success, but in most cases being successful comes down to making correct decisions in time management and study habits.

Ethnicity: Why do you think ethnicity differences exist? What do you need to help close the gap?

Ethnicity is another factor which could be misleading as the data is self-reported and the current societal trends encourage people to embrace their ancestral or cultural roots. This can be seen in the Institutional Research and Planning (IRP) reports with the multi-ethnicity category, which is a relatively new category. That being said, ES 100 typically has fewer than 10 students per semester in any category other than Hispanic or White.

At the College level, as a Hispanic-Serving Institution, we have seen a steady increase in enrollment of Hispanic students over the past five years from 42% to 46% while the number of White students has experienced a steady decline from 38% to 33%. Within the data for ES 100, there has been a similar trend with Hispanic student enrollment increasing from 60% to 66% while White student enrollment has declined from 40% to 33%. The enrollment numbers likely represent the general demographics of the immediate region around the College as we are a commuting school rather than a residential school. Overall, retention rates for all students regardless of ethnicity average 91% College-wide and 92% for ES 100.

Success rates do show distinct differences. College-wide, the success rates for Hispanic students over the past five years average 65% while White students exhibit an average success rate of 75%. Interestingly, these values have changed little over the years. Reflecting on an IRP report from 2013-2014, values for success rates for the College were reported as 68% for Hispanic students and 74% for White students. This suggests success rates at the College level for Hispanic students have actually declined; this is visible within data from the past five years though percent differences are smaller over a smaller time range.

For ES 100, success rates over the past five years show Hispanic students with an average of 62% while White students average 77%...very similar to the current College data of 65% and 75%, respectively. This data pattern is also similar to that seen in other ESES Department programs as well as other science departments within the MSE Division. Hispanic students have pass rates averaging 10% below their White classmates.

I do not have the resources to explore the reasons for this difference. However, routine observations in the classroom suggest that Hispanic students might be struggling with basic reading comprehension as well as the use of technology to complete assignments. Observations also indicate lack of basic skills in Elementary School math operations (addition, subtraction, multiplication, division) as well as Middle School math concepts (decimals, fractions, and percent as well as the concept of positive and negative numbers). These observations suggest that there might be a lack of preparation for students from the local school districts that feed into Palomar College. I do not know if Institutional Research and Planning has access to this information though I suspect that it would be part of the information submitted by students when they first enroll.

Are there differences in success/retention between on-campus and online courses?

N/A

Please share any best practice methods you use for online courses.

The ES 100 lecture course has only been taught online under the emergency protocols related to COVID-19. It is considered pedagogically not in the best interest in the students to teach the concepts online.

That being said, having no alternative during COVID-19, some of the best practice methods that have been employed include:

- Prior to the first day, making sure that students know how to access Canvas, the learning management system (LMS) used by Palomar (via student email).
- Providing a guide for the course set-up including location of resources and symbols used to indicate and distinguish resources versus assignments (students can download a single-page guide to the course).
- Use of screen shots to illustrate how to navigate certain resources used in the course, including an online eText.
- Being present in the course with regular announcements and discussion posts to all enrolled students, and emails directly to at-risk students.
- Students receive regular feedback on upcoming assignments as well as submitted work. Feedback may occur to the class as a whole or to individual students as the need arises.
- Students are provided with multiple ways to engage in the course and demonstrate acquired knowledge.
- Although it is made clear to the students that their success depends upon their level of engagement and participation, in addition to having a detailed calendar for the semester, students receive regular reminders and updates regarding assignments and due dates.
- Content is arranged via "topics" so that all materials for that learning module can be accessed from a single location.

COURSE STUDENT LEARNING OUTCOMES (SLOs)

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

Overall student success rate for student learning outcomes assessments is above 70%. SLO assessments include multiple choice/matching questions, completion of diagrams, and short answer essay questions which are embedded in the exams for each SLO being assessed.

Typically for each SLO being assessed, questions of varying difficulty are used. For questions of basic knowledge, students exhibit an accurate grasp of the topic with typically ~85% of the students successfully answering these basic knowledge questions.

Questions requiring more sophisticated understanding of the material, typically yield lower pass rates of ~75%.

The most complex question requires students to have a superior understanding of the topic and the pass rate typically drops to ~65%.

In general, the average pass rate for the embedded questions is typically above 70% for all SLOs being assessed.

Reflecting on the major findings you summarized, what are some questions you still have about student learning in your courses that you have not yet been able to address with your outcomes assessments?

Student learning and success are largely tethered to student motivation and engagement. In order to assist with student learning and to increase student success, I experimented with student activities prior to the SLO assessments.

Students were given the opportunity to complete several activities as part of the discussion and exploration of a topic with the intent to enhance their understanding of the topic. Students who fully and successfully completed these activities scored well above the standard 70% on the SLO assessment. In contrast, students who failed to participate in or complete these activities also tended to fail the SLO assessment. Obviously students who participate in learning activities do much better on assessments, which is certainly not surprising.

Thus, since students are responsible for their own learning, how does one enforce the full participation of all students in the completion of these learning activities. Students make a choice of whether or not to fully participate in a course and thus their grade will be a reflection of their level of participation. This is of course the age old proverb of "you can lead a horse to water but you can't make it drink"...you can give someone an opportunity but not force them to take it. This, of course, is a much larger topic than simply a "learning outcome" as it addresses the entire behavior of certain students.

What are some improvements in your courses that have been, or can be, pursued based on the key findings from your course learning outcomes assessments?

The changes described above with the learning activities being offered to students has had an overall positive effect on what certain students gain from the course and these activities will be continued and expanded. The goal of the ES 100 course is not only to have the student succeed in the academic environment, but to also produce an Earth Science-literate member of a global community. Successful students become aware of our current scientific understanding of our planet and thus play a critical role in Earth stewardship, sound public policy, and expanded international cooperation.

Although overall (as an average) students meet course assessment goals, course success at an average of 70% is misleading as what is being observed is not the typical bell curve distribution. More and more, what is being seen is a trend towards a bimodal distribution with almost equal amounts of A/B grades compared to D/F grades and a lesser number of students in the average "C" range. This continues to reflect the decisions made by students to invest time/effort into their academic goals or not to invest that time or effort. Students cannot be forced to participate.

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

PROGRAM CURRICULUM ALIGNMENT, MAPPING, SCHEDULING, & PLANNING

The Chancellor's Office Vision for Success stresses the importance of decreasing the average number of units accumulated by CCC students earning degrees.

Palomar College's Guided Pathways plan includes clarifying paths for students by sequencing course offerings so that they support scaffolding and timely completion. Our goal is to ensure learning through:

- The mapping and assessment of clear program outcomes that are also aligned to employer and/or transfer institution expectations.
- Engaging and applied learning experiences.
- Effective instructional practices to support students in achieving success.

What is your departmental strategy on how you schedule your courses, including the time of day you offer courses? Do you use 4-week, 8-week, or block scheduling (putting required classes near each other) to organize required classes to meet the needs of disproportionately impacted students? Please explain.

ES 100 is a stand-alone General Education course neither requiring any prerequisite nor being part of a sequence of required courses.

In terms of scheduling, the ESES Department follows the block scheduling format with most offerings of the ES 100 course occurring in prime time morning time slots. The ES 100 course has also been offered as a late afternoon (twilight) course as well as an evening course. Due to the diversity of concepts discussed in the class (it is a geoscience survey course), pedagogically it would not be a sound practice to run the course in a 4-week or 8-week format.

How do you work with other departments that require your course(s) for program completion?

The Antropology AA-T had required the ES 100 lecture and lab as part of their completion requirements. Due to course offering reductions, the ES 100 lab has not been offered since first approved in 2015. I have thus filed for deactivation of the ES 100 lab course and the Anthropology program has been notified of this change.

A recommendation for Geology 100 lecture and lab (Physical Geology) has been suggested to them as an appropriate replacement for a lecture/lab combo.

Does your discipline offer cross-listed courses?

No

Are there curriculum concerns that need to be resolved in your department? What are they?

No.

How is the potential need for program/course deactivation addressed by the department?

ES 100 Lab was approved to be offered beginning Fall 2015. Due to overall cuts in the number of courses and sections being offered by the College, the lab class has never been taught. As a result, the ES 100 Lab course has been filed for deactivation.

Are there areas you would like to expand?

Once concerns related to COVID-19 are resolved, it would be appropriate to offer a section of ES 100 at the Rancho Bernardo Education Center. Materials have already been purchased and placed at the site in prior anticipation of teaching at that location.

Describe any data and/or information that you have considered as part of the evaluation of your program.

Not applicable; ES 100 is a single course discipline, not a program.

That being said, the course can be used for the completion of the Associate in Science, General Studies:Science and Mathematics.

To answer the next two questions, you will need to review your [program maps](#) and program information in the [2021-2022 Catalog](#).

Is the content in the program mapper accurate?

Yes

Is the content in the catalog accurate?

Yes

Has your department or discipline started having discussions about embedding diversity related issues or content in your curriculum?

Yes

If yes, describe your efforts. If no, what type of training or help do you need to do this work?

As I (Dr. Lisa Yon) am the only full-time faculty for this discipline, I have been researching information on my own to make available to students in general. Many underrepresented groups in the geosciences are initially science-phobic. Making these students feel more comfortable with the concepts is an important first step in recruitment of diverse talent. Resources I have explored come from the American Geophysical Union, the Geological Society of America, and the National Association of Geoscience Teachers. The University of California-Berkeley Library also maintains a website called "Diversity, Equity and Inclusion in Earth & Planetary Science" with links to various resources.

For most of the students that I encounter in ES 100, this may not only be their first encounter with a geoscience, but their only encounter. Other sciences such as life science are taught at multiple levels throughout a student's public school education. For students in California, they have only a brief introduction in Middle School 6th Grade Science Curriculum. There typically is no high school curriculum in the geosciences as focus is placed on AP Bio, AP Chem, or AP Physics. Most high schools do not offer AP Environmental Science, which although not a geoscience, would be the closest analogue. Thus, there is an unfamiliarity with the Geoscience subject matter by the time the student reaches college age and is considering career paths.

Early outreach to younger students is considered to be crucial in generating interest and familiarity with the concepts presented in the geosciences and thus encouraging students that they have the ability to contribute in a positive way to the field. To this end, I have volunteered as a coach for both Middle School and High School Science Olympiad Programs covering topics such as minerals/rocks, fossils, tectonics (earthquakes & volcanoes), oceanography, and meteorology.

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?

O-NET OnLine suggests the following occupations would be a match for a person with training/skills within the Earth Sciences:

25-1051.00 Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary
 19-4043.00 Geological Technicians, Except Hydrologic Technicians
 19-2042.00 Geoscientists, Except Hydrologists and Geographers
 25-1053.00 Environmental Science Teachers, Postsecondary
 19-3092.00 Geographers
 19-4099.00 Life, Physical, and Social Science Technicians, All Other
 19-4042.00 Environmental Science and Protection Technicians, Including Health
 19-4092.00 Forensic Science Technicians
 15-1221.00 Computer and Information Research Scientists
 19-2021.00 Atmospheric and Space Scientists

New or emerging careers: One potential area of employment is with public outreach organizations such as museum education departments. These facilities are tasked with explaining scientific concepts to the general public. This would include development of displays, production of educational materials (print, video, online) and educational tours for groups of varying ages (elementary through adult learners).

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

The KSAs needed for employment in any of the above fields are basic Earth Science knowledge as well as general scientific skills and abilities. Postsecondary teaching jobs would require a minimum of a Master's degree.

Knowledge needed includes:

Education and Training
English Language
Mathematics
Computers and Electronics
Physics
Chemistry
Geology
Biology

Skills needed include:

Speaking
Reading Comprehension
Instructing
Problem Solving Using Scientific Principles
Active Listening

Abilities needed include:

Oral Expression
Speech Clarity
Oral Comprehension
Written Comprehension
Deductive Reasoning

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

By completing the ES 100 lecture, successful students have a basic background in science and fundamental Earth Science concepts to enable them to continue their education at other 4-year institutions. Many of these KSAs are fundamental items (English Language, Speech Clarity, Reading Comprehension) that a student learns in a variety of classes while obtaining a college degree.

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?

Although COVID-19 has negatively impacted outreach opportunities since March 2020, in the past outreach has occurred via numerous pathways including: Palomar STEM Conference, Earth Science Week, and guest speaker program (Dr. Yon has given presentations to several civic groups).

Outreach also occurs with Middle and High School students participating in the San Diego Regional Science Olympiad program.

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

Expand offerings of ES 100 to Rancho Bernardo Education Center

Is this a new or existing goal?

New

How will you complete this goal?

This is actually the resurrection of a goal first proposed in the ES 2013-2014 PRP and subsequently dropped due to reduction of offerings occurring at the Rancho Bernardo site (as well as College-wide).

The goal can only be completed with the support of the College. As I participated in the workgroup design of the facilities at the Rancho Bernardo site, the ES classroom/storage area is already set up for teaching of the course and supplies for the course are already stored on site.

Outcome(s) expected (qualitative/quantitative)

The Rancho Bernardo Education Center is strategically placed within the Poway Unified School District, which is home to twenty-five elementary schools (K-5), six middle schools (6-8), one K-8th Grade combined, and six high schools. There is incredible potential at the Rancho Bernardo Education Center for both assisting current teachers in updating their certification as well as reaching well-qualified and motivated high school students ready for college-level courses.

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

The State of California is home to 500 active faults with a risk greater than 99% of one or more magnitude 6.7 earthquakes striking within the next several decades. Most Californians live within 30 miles of an active fault. Residents of San Diego County live within 15 miles of an active fault of which there are three major fault zones for the County.

California is home to eight volcanic areas posing threats categorized from moderate to very high. Closest to San Diego is "Salton Buttes" in Imperial County, which is classified as a high threat.

The entire coastal region of the State of California is at risk for tsunami waves generated from sites around the Pacific Ocean. Threat levels range from moderate to high. San Diego County has a threat level of moderate and risks include local offshore faults capable of producing tsunami-generating submarine landslides with little to no warning for coastal communities.

Ninety-four percent of California is classified as being in a severe drought with all 58 Counties receiving a "disaster" designation by the US Dept of Agriculture. The environmental and economic impact is significant as Californians need to address the role of increased recycling and purification of existing water resources as well as expanding resources such as desalination.

All of the above topics point to the need for California citizens to cognizant of the environment in which they live and the resources which they use. The overall mission of the Earth Science discipline is to develop an Earth-Science-literate community that is aware of the current and accurate scientific understanding of our planet. Such a population is critical to the promotion of Earth stewardship, sound public policy, and expanded international cooperation. The ES 100 course provides a current overview of all of the above topics to an audience that has likely not been previously exposed to the information and gives these citizens the knowledge they need to make informed decisions about public policies. As such, the College should be supportive of offering additional sections of this course, not reducing sections.

Expected Goal Completion Date

8/22/2022

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?

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.

Lyon@palomar.edu