



Cañada College

**COMPREHENSIVE
PROGRAM REVIEW REPORT**

Computer Science

Program Context

1. Mission

Share how your program contributes to the college, fits into the college's mission, vision, and values, and contributes to the college's Education Master Plan. If your program has a mission statement, you may include it here.

What other academic programs and student/academic services does your program engage with?

Examples of student/academic services include the Learning Center, Library, STEM Center, SparkPoint, Dream Center, etc. Another example, how does your program fit into any of the College's plans (such as Student Equity and Achievement Program, Technology, Strategic Enrollment, etc.)?

The Cañada College Computer Science (CS) program explicitly incorporates the Cañada College Institutional Learning Outcomes (ILOs), the San Mateo Community College Statement of Academic Freedom, Equal access to Personal Computer Technology and Software, and Open Enrollment to all students.

Computer Science courses are founded on verified facts by using the ILO's 'Critical Reasoning' and 'Quantitative Reasoning'. Students identify the physical foundations of computer hardware and from there build up the necessary cognitive connections to enable them to create software that controls PC hardware.

The CS program fosters an environment of 'Academic Freedom'. In this nurtured environment of Academic Freedom, they can freely 'Communicate' and be creative producing useful products for the 'Community'.

All students have equal access to the Personal Computers found in the Student Learning Center. The two dedicated Computer Science Class rooms in building 23, have 20+ PCs each and all the software necessary to be successful. IT and the CS dept. yearly insure that the software is up to date.

The CS program courses are mostly designed without prerequisites so any student has enrolment access, thus encouraging wide access to all students. The students self-select the course enrollment level.

The CS program has beginning courses, like CIS 118 Introduction to Computer Science, that are beneficial for all majors. The CS program works with other majors like Engineering by offering courses like CIS 250 Introduction to OOP.

Over all the CS program is open all levels of students and provides an Integrated and thoughtful sequences of course enabling the individual student for fulfilling work in the community and advancement to a higher level institutions.

2. Articulation

Are there changes in curriculum or degree requirements at high schools or 4-year institutions that may impact your program? If so, describe the changes and your efforts to accommodate them. If no changes have occurred, please write "no known changes."

No Known curriculum degree changes for high schools or 4-year institutions are needed.

3. Community & Labor Needs

Are there changes in community needs, employment needs, technology, licensing, or accreditation that may affect your program? If so, describe these changes and your efforts to accommodate them. If no changes have occurred, please write "no known changes." CTE programs: identify the dates of your most recent advisory group meeting, its membership, and describe your advisory group's recommendations for your program.

The rise of AI systems is commonly known. AI systems and software is used by more and more businesses. This is driving the need to offer the Python Programming language. Python is frequently used for writing AI systems. The CS Dept. has created and now offers CIS 122 Introduction to Python.

Program Review

Also, the course CIS 242 Introduction to Computer Architecture discusses new computer hardware. The rise of Photonics based computer architecture, which enables a 70+ percent reduction in energy usage, 10x plus faster computers, and less device size, is now incorporated in the class. This keeps the students current with the new hardware increasingly used for AI systems.

A new advisory group is being formed to recommend any updates that the emergence of Artificial Intelligence Systems can be further incorporated into the program.

Looking Back

4. Curricular changes

4A. Progress Report - IPC Feedback

Provide your responses to all recommendations received in your last program review cycle.

The need to advertise the Cañada College Dept. program and courses.

See Section 4B Progress Report section.

4B. Progress Report - Prior Program Goals

Provide a summary of the progress you have made on the program goals identified in your last program review. Include any challenges that have prevented or limited your pursuit of the program goals.

There are numerous 'Challenges' impacting enrollment in the Computer Science (CS) program at Cañada College.

1) Since the Introduction of the CS program at Cañada College, our two sister colleges have also now offer a CS degree. This has impacted enrollment.

2) The massive migrations of businesses, from California and specifically the Bay Area economy, to other states has caused an impact on enrollment. Examples: ATT in San Ramon, Tesla, Oracle, Chevron in San Ramon, Hewlett-Packard, Charles Schwab, McKesson and many more. <https://thedailyoverview.com/companies-that-moved-out-of-california/>

3) Since the Pandemic of 2020, many students have switched to Online courses. The offering of on campus classes have become less popular and subsequently less enrollment for on campus classes. <https://edsources.org/2025/at-community-colleges-online-classes-remain-popular-years-after-pandemic/728458>

4) Long Term issue: Fewer High School Seniors. <https://www.npr.org/2025/01/08/nx-s1-5246200/demographic-cliff-fewer-college-students-mean-fewer-graduates>

These four issues cause the need to further advertise the CS Degree at Cañada College.

To address these challenges:

1) The need to create a Computer Science Brochure discussing the 'Wonders' of studying Computer Science has been accomplished. The brochure has been distributed around campus and is available upon request. (see attached documents) It discusses the Computer Science Bachelors Science Transfer Degree, the three Certificates in Computer Science for: C++, Java and Swift. It also explains the individual classes offered by the CS Dept. The recommended sequences of courses are made clear by a diagram. There is one class that is recommended for all students and all majors: CIS 118 Introduction to Computer Science. All majors today, use computers.

2) The need to create a Poster encouraging the study of CS has just been accomplished and posted.

3) The outreach to feeder high schools, by sending packets of CS Brochures to them.

4) Create and now offer CIS 122 Introduction to Python for AI systems to keep current.

5) Incorporating the study Photonics architecture for AI systems in CIS 242 and others.

6) Encouraging existing CS students to have friends and family to enroll.

Program Review

Current State of the Program

As stated in the 2022-2027 EMP: “Cañada College continuously assesses processes and removes barriers to student access, success, and completion.” The program review is an essential part of that process.

5A. Program Changes

List any significant changes that have occurred over the prior years in your program's curricular offerings, scheduling, or mode of delivery. Please describe if any changes impacted specific programs of study within your discipline. For decisions made by your department, explain the rationale for these changes. If applicable, how have state policy changes affected your program offerings?

The significant changes to the program offerings at Cañada College are:

- 1) The Removal of the Amazon Web Services (AWS) Certificate. Due to the consistently very small level of demand, the AWS certificate was suspended / cancelled in 2024.
- 2) The addition of the course CIS 122 Introduction to Python, needed due to the rise of AI.
- 3) The incorporation of the Photonics architecture/hardware in CIS 242, due to the rise of the use of AI.
- 4) The shift from fully on campus classes, to more Hybrid and full online course. The shift is driven by Student enrollment patterns since the 2020 pandemic.

5B. Program of Study Completeness

Look at your course offerings, in the last program review cycle: was it possible for a student to complete your certificate(s) or degree(s) while only completing courses at Cañada College? If not, was your certificate(s) or degree(s) completable within the District?

When the Computer Science (CS) BS Transfer Degree program and the related CS certificates were instituted at Cañada College, all the necessary courses for the degree and certificates were created and made part of the Web Schedules course offerings. All the courses are still offered at Cañada College.

Since the two sister colleges instituted their own CS Degree, a student now also has the option to take the same needed CS BS degree courses at Skyline or San Mateo. This has impacted enrollment at Cañada College. Students take the course at the college convenient to them.

5C. Program of Study Maps

Review your discipline's currently listed program(s) of study maps. Are any updates needed? If so, please list the needed changes. (These changes will be forwarded to the PRIE office after the Program Review process is completed, or you may submit changes using the PRIE Data request form.)

The Study maps and course sequences are up to date.

6: Enrollment Trends and Changes

Use the data provided by PRIE to examine your enrollments by discipline and courses. Analyze each of the following: •Trends, significant changes, and any disproportionate enrollment impacts in course offerings, •Any disproportionate enrollments of student subpopulations indicated in PRIE data, •Trends in headcount, FTES, and load.

Based on your analysis of the data, discuss what you believe is noteworthy. If applicable, describe any other enrollment data that is relevant to your program, such as courses that are part of learning communities. You are welcome to include additional graphs or charts if they help your analysis. For example, has there been a significant increase or drop in FTES or Load? If applicable, consider trends in class cancellation rates and how it might have affected your course offerings. If needed, consider how the pattern of course offerings (times/days/duration/delivery mode/number of sections) affected your enrollment. Please note: If additional sources of data are used, please upload these documents or provide links.

The enrollment trends that impact Computer Science classes:

- 1) The Increase in demand for fully on campus classes. Students enjoy the flexibility that Online courses gives them. Since the Pandemic, Online classes have dominated CIS class enrollment. We are now deliberately offering more online and Hybrid modality CIS classes.

Headcount % by Course	FACE TO FACE	HYBRID	ONLINE	SYNCHRONOUS
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Program Review

CIS-118	3.50%		96.90%	
CIS-122			100.00%	
CIS-242	59.50%	23.40%	20.30%	
CIS-250	8.10%	8.90%	84.80%	
CIS-252	51.70%	25.40%	27.10%	
CIS-262	49.50%	11.10%	41.40%	
CIS-284	4.20%		95.80%	
CIS-286	5.50%		60.60%	41.30%
CIS-295			100.00%	

2) The change in total enrollment in the CIS program at Cañada College, has many factors. The Pandemic, increased competing offering other colleges and the change in demand in the local area. To address this issue, we will be advertising the CS Degree and Certificates.

		CIS Unique Student Enrollment
Enrollment	Year	
	2020	660
	2021	480
	2022	473
	2023	535
	2024	510

7: Retention and Success

• Please Note: Retention rate counts enrollments who have earned a passing grade, a failing grade, or an incomplete grade. • Please Note: Success rate counts enrollments who have earned a passing grade.

7A. Current Retention and Success Data

Describe the retention and student success rates in your courses and any disproportionate enrollment impacts using the data provided by PRIE.

Student success rates for core CIS courses overall.

Success Rate by Course	Total Success Rate
CIS-118	70%
CIS-242	76%
CIS-250	70%
CIS-252	72%
CIS-262	85%
CIS-284	76%
CIS-286	76%

Program Review

To increase the success rates,

- 1) Mandatory attendance will be instituted. (Will be graded) - Attendance is a major factor contributing to student success in CIS courses.
- 2) Mandatory consultation with a Cañada College Academic counselor if low participation.
- 3) See also 7A.

Drop issues:

Policy of dropping students who choose not participate in a class they are enrolled in...

In more than half the time, I receive an email from a student saying "Do not Drop me, else I will lose my Financial Aid". Additionally, When I send out warning emails, many students say "Do not Drop me, I am a foreign Student. I will not be visa compliant if I fall below a certain number of units". Additionally, student may not respond to my warning email, and when they are dropped, they contact their Counselor who invariable asks me to 'reinstate them'... These types of students cause the Failure rate for courses to be higher. Additionally, there high school students who sign up for classes, but choose not to participate fully... and they increase the drop and failure rate. These issues need to be discussed with the appropriate dept. to come to the best resolution.

7B. Online Success

The college has a goal of improving success in online courses. Using the data provided by PRIE, what significant gaps do you see in success between different course modalities: asynchronous, synchronous, hybrid, and face-to-face courses? Analyze any disproportionate online course retention and success rates by modality. If your program does not offer online courses, please write "not applicable."

Course Resources:

Setting up the course so students have 24/7 access to all the information they need is one of the key elements to student success in Online, Hybrid and Face-to-Face classes.

To improve the retentions and success of students in an online course, and all other modalities, a fully populated CANVAS component will be setup and used. It will include the following:

- 1) Live weekly ZOOM lectures for both asynchronous and asynchronous online classes. All live Zoom lecture are recorded for later student viewing.
- 2) References to additional recorded course lectures, by others on YouTube.
- 3) Inclusion of weekly written lecture notes containing: Terms and explanations, diagrams and code examples and more, written and posted by the professor
- 4) Inclusion of Weekly interactive discussions about weekly topics
- 5) References to online sites that have additional written explanations of weekly topics.
- 6) Online weekly Study group available in Canvas for students
- 7) Use of Summary Study Method done by students - for weekly material
- 8) Online Text books
- 9) Online exams and quizzes
- 10) Availability of professor by Canvas Message system for questions.
- 11) Availability of professor by SMCCCD email system for question.
- 12) Online Web Tutor link for CS classes
- 13) STEM Tutor Center in Building 9, in person or online.
- 14) Acceptance of late work, with minimum of 1 point up to 20% penalty depending how late.

Even with all these resources: Many students choose not to avail themselves with the extensive resources.

Success Rate by on campus course and online course is roughly the same

Total Success Rate

	Face-to-Face	Hybrid	Online
CIS-118	70%		71%
CIS-242	72%	84%	78%
CIS-250	70%	62%	71%
CIS-252	71%	76%	70%
CIS-262	86%	82%	85%
CIS-284	82%		75%

Program Review

Course retention is lower in the CIS 118, and higher in the degree required CIS courses.

There is a larger withdrawal rate for CIS 118, the Introduction class. This is due to there many more students who are exploring Computer Science by taking this class. As communicated by there Emails to the professor, they indicate that they discovered that CS is not for them and then withdraw.

8: Resource Changes

8A. Impact of Prior Resource Applications

Describe the impact to date of previously requested new resources (assignment, equipment, facilities, research, funding) including both approved and non-approved resource request. What impact have these resources or lack of resources had on your program and measures of student success? Do you notice any disproportionate impact on any student populations? What have you been unable to accomplish due to resource requests that were not approved? ?

The main resource request is the update of Software need for students in all the Computer Science (CS) classes. District IT and Cañada College IT are great and keep all hardware and software in the two dedicated CS classrooms B23-140 and B23-144 updated.

Today, students have their own PC devices: Desktops, laptops, iPads, or Smart Phones. They frequently install the same software, for FREE, on their own devices.

There is virtually no lack of hardware or software resources for CIS Students at home or on campus.

If there is still a need, the Library has loaner Laptops and tablets.

8B. Impact of Staffing Changes

Describe the impact on your program of any changes within the last program review cycle in staffing levels (for example, the addition, loss or reassignment of faculty/staff), in particular how those changes impact student success. Do you notice any disproportionate impact on any student populations? If no changes have occurred please write "not applicable."

The staffing levels have basically remained the same. 1 full time faculty, 3 part time faculty.

9. SLOs and PLOs

9A. SLO Assessment - Compliance

Are all active courses being systematically assessed over a three-year cycle? Refer to the Program's /Department's Three-Year Assessment Plan and describe how the plan is completed across sections and over time.

Yes, SLOs' for each class has been evaluated according to the scheduled 3-year cycle. The courses are all evaluated multiple times in the three years.

They normally use a combination of student evaluated surveys that answer how they believe they are successful, and also an analysis of student success in class.. based on objective representative assignments and their actual success percentage for students.

The student SLO' mastery Survey results and the objective evaluations based on actual student performance, they are within 10% match range.

The SLOs are successful if they are 70% or above. Over the last several years there has been an overall success rate of 70% or higher in the CIS degree classes.

9B. SLO Assessment - Impact

Summarize the dialogue that has resulted from these course SLO assessments. What specific strategies have you implemented, based upon the results of your SLO assessment?

As the result of the SLO assessments, to increase success rates, all classes over time have been setup in CANVAS. Weather it is a fully on campus class or an Online class, they now all contain the same layout and online Canvas resources. With the consistent layout and listed resources, all students have a better opportunity to pass the class.

Successful students frequently comment that the numerous resources online and consistent layout helps them tremendously.

Program Review

9C. PLO Assessment

Describe your program's Program Learning Outcomes assessment plan using your Program/Department's Three Year Assessment Plan. Summarize the major findings of your PLO assessments. What are some improvements that have been implemented as a result of PLO assessment?

The Program Learning Outcomes are linked to the Intentional Learning Outcomes:

- 1) Critical Thinking - Select, evaluate, and use information to investigate a point of view, support a conclusion, or engage in problem solving.
- 2) Creativity - Produce, combine, or synthesize ideas in creative ways within or across disciplines.
- 3) Communication - Use language to effectively convey an idea or a set of facts, including the accurate use of source material and evidence according to institutional and discipline standards.
- 4) Community - Understand and interpret various points of view that emerge from a diverse world of peoples and cultures.
- 5) Quantitative Reasoning - Represent complex data in various mathematical forms (e.g., equations, graphs, diagrams, tables, and words) and analyze these data to draw appropriate conclusions.

Each PLO is linked to one or more of the above ILOs. Each SLO is linked to one or more PLO.

The PLO assessment plan is listed in the Depts. Three Assessment Plan.

Looking at the PLO's results, one gathers that there is a need for additional code examples, explanations and diagrams. They will deliberately incorporate the 5 ILOs.

Looking Ahead: Program Planning and Goals

In this portion of program review, you will develop action plans based on your enrollment, retention, and success data (questions #6 and 7) for the most disproportionately impacted students. • Please note: your action plans will reflect the program's assessment of which equity issues need to or can be addressed. • Please note: action plans are measurable so that we can examine their success or failure, not because they are guaranteed to be successful. As part of our culture of continuous improvement, we encourage programs to pursue action plans that might or might not be successful. Successes and failures can both provide valuable information for programs.

10A. Improving Enrollment

What changes could be implemented, including changes to course scheduling (times/days/duration/delivery mode/number of sections), curriculum, marketing, and articulation of pathways to improve enrollment, particularly for disproportionately impacted student groups identified in Question 6? If applicable, include plans for faculty recruitment and faculty training.

To improve enrollment the following is to be further implemented:

- 1) Yearly Update Computer Science Brochures and posters
- 2) Massively distribute CS brochures each semester to:
 - Students at Cañada College
 - High schools and their Counselors
 - Cañada College Counselors - Attend Counseling Dept. Meetings, explain and Distribute brochures
- 3) Update course content to include more about Artificial Intelligence hardware and software
- 4) Ameliorate issues of students only enrolling for student aid, visa requirements, etc..
- 5) Promote classes within existing student base.
- 6) Mandatory attendance will be instituted.
- 7) Mandatory consultation with a Cañada College Academic counselor if low participation.

10B. Improving Retention and Success Rates

What changes does your program propose to make to improve student course retention and success, particularly for disproportionately impacted students identified in Question 7? How can the college help you improve student retention and success? Consider course offerings, curricular and/or pedagogical changes. You are encouraged to collaborate with the Director of Equity and/or Faculty Equity Coordinator to develop strategies for addressing equity gaps and to include those here. Examples of possible strategies include trials of new equitable grading strategies, use of OER/ZTC textbooks, surveys to capture student voices and needs in the classroom, new or improved partnerships with student services, and/or plans for faculty recruitment and faculty training.

Success rates are over 70%.

Program Review

To improve student success, it is suggested that:

- 1) One needs to modify courses to have prerequisites. This will insure students have the necessary prerequisite knowledge to be more successful.
- 2) Contact Canada College Academic counselors to consult directly with students who are choosing not to participate fully. There is a option in CANVAS you can set up, so a professor can refer a student to a Counselor at Canada College - Learn about it and set up.
- 3) Encourage students to attend Tutoring
- 4) Mandatory weekly attendance will be instituted.

10C. Improvements Based on SLOs and PLOs

What specific strategies do you plan to implement, based upon the results of your SLO and PLO assessment, and how do you anticipate those changes will contribute to more equitable outcomes?

The specific strategies: It is now necessary to strictly enforce student attendance. Success rates increase if students consistently attend class. For online classes, mandatory attendance of live online Zoom lectures is best. For on campus class, mandatory attendance of in person classes is most effective. Update course written lectures with new examples and explanations. More students should be successful.

Supporting Information

Tables & Graphs

New Computer Science Brochure

New Computer Science Poster

SLO student Survey - Example

SLO student object measure based on work turned in - Example

Canada College ILO list

SMCCD Academic Freedom Statement

Resource Requests