

# INSTRUCTIONAL COMPREHENSIVE PROGRAM PLANNING AND REVIEW (CPPR) FOR 2023

Only to be completed by those programs scheduled for the year according to the institutional comprehensive planning cycle for instructional programs (i.e., every four years for CTE programs and five years for all other instructional programs), which is produced by the Office of Instruction. Faculty should meet with their dean prior to beginning this process. Training is available to support faculty completing this work.

**Cluster:** ABS/BE/SS

**Area of Study:** STEM

**Program:** CIS - Computer Information Systems

**Current Academic Year:** 2022-2023

**Last Academic Year CPPR Completed:** 2018-2019

**Current Date:** March 2023

## NARRATIVE: INSTRUCTIONAL CPPR

Please use the following narrative outline:

- I. Describe how this program review was conducted, including how all program members were involved in the planning process.

This review was done by Full-time CIS Instructor Randy Scovil, with guidance from Division Chair Susan Kline.

## II. GENERAL PROGRAM INFORMATION

### A. Program Mission

The Cuesta College Computer Information Systems (CIS) promotes both the career and technical education (CTE) and transfer education missions of the College. The CIS program prepares students for transfer to four-year schools. The courses and degrees serve students intending to major in Computer Science, Computer Engineering, Software Engineering, Information Systems, and similar degrees. The CIS program certificates prepare vocational students to enter the workforce upon course work completion. CIS courses also provide support courses to students in a variety of disciplines including but not limited to Engineering, Mathematics, Chemistry, Physics, Business, Library and Graphic Communication.

- B. Please highlight any changes and improvements since the last Comprehensive Program Review. Be sure to specifically indicate those changes that have been made in the program in order to address equity gaps.

The program has remained stable for the past 20 years, with new courses and curriculum as opportunities have presented themselves.

The primary highlight is the new Cloud Computing Certificate program, which was taught beginning in the 2019-2020 school year. The program incorporates four courses (CIS 220, 223, 225, and 226) that each lead to an individual AWS (Amazon Web Services) professional certification. The new program was created by Part-time Instructor Robert Sfarzo with the support of Amazon.

- C. List all current full-time and part-time faculty in the program.

Full-time: Randy Scovil + Chris Akelian (CNET instructor who teaches CIS 217 and 240).

Part-time: Craig Arnold, Marilyne Cleeves, Jennifer Hubbard, Michelle McAustin, Susan Scholl, Robert Sfarzo, Dr. Ignatios Vakalis

**III. PROGRAM SUPPORT OF DISTRICT'S [MISSION STATEMENT](#), [INSTITUTIONAL GOALS](#), [INSTITUTIONAL OBJECTIVES](#), AND/OR [INSTITUTIONAL LEARNING OUTCOMES](#)**

- A. Identify how your program addresses or helps to achieve the [District's Mission Statement](#).

The Computer Information Systems program is at its core about achieving and building Technical and Informational Fluency to its highest levels. Students in the program not only use a variety of hardware and software on a daily basis but they are also using some of the most sophisticated software on campus as part of their coursework. Furthermore, students are being empowered in CIS courses to not only use these tools at a high level but to create and construct successful software solutions.

The Program is available to all students in many modalities, and it offers courses and certificates that range from CSU four-year transferable coursework to vocational technical skills. Our curriculum is strong in foundational material, and robustly adaptive to changing technologies. We teach students to use computing technology in a way that is safe and beneficial to society

The Cuesta College Computer Information Systems (CIS) program consists of the following degrees and certificates: Computer Science Degree; Android Developer Certificate; Internet Applications Developer Certificate; IOS Developer Certificate and Cloud Computing Certificate; and support courses for computer applications reflects and promotes both the vocational education and transfer education missions of the College. The Android Developer Certificate; Internet Applications Developer Certificate ; IOS Developer Certificate; and Cloud Computing Certificate are designed as vocational certificates.

B. Identify how your program addresses or helps to achieve the [District's Institutional Goals and Objectives](#), and/or operational planning initiatives.

1. Increase student access to higher education.

The CIS Program has increased access to distance education by achieving a 100% DE certified faculty, and all of the courses are DE approved. CIS Faculty use Open Educational Resources (OER), providing zero-cost and low-cost textbook solutions. CIS Faculty implement OEI solutions, providing zero-cost access to learning resources such as Google Cloud, Amazon Cloud, Practice Labs LTI.

C. Identify how your program helps students achieve [Institutional Learning Outcomes](#).

Listed below are multiple CIS classes that align with institutional learning outcomes.

ILO 1. Personal, Academic, and Professional Development

Students achieving this outcome will be able to:

- Recognize, assess, and demonstrate the skills and behaviors that promote academic and professional development
- Recognize, assess, and practice lifestyle choices that promote personal health and well-being
- Demonstrate the professional skills necessary for successful employment

A sample of courses that achieve these outcomes are listed below:

- 1. CIS 201, CIS 210, CIS 231, CIS 232, CIS 233, and CIS 241 require comprehensive final examinations to promote the rigor of study behaviors necessary for success in four-year university systems.

Several classes have capstone projects that promote professional development.

These include:

- CIS 203 - IOS Development I - Semester App project
- CIS 204 - IOS Development II - Semester App project
- CIS 207 – Android Development I - Semester App project
- CIS 208 - Android Development II - Semester App project
- CIS 210 – Introduction to Computer Applications – Integrated Business Project.
- CIS 215 – Advanced Business Applications – Advanced Integrated Business Project.
- CIS 233 – Fundamental Computer Science III Data Structure Implementation

ILO 2. Critical Thinking and Communication

Students achieving this outcome will be able to:

- Analyze and evaluate their own thinking processes and those of others
- Communicate and interpret complex information in a clear, ethical, and logical manner

1. Algorithmic thinking is a key part of computer science. Students must look at problems and decompose them into smaller problems. They must then develop algorithms to solve the sub-problems and the overall problem.
2. Students must analyze their algorithms in order to determine the best way to implement a solution via programming code. They must not only determine the best constructs to use but also customize them using pattern-matching. Solutions need to be optimized using a combination of course content and practice.
3. Students need to evaluate all tasks and sub-tasks of a program in order to ascertain what algorithms and data structures are most appropriate for that particular task. Once they have identified the best options they need to select and implement those components as appropriate for the task, customizing as necessary.
4. Students must be able to communicate their decisions in writing and/or orally with an appropriate level of technical detail. This requires careful analysis of the problem as well as the most appropriate terms for communicating the key elements of that problem.

### ILO 3. Scientific and Environmental Understanding

Students achieving this outcome will be able to:

- Draw conclusions based on the scientific method, computations or experimental and observational evidence
- Construct and analyze statements in a formal symbolic system
- Analyze the relationship between people's actions and the physical world
- Make decisions regarding environmental issues based on scientific evidence and reasoning

The CIS program fosters scientific and environmental understanding through extensive quantitative analysis in CIS 231, CIS 232, CIS 233, and CIS 241. Students are given a problem to solve which then requires the student use a symbolic system to construct a series of statements, then analyze the results and refine the statement constructs to successfully address the problem at hand.

### ILO 4. Social, Historical, and Global Knowledge and Engagement

Students achieving this outcome will be able to:

- Analyze, evaluate, and pursue their opportunities and obligations as citizens in a complex world
- Demonstrate understanding of world traditions and the interrelationship between diverse groups and cultures
- Students demonstrate an understanding the role of computers in a modern global economy through the development of: web-based application in: CIS 103 and 106; as well as computer apps in: CIS 203, CIS 204, CIS 207 and CIS 208. These apps are specifically designed to meet the need of the global economy.

ILO 6. Technical and Informational Fluency

Students achieving this outcome will be able to:

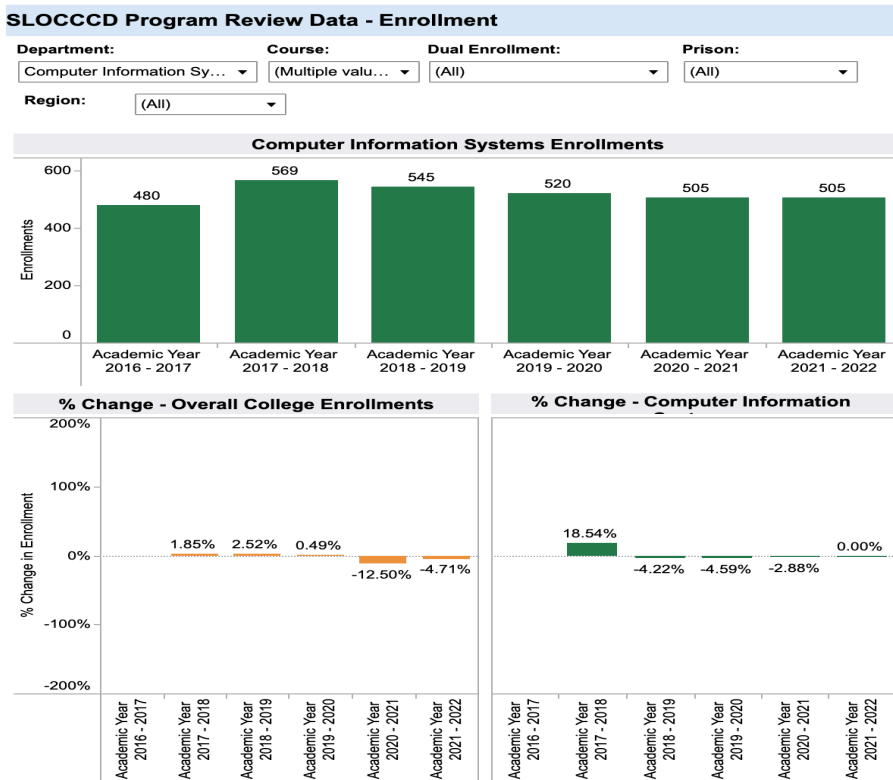
- Recognize when information is needed, and be able to locate and utilize diverse sources effectively and ethically
- Produce and share electronic documents, images, and projects using modern software and technology

**IV. PROGRAM DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS**

**(Where applicable the success metrics are aligned with the Student Success Metrics/SCFF).**

The data components are hyperlinked below. Below are statistics for our core transferable courses CIS201, CIS231, CIS232, CIS233.

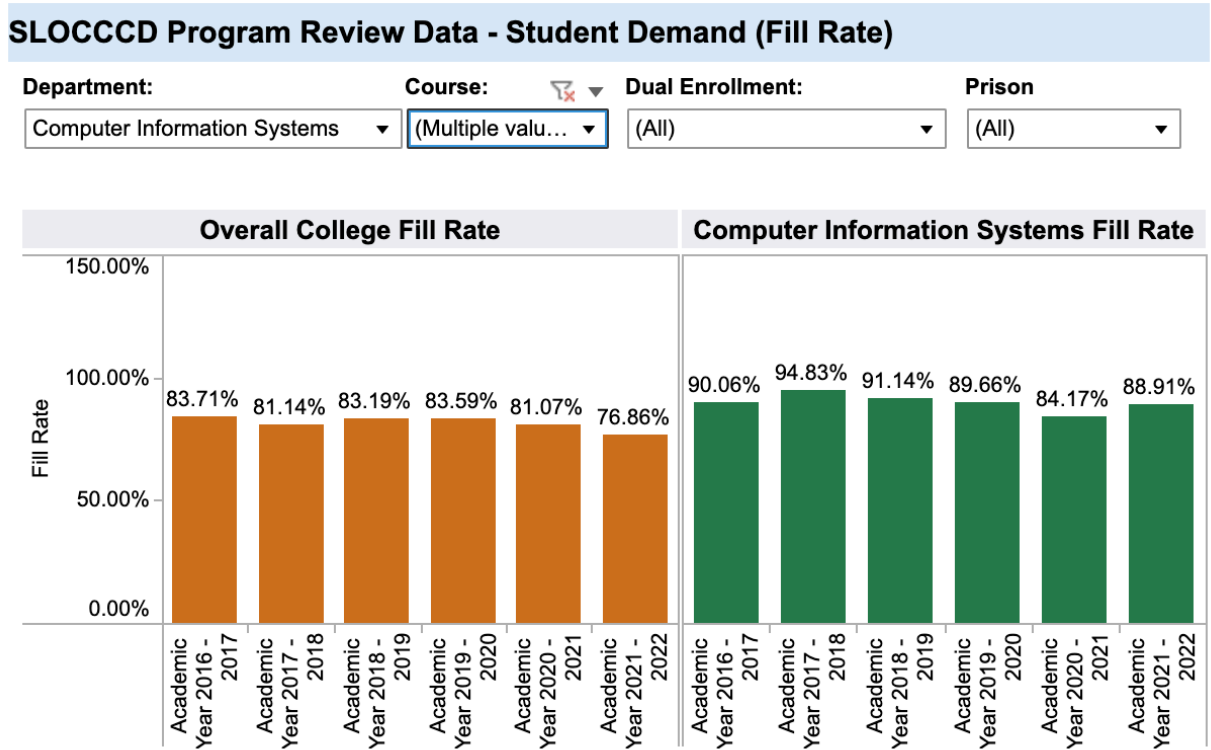
A. [General Enrollment \(Insert Aggregated Data Chart\)](#)



Enrollment: Duplicated count of students who completed greater than 0 units in positive attendance courses or were present on census for all other accounting methods.

The CIS program’s enrollment was far less impacted by the COVID pandemic during the 2020-2021 school year. The program’s enrollment was only down -2.88% (15 students) compared to the college-wide decline of -12.50%.

B. [General Student Demand \(Fill Rate\) \(Insert Aggregated Data Chart\)](#)



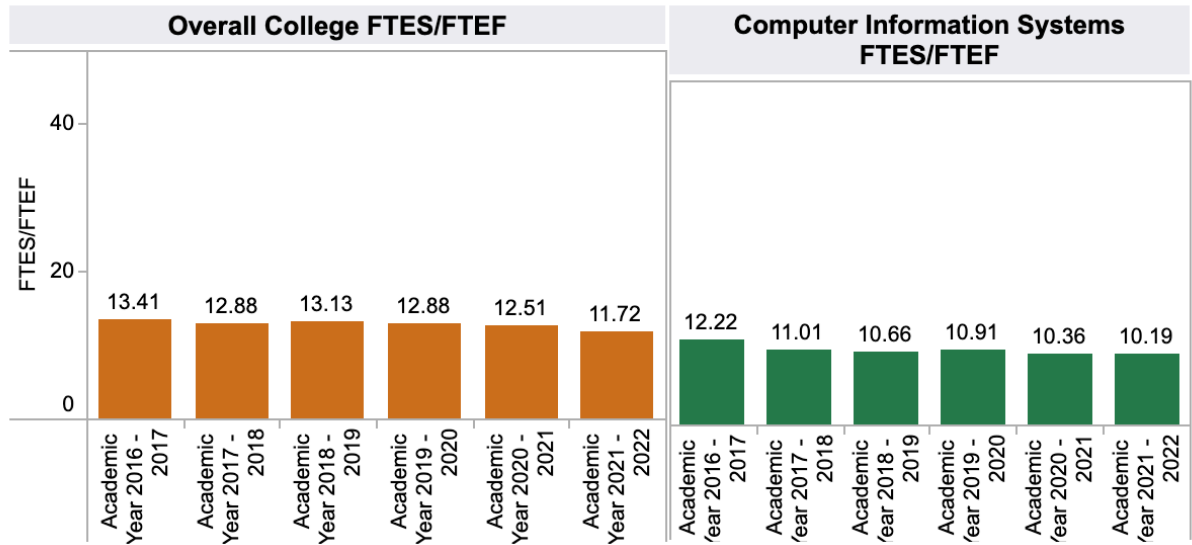
Fill Rate: The ratio of enrollments to class limits. Cross listed class limits are adjusted appropriately. Also, courses with zero class limits are excluded from this measure.

This CIS program’s fill rate did decline at a slightly higher rate during the 2020-2021 school year, the program has since rebounded to near pre-COVID levels,, and in 2021-22 was more than 12 points higher than the college average.

C. [General Efficiency \(FTES/FTEF\) \(Insert Aggregated Data Chart\)](#)

## SLOCCCD Program Review Data - Efficiency (FTES/FTEF)

Department: 
 Course: 
 Dual Enrollment: 
 Prison:



FTES/FTEF: The ratio of total FTES to Full-Time Equivalent Faculty  
 $(\text{SXD4 Total-Hours}/17.5)/\text{XE03 FACULTY-ASSIGNMENT-FTE}$

The CIS program has relatively lower class sizes compared to some transferrable programs but has been able to maintain a consistent efficiency rate over the years. The program is somewhat impaired by a low efficiency rate of CIS 201. This course is offered more widely in order to provide introductory access to computing to as many students as possible, no matter what their previous background. If CIS 201 is omitted, the 2021-2022 efficiency rate is 12.61, above the college average.

D. [Student Success—Course Completion by Modality \(Insert Data Chart\)](#)

## SLOCCCD Program Review Data: Successful Course Completion

Select Department:

Computer Information Systems

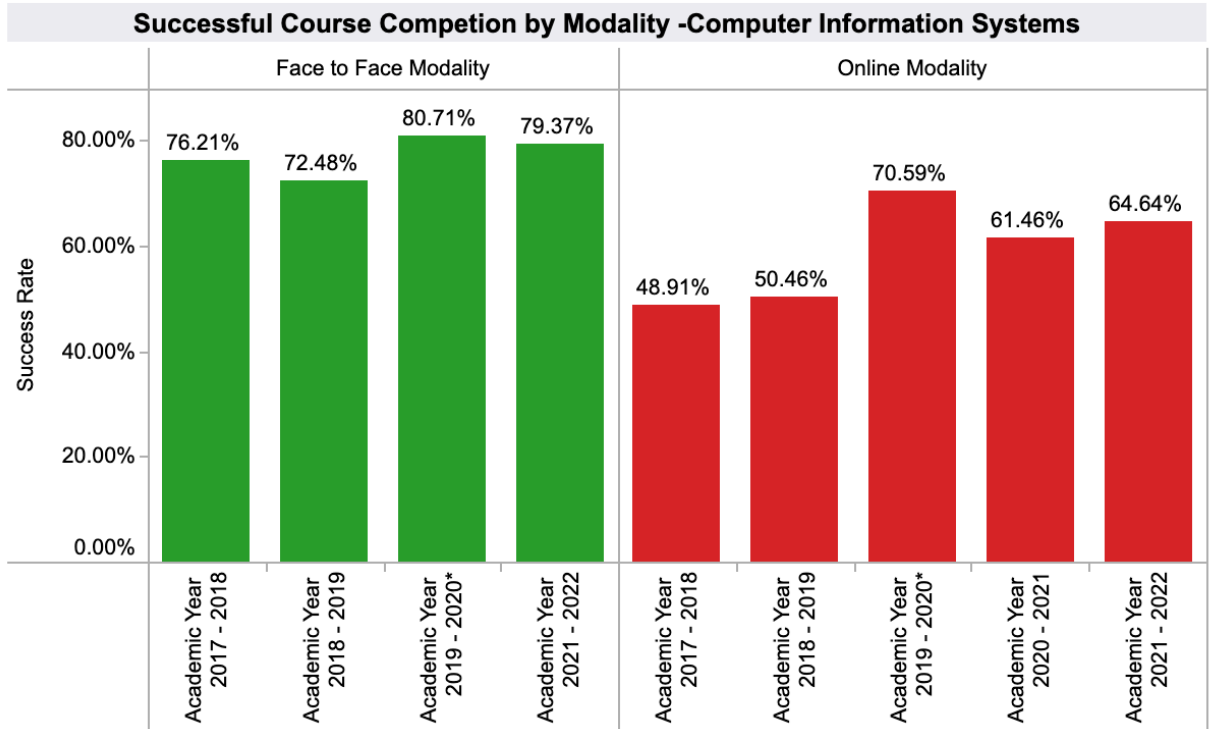
Course:

(Multiple values)

Legend:

Face to Face Modality

Online Modality



### Successful Course Completion by Modality Table - Computer Information Systems

		Academic Year 2017 - 2018	Academic Year 2018 - 2019	Academic Year 2019 - 2020*	Academic Year 2020 - 2021	Academic Year 2021 - 2022
Face to Face Modality	Department Success Rate	75.81%	72.58%	81.69%		81.41%
	Total Department Enrollments	740.0	723.0	509.0		167.0
Online Modality	Department Success Rate	66.57%	59.71%	71.40%	65.03%	64.97%
	Total Department Enrollments	359.0	278.0	538.0	971.0	773.0

The CIS program is one of the more difficult programs in the college and as such is unlikely to have one of the higher marks in this area. However, the program has a similar Face to Face Modality success rate compared to the college. While the Online Modality success rate is below the college average, it has been climbing post-COVID and is significantly higher than past rates.



E. [Degrees and Certificates Awarded \(Insert Data Chart\)](#)

Program Awards Table								
Award Type	Award	2016	2017	2018	2019	2020	2021	2022
AS	Computer Science (AS)	8	10	10	11	6	11	7
	<b>Total</b>	8	10	10	11	6	11	7
CS	Android Developer (CS)	2				1	6	
	<b>Total</b>	2				1	6	
<b>Grand Total</b>		10	10	10	11	7	17	7

Program Awards: The number of degrees and certificates awarded by program type

While the program has been consistent in AS degree recipients, the COVID-19 pandemic had a clear impact on degree completion. The program was able to rebound during the full COVID year, though there was a drop thereafter. Overall enrollment numbers are good so the program could show a strong recovery in the coming years. It should also be noted that many students in this program transfer and/or receive gainful employment before completing their AS.

F. [General Student Success – Course Completion \(Insert Aggregated Data Chart\)](#)

The CIS program is one of the most challenging in the college and therefore will not have the same completion levels as most programs. The program is consistently about 6% below the college average, paralleling any gains/losses in the college average.

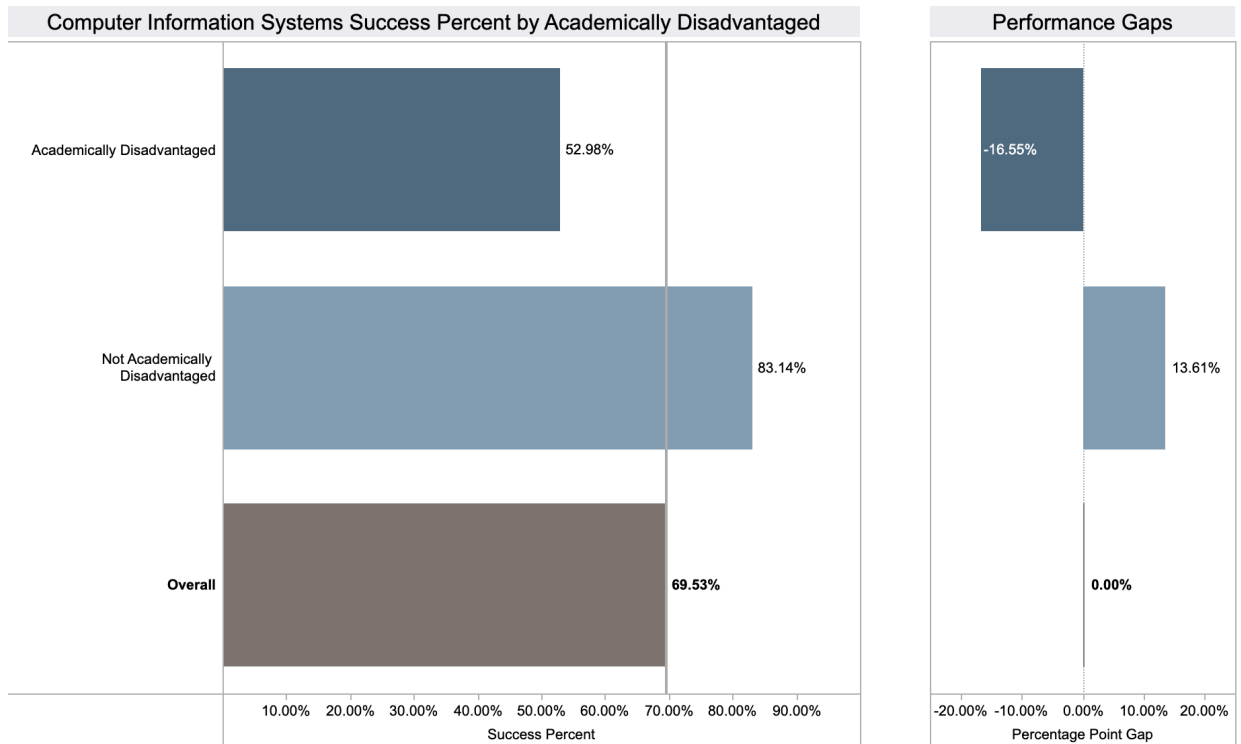
What resources might you need to meet and exceed the Institutional Set Standard?

G. Review the [Disaggregated Student Success](#) charts; include any charts that you will reference. Describe any departmental or pedagogical outcomes that have occurred as a result of programmatic discussion regarding the data presented.

The following are some questions you might want to consider:

- What strategies have you implemented to address equity gaps in the classroom?
- What type of professional development opportunities are your program faculty participating in to address equity in the classroom?
- What resources might you need to minimize equity gaps?

## Successful Course Completion by Student Subpopulation



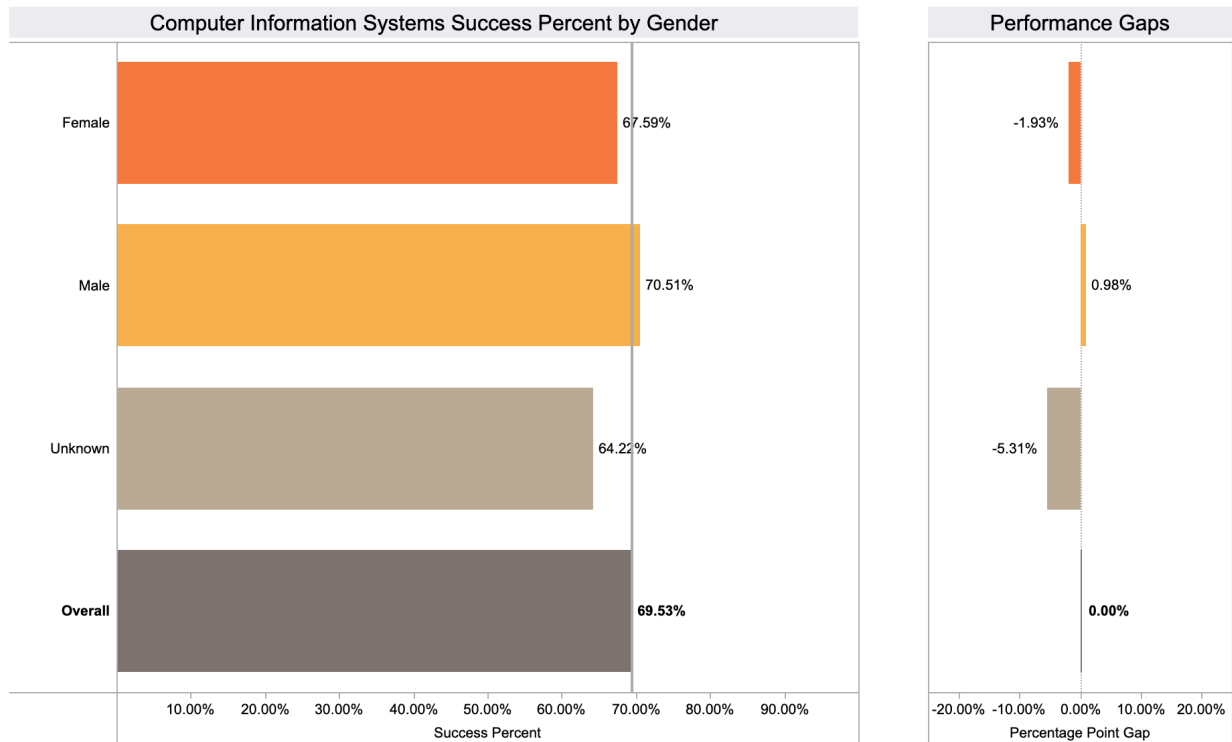
**Note:** Successful Course Completion is the ratio of enrollments resulting in a final grade of A, A-, B+, B, B-, C+, C, CR or P to all valid grades.

The CIS program does have a gap with academically disadvantaged students. This is unsurprising given the difficulty of the material. The availability of computer science on the high school level, as well as its applicability for college-level study, varies widely. This can create gaps if students have not had access to the material (even on an extracurricular level) prior to college.

The program has historically been proactive in providing online and hybrid sections to increase the availability of our course to high school students, as well as being an early adopter of Dual Enrollment at several local high schools.

The program instituted the CIS 201 course in the 2000s to help address these issues. The course has no prerequisites and is designed for students with no previous exposure to computer science. This course is an advisory for our core CIS 231 course. CIS 201 has been chosen as our dual enrollment course as it offers everyone a chance at success while putting them on an articulation path to college.

## Successful Course Completion by Student Subpopulation



**Note:** Successful Course Completion is the ratio of enrollments resulting in a final grade of A, A-, B+, B, B-, C+, C, CR or P to all valid grades.

The computer science field is a notoriously poor performer in the area of gender balance, especially as of late. However we have a long history of female students who have succeeded at Cuesta and beyond, many of whom are working in the industry. As the chart demonstrates, there is a very small gender disparity when it comes to success in our program.

As a program we have always strived (despite said gender balance issues) to hire as diverse a group of part-time instructors as the application pools have allowed, including a significant number of female instructors over the past 20 years.

## V. PROGRAMS AND CURRICULUM REVIEW

### A. Programs Review

- a. Review the CurricUNET “Program of Study” outline for each program and indicating yes/no for each program/certificate.

<b>Program/Certificate Title</b> (include all those programs and certificates that were active at the time of the last CPPR).	Currently active	<b>New program since last CPPR</b> (if yes, include active date)	<b>Program modified since last CPPR</b> (if yes, include modified date)	<b>Deactivated since last CPPR</b> (if yes, include deactivation date)
Android Developer / Certificate of Specialization	Yes	No	No	No
Cloud Computing / Certificate of Specialization	Yes	Yes	No	No
Computer Science / AS	Yes	No	No	No
Internet Application Developer / Certificate of Specialization	Yes	No	No	No
iOS Developer / Certificate of Specialization	Yes	No	No	No
Management Information Systems / AS	Yes	No	No	No

- b. **For all Currently Active Programs/Certificates**, review the CurricUNET “Program of Study” outline for each active program/certificate and complete the table by indicating yes/no for each column.

<b>Program/Certificate Title</b> (include only those programs/certificates that are active).	Required courses and electives (including course numbers, titles, and	Program description is current	Program Learning Outcomes are accurate and include method of assessment.	If any answers are “no” for a program, please enter a date (MM/DD/YYYY) in the next 5 years by which the program will be corrected.

	credits) are accurate			
Android Developer / Certificate of Specialization	Yes	Yes	Yes	
Cloud Computing / Certificate of Specialization	Yes	Yes	Yes	
Computer Science / AS	Yes	Yes	Yes	
Internet Application Developer / Certificate of Specialization	Yes	Yes	Yes	
iOS Developer / Certificate of Specialization	Yes	Yes	Yes	
Management Information Systems / AS	Yes	Yes	Yes	

## B. Curriculum Review

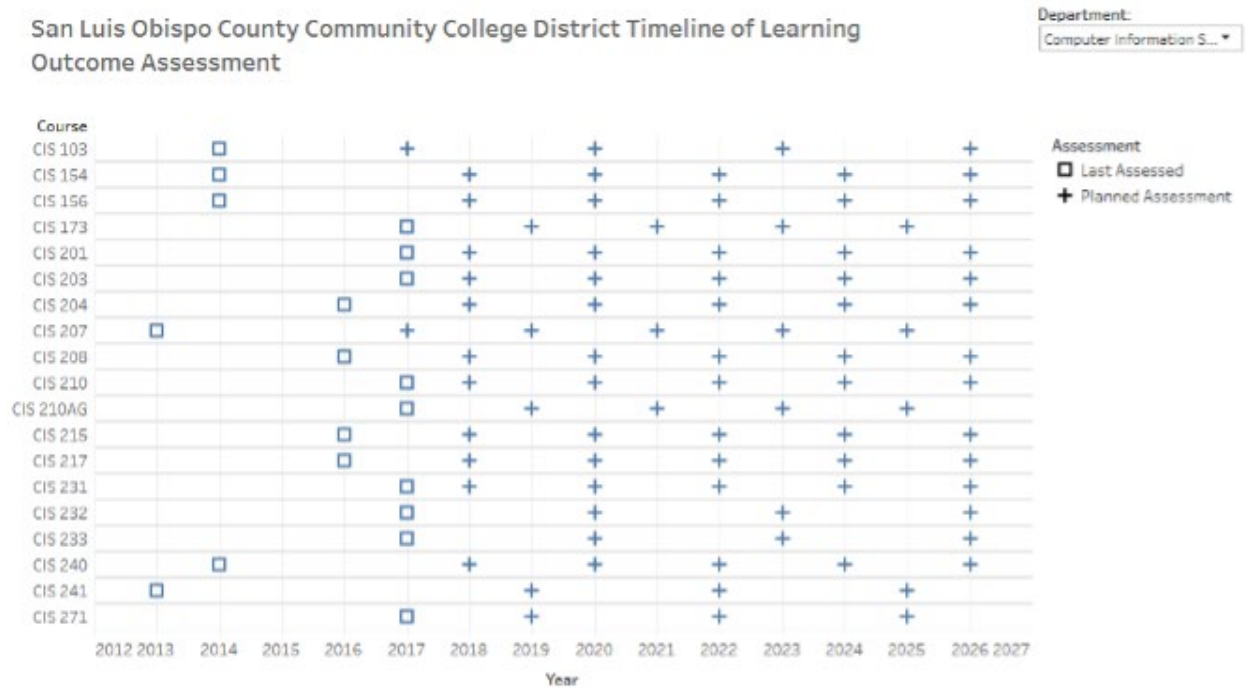
Complete the Curriculum Review Worksheet ([download from this folder](#)) and submit the form with your CPPR.

Based on information that you enter, the template will create a 5-year calendar for your program to follow during which any modifications to the Course Outline of Record determined during the curriculum review.

**What is the purpose of the worksheet?** Completing the worksheet provides evidence that the curriculum (including course delivery modalities) have been carefully reviewed during the past five years for currency in teaching practices, compliance with current policies, standards, regulations, and with advisory committee input. The form requires you to include evidence that you have reviewed that the entries on the course outline of record (CurricUNET format) are appropriate and complete.

**VI. PROGRAM OUTCOMES, ASSESSMENT AND IMPROVEMENTS**

A. Attach or insert the assessment calendar for your program for the next program review cycle.



B. Have you completed all course assessments in eLumen? If no, explain why you were unable to do so during this program review cycle and what plan(s) exist for completing this in the next program review cycle.

C. Include the most recent “PLO Summary Map by Course” from eLumen which shows the Course-level SLOs mapped to the Program-level SLOs.

D. **Map Origin:** AS\_COMP\_SCI

E. **Map Target:** AS\_COMP\_SCI

F.

G.

**AS\_COMP\_SCI**

<p style="text-align: center;"><b>AS_COMP_SCI</b></p> <p><b>SLOs</b></p>	<p>Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.</p>	<p>Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.</p>	<p>Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.</p>	<p>Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.</p>
<p style="text-align: center;"><b>CHEM201A</b></p>				
<p>Communicate chemical concepts through the use of molecular formulas, structural formulas, and names of compounds.</p>				X
<p>Describe the chemical and physical properties of a chemical substance based on the atomic and molecular structure including orbital theory, the type of chemical bond, and the shape of the molecule.</p>				X
<p>Evaluate and interpret numerical and chemical scientific information.</p>				X
<p>Perform laboratory experiments based on gravimetric, volumetric, qualitative and instrumental analysis techniques, and effectively utilize the appropriate experimental apparatus.</p>				X
<p>Solve stoichiometry problems, including mass/mass, mass/volume, and volume/volume relationships.</p>				X

H. I.		AS_COMP_SCI			
		Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
AS_COMP_SCI					
SLOs					
<b>CHEM201B</b>					
Use chemical evidence to develop a qualitative analysis scheme, and use the scheme for the determination of unknown cations in solution					X
Evaluate and interpret numerical and chemical scientific information, including the determination of a rate law or equilibrium constant based on experimental data.					X
Solve mathematical problems in chemistry, including equilibrium calculations, kinetics, electrochemistry, and energetics.					X
Communicate chemical concepts through the use of molecular formulas, structural formulas, and names of compounds.					X
Perform laboratory experiments based on qualitative, gravimetric, volumetric, and instrumental analysis techniques and effectively utilize the appropriate experimental apparatus and technology.					X
<b>CIS201</b>					
Describe the software development life cycle.		X	X		X



SLOs		AS_COMP_SCI			
		Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
<b>AS_COMP_SCI</b>					
Describe the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology.		X	X	X	X
Explain what an algorithm is and its importance in computer programming.		X	X		X
<b>CIS231</b>					
Demonstrate an understanding of the fundamental concepts of computing.		X	X		X
Identify and analyze the component parts of problems of moderate complexity.		X			X
Formulate algebraic expressions that describe mathematically the solutions to problems which are presented verbally.		X			X
Construct modular algorithmic problem solutions using modern software engineering techniques.		X			X
Use a modern high-level programming language to write computer programs which will implement previously defined algorithms.		X			X

L. M.		AS_COMP_SCI			
		Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
<b>SLOs</b>	<b>AS_COMP_SCI</b>				
	Devise test procedures that prove logically and mathematically that a computer program performs correctly and accurately.	X			X
	Demonstrate the ability to make use of new tools, environments, and languages without assistance.	X	X		X
	Demonstrate an awareness of social and ethical issues in computing.	X	X	X	X
	Employ basic graphical user interfaces and the use of their related components.	X			X
	Apply basic software engineering concepts.	X	X		X
	Apply the principles of interface, inheritance and class hierarchy.	X			X
	<b>CIS232</b>				
	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language.	X	X	X	X
	Apply procedural and object oriented methods in developing computer software.	X			X
Use classic algorithmic techniques such as recursion, exception, sorting and searching.	X			X	

SLOs		AS_COMP_SCI			
		Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
AS_COMP_SCI					
Perform simple formal and empirical analysis of algorithms.		X	X	X	X
Define the Abstract Data Types covered, including arrays, vectors, collections, lists, stacks, queues and collections.		X			X
<b>CIS233</b>					
Contrast array and linked implementations of the Abstract Data Types.		X			X
Use the Abstract Data Types in applications.		X			X
Analyze for performance the algorithms used for methods in the Abstract Data Types.		X	X		X
Define the shortest distance, minimal spanning tree, iteration, search and sorting algorithms covered, including bubble sort, insertion sort, merge sort, heapsort, and quicksort.		X			X
Employ by hand examples of the shortest distance, minimal spanning tree, iteration, search, and sorting.		X			X

Demonstrate and test the shortest distance, minimal spanning tree, iteration, search, and sorting algorithms through generic programs.	X	X		X
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SLOs		AS_COMP_SCI			
		Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
	<b>AS_COMP_SCI</b>				
Analyze for performance the algorithms used for shortest distance, minimal spanning tree, iteration, search and sorting.		X	X		X
Evaluate correctness and effectiveness of procedures.		X	X	X	X
<b>CIS240</b>					
Examine the Von Neumann architecture model and basic computer components.		X			X
Analyze Instruction Set Architecture (ISA) and hardware.		X	X		X
Design low level programs using basic control structures.		X			X
Investigate assembly process.		X	X		X
Examine Input / Output methods and instructions.		X			X
Analyze stack operation.		X			X
Analyze C language constructs assembly language.		X			X
<b>CIS241</b>					

Apply the theory of sets to the description and development of equivalence and order relations, equivalence classes and well ordered sets, and the definition of one-one, onto, and invertible functions.	X	X		X
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<p>R. s.</p> <p><b>AS_COMP_SCI</b></p> <p><b>SLOs</b></p>	<b>AS_COMP_SCI</b>			
	<p>Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.</p>	<p>Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.</p>	<p>Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.</p>	<p>Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.</p>
	<p>Use the concepts and techniques of propositional and predicate logic to describe the structure of mathematical proofs (including mathematical induction), analyze control structures in computer programs and algorithms, and determine program correctness.</p>	<p>X</p>	<p>X</p>	<p>X</p>
	<p>Use basic combinatorial concepts (inclusion-exclusion and pigeonhole principles, permutations and combinations) to derive the binomial theorem, solve recurrence equations, and analyze and compare the complexity of algorithms.</p>	<p>X</p>	<p>X</p>	<p>X</p>
<p>Demonstrate different traversal methods for trees and graphs and apply these concepts to the determination of optimal spanning and routing trees, and the development and analysis of efficient searching and sorting algorithms.</p>	<p>X</p>	<p>X</p>	<p>X</p>	

Derive the basic principles of discrete probability theory (independence, conditional probability, and Bayes' theorem) using the theory of sets, and apply these concepts to the definition of discrete random variables, and the derivation of the Law of Large Numbers.	X	X	X	X	
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SLOs		AS_COMP_SCI			
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<b>AS_COMP_SCI</b>					
<b>MATH265A</b>					
Compute limits algebraically, graphically and using L'Hopital's rule.					X
Compute derivatives of single-variable functions using product rule, quotient rule, chain rule, and differentiation rules for polynomials, trigonometric, inverse trigonometric, exponential, and logarithmic functions.					X
Apply derivatives to investigate the graphs of functions through tangent lines, extrema, and concavity.					X
Apply derivatives to solve related rates and optimization problems.					X
Evaluate definite and indefinite integrals of single-variable functions using Riemann sums, basic integration rules, and substitution.					X
Apply definite integrals to find areas and the average value of a function.					X
<b>MATH265B</b>					

Solve integration problems using methods such as substitution, parts, trigonometric substitution, tables, and partial fractions.				X
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V. w.	<b>AS_COMP_SCI</b>			
	Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
<b>SLOs</b>	<b>AS_COMP_SCI</b>			
Use Riemann sums and integration to solve problems that apply to fields like geometry, physics, economics, and probability theory.				X
Use algebraic, geometric and numeric techniques to analyze and solve differential equations.				X
Analyze numeric series and power series and utilize these series to approximate functions. Determine series convergence using tests such as the Integral Test, Ratio Test, Comparison Test, Limit Comparison Test, nth Term Test and Alternating Series Test.				X
Combine vectors through addition, subtraction, scalar multiplication, dot product and cross product.				X
<b>PHYS208A</b>				
Apply work-energy equations when appropriate to solve problems in mechanics				X
Perform laboratory experiments effectively utilizing appropriate experimental apparatuses				X
Solve static and dynamic systems by utilizing Newton's Laws of Motion				X

X.  
y.

		AS_COMP_SCI			
		Achieve a core understanding of Computer Science principles commensurate with that of the first two years of any university program and the ACM Guidelines Associate-Degree Curricula in Computer Science.	Develop verbal and non-verbal communication skills that empower students to be credible and able to advance in a diverse workplace.	Employ a code of ethics and standards consistently and appropriately in the workplace to develop skills for leadership, teamwork, and personal improvement to achieve one's potential.	Exhibit the ability to evaluate information sensibly and consistently in making decisions and solving problems dealing with professional and personal issues/concerns.
<b>SLOs</b>	<b>AS_COMP_SCI</b>				
	Utilize impulse and momentum concepts to solve problems				X
	<b>PHYS208B</b>				
	Analyze and compute electric and magnetic forces, fields, and energy				X
	Describe the mechanics of wave motion by utilizing Newton's Laws of Motion				X
	Model optical systems				X
	Perform laboratory experiments effectively utilizing appropriate experimental apparatuses				X

Z.

**CC. ILO/PLO Summary Map by Course/Context**

DD.

EE.

FF. **Map Origin:** AS\_MGMT\_INFO

GG. **Map Target:** AS\_MGMT\_INFO

HH.

II.

		AS_MGMT_INFO			
		Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
SLOs	AS_MGMT_INFO				
<b>BUS201A</b>					
Analyze accounting information.			X		
Demonstrate understanding of accounting terminology, principles and procedures.			X		
Prepare accounting information following generally accepted accounting principles.			X		
Demonstrate effective written and oral communication. This includes demonstrating professional and ethical behaviors and using technology effectively.			X		
<b>BUS201B</b>					
Analyze financial data to form business decisions for planning, directing and controlling a business.			X		
Demonstrate understanding of accounting terminology, procedures and functions within a business.			X		

Prepare accounting information for internal and external users using various costing models.				
			X	

JJ. KK.	<b>AS_MGMT_INFO</b>			
<b>AS_MGMT_INFO</b>	Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
<b>SLOs</b>				
Demonstrate effective written and oral communication. This includes demonstrating professional and ethical behaviors and using technology effectively.			X	
<b>BUS218</b>				
Identify the different sources and types of American law and demonstrate how American law is created, changed, and classified.			X	
Distinguish between the ethical and social responsibilities in the field of business that are imposed by law versus by custom.			X	
Use the IRAC (Issue, Rule, Analysis, Conclusion) method to analyze legal cases.			X	
Describe the federal and state court systems along with court procedures such as litigation and alternative dispute resolution procedures such as mediation and arbitration and the use of these procedures in resolving business disputes.			X	
Differentiate among the different areas of substantive law relevant to business such as contract, tort, and property law and describe the impact these areas of the law have on the field of business.			X	

LL. MM.  <b>AS_MGMT_INFO</b> <b>SLOs</b>		<b>AS_MGMT_INFO</b>			
		Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
Apply the knowledge acquired in this course to make legal and business decisions based on reasoned analysis and application of legal principles.				X	
<b>CIS201</b>					
Describe the software development life cycle.		X			
Describe the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology.		X			
Explain what an algorithm is and its importance in computer programming.		X			
<b>CIS210</b>					
Demonstrate an understanding of the development and use of information systems in business.		X			
Discuss security, ethical and privacy issues resulting from the use of computer technology.		X			
Demonstrate the process to create basic word processing documents, spreadsheets, databases and presentation software.		X			



NN. oo.		<b>AS_MGMT_INFO</b>			
<b>SLOs</b>	<b>AS_MGMT_INFO</b>	Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
Demonstrate application of the information systems concepts and methods through the completions of a comprehensive project using computer-based-solutions to business problems.		X			
<b>CIS215</b>					
Apply a professional understanding of intermediate to advanced skills in word processing, spreadsheets and database application software.					X
Demonstrate the ability to apply advanced skills in word processing, spreadsheet applications and database software through the creation of an integrated project.					X
Demonstrate proficiency at analyzing business scenarios using word processing, spreadsheet and database software.					X
<b>CIS231</b>					
Demonstrate an understanding of the fundamental concepts of computing.		X			
Identify and analyze the component parts of problems of moderate complexity.		X			

Formulate algebraic expressions that describe mathematically the solutions to problems which are presented verbally.		X			
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PP. QQ.  <b>AS_MGMT_INFO</b> <b>SLOs</b>		<b>AS_MGMT_INFO</b>			
		Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
Construct modular algorithmic problem solutions using modern software engineering techniques.		X			
Use a modern high-level programming language to write computer programs which will implement previously defined algorithms.		X			
Devise test procedures that prove logically and mathematically that a computer program performs correctly and accurately.		X			
Demonstrate the ability to make use of new tools, environments, and languages without assistance.		X			
Demonstrate an awareness of social and ethical issues in computing.		X			
Employ basic graphical user interfaces and the use of their related components.		X			
Apply basic software engineering concepts.		X			
Apply the principles of interface, inheritance and class hierarchy.		X			
<b>CIS232</b>					
Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language.		X			

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SLOs	AS_MGMT_INFO			
	Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
Apply procedural and object oriented methods in developing computer software.		X		
Use classic algorithmic techniques such as recursion, exception, sorting and searching.		X		
Perform simple formal and empirical analysis of algorithms.		X		
Define the Abstract Data Types covered, including arrays, vectors, collections, lists, stacks, queues and collections.		X		
<b>ECON201A</b>				
Illustrate the economic way of thinking, including but not limited to: marginal analysis, opportunity cost, and how people respond to incentives.			X	
Identify assumptions of economic models and use economic models to make predictions of outcomes when factors in the economy change.			X	
Calculate and critically analyze key economic variables such as unemployment, inflation and national income.			X	
Evaluate factors that contribute to economic growth.			X	

SLOs		AS_MGMT_INFO			
		Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate proficiency in business applications of spreadsheets and database to solve business problems. (CAOA 261, CAOA 264)
Identify the role that monetary policy, fiscal policy and international trade play in shaping the national economy.				X	
<b>ECON201B</b>					
Utilize microeconomic concepts and models to critically evaluate and make predictions of outcomes in the short and long run when factors in the economy change.				X	
Illustrate economic perspective and analysis when responding to choices.				X	
Critically evaluate issues of the economy as they pertain to microeconomic analysis; including but not limited to, market failure, income inequality, and international trade and finance.				X	
<b>MATH255</b>					
Determine derivatives of functions involving constants, sums, differences, products, quotients, real numbered powers, and the composition of two or more functions.		X			
Determine derivatives of functions involving exponentials, logarithms or combinations of these functions.		X			

VV. ww.		AS_MGMT_INFO			
		Apply the methods of differential calculus to solve problems involving functions unique to business applications. (MATH 255)	Analyze problems, design algorithms, and implement and test the algorithm in a modern object oriented programming language. (CIS 201, CIS 231, CIS 232)	Apply concepts of accounting, business law and economics to solve business orientated problems. (BUS 201 A&B, BUS 218, ECON 201 A&B)	Demonstrate business appl spreadsheets solve business (CAOA 261, C
AS_MGMT_INFO					
SLOs					
Determine the indefinite integral of functions involving powers, exponentials, logarithms or combinations of these functions.	X				
Evaluate definite integrals using integration by substitution and the fundamental theorem of calculus.	X				
Apply the methods of differential calculus to solve problems involving functions unique to business applications.	X				

XX. Include the most recent "ILO Summary Map by Course" from eLumen that shows the Course-level SLOs mapped to the Institutional Learning Outcomes.

YY. Highlight changes made at the course or program level that have resulted from SLO assessment. Please include the evidence of dialog that prompted these changes.

ZZ. Identify and describe any budget or funding requests that are related to student learning outcome assessment results. If applicable, be sure to include requests in the Resource Plan Worksheet ([download from this folder](#)) and review the [Resource Allocation Rubric](#).

**VII. PROGRAM DEVELOPMENT**

Indicate how the program supports efforts to achieve any of the following:

- A. Institutional Goals and Objectives
- B. Institutional Learning Outcomes
- C. Program outcomes

The CIS program will continue to offer courses in the Distance Education and Hybrid modality and increase their availability. The program has engaged with local high schools to not only continue with but also expand Dual Enrollment to any interested schools.

Additionally CIS faculty and Cuesta staff worked with Lucia Mar School district to create a dual computer lab similar to that on the San Luis Obispo campus on the campus of Central Coast New Tech High School. This lab allowed the college to enhance and expand the success in dual enrollment as well as enabling Cuesta College to offer CIS courses in the South County. This resource could be reactivated if the college decides to make South County a priority.

CIS is an extremely dynamic field and arguably the most dynamic at the college. Several of our courses involve technologies that did not exist in their current form as recently as ten years ago. Other areas have grown in importance, especially for the job market. As such this program is one of the most active in the college in the area of curriculum development. Cuesta CIS faculty regularly engage with industry as well as learn new developments in the field.

Indicate any anticipated changes in the following areas:

A. Curriculum and scheduling

We now currently offer extensive set of offerings in Cloud Computing that leads to a certificate, as well as multiple industry certifications. Curriculum addressing web development will be looked into to address new opportunities to create more courses should there be sufficient instructor resources. Scheduling will continue to offer degree courses within a year rotation.

CIS has continued to experience a phenomenal growth rate, even with its inherent challenges due to lack of full-time faculty and the difficulty in recruiting/retaining part-time instructors given the excellent salaries available in industry. This situation was further impacted by the retirement of full time instructor Michele McAustin after the 2017-2018 school year. This position has yet to be replaced.

New sections fill immediately when we have been given the opportunity to offer them. Our biggest challenge is finding qualified faculty to teach these and potentially new course as the field continues to broaden. This also may require faculty to undergo extensive training, which is very detailed and very time-intensive.

B. Support services to promote success, persistence and retention

None at this time, as the program was well-prepared for the shift to increased online teaching.

C. Facilities needs

Given the significant shift (which was apparent even pre-pandemic), the need for on-campus instructional facilities has lessened. The 3413 lab classroom was recently refreshed with a current model Macs. The 3412 room is not actively used and therefore does not require an update at the moment.

D. Staffing needs/projections

The CIS program currently has an on-going part-time hiring pool which still is unable to meet our growing needs. Additionally Cal Poly part time faculty are paid at least 50% higher than Cuesta College faculty, thus we lose many qualified part time faculty to Cal Poly. The program needs to have an additional full-time CIS faculty member to reliably manage growth.

Lastly, address any changes in strategy in response to the predicted budget and FTES target for the next program review cycle.

In order to meet the FTES target for the next academic year our major need is another full-time faculty member. Our program has grown significantly and has the potential to grow even more, faculty permitting.

## VIII. END NOTES

If applicable, you may attach additional documents or information, such as awards, grants, letters, samples, lists of students working in the field, etc.

The following pages include minutes from CIS Advisory Committee meetings since the last CPPR. Our next advisory committee meeting is tentatively scheduled for later in 2023.

CIS students have become very successful since leaving Cuesta. Students in the program have transferred to most if not all UC campuses, a majority of CSUs, and several schools out of state. Alumni have or are currently working for companies such as Google, Amazon, Microsoft, Apple, as well as several other companies.





**Computer Information Systems Advisory Meeting Minutes, Cuesta College**

**Friday, February 7, 2020**

\*\*\*\*\*

**In attendance:**

Faculty:

Randy Scovil (Full-Time Instructor, Computer Science Lead)

Robert Sfarzo, (Part-Time Instructor)

Bartt Frey (Dual Enrollment Instructor)

Industry:

Tim Burks, Apigee/Google

John Osumi, Icomera (formerly Bishop Peak Technology)\*

Ryan Shepherd, Databrook\*

Kyle Wiens, iFixit

Education:

Dr. Clinton Staley, Cal Poly Computer Science Professor

Paula Hodge, ICT Deputy Sector Navigator

Nathan Carrasco, CSUMB Student\*

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(\* ) Former Cuesta CIS Student

- After spirited spontaneous group discussions, Randy thanked everyone for participating, and everyone introduced themselves.
  
- **Overview of CIS Program:**
  - Randy shared that the program's enrollment is in the middle of another growth period, especially in CIS 231 and in the core computer science courses (CIS 201, 232, 233, 240-241).
  - Randy also mentioned that the program is continuing to offer courses in different modalities (face-to-face, hybrid, blended, fully online, shorter courses)
  - Summer enrollment doubled last year and is expected to grow.
  
- **Cloud Certificate and Courses:**
  - Bob Sfarzo presented an overview of the new Cloud Computing Certificate and the new courses.
  - Each of the four new cloud courses that form the core of the certificate leads to a specific AWS Cloud Certification.
  - Courses were offered beginning in Fall 2019 and all courses will be introduced over this and next year.
  - The certificate and the decision to offer AWS certification was very well received.
  - There was an extended discussion on different course topics that might be offered, especially relating to web client programming and development tools.
  - There was discussion on how these skills were already being addressed in the cloud courses as well as if CIS 201 might be an avenue for introducing more of these concepts beyond what is already part of the course.
  - There was also discussion on potential value of having a course focused on web development skills and having that as a potential degree option.
  - On the employability front the group seemed to feel that the cloud courses were on target as they offered certifications. Kyle suggested that it would be helpful to have student work lead to a portfolio that potential employers could review.
  
- **Regional Topics:**
  - Bob and Paula discussed the possibility of hosting a regional AWS training conducted by Amazon.
  - Bob and Paula also discussed local cybersecurity issues happening in the region.
  
- **Dual Enrollment:**
  - Cuesta began offering CIS 201 and CIS 210 at local high schools during the regular school day starting in Fall 2016.
  - The courses were initially offered at New Tech High School in Nipomo and Paso Robles High School, with San Luis Obispo High School coming on board this year. Other schools in the county may be participating as well.

- 
- Bartt Frey from Paso Robles High School and Bob Sfarzo both convey that the program is working well and that a cloud course could have strong potential for Dual Enrollment.
  - Once the assigned time had been exhausted all participants had contributed to the discussion and felt that their concerns had been heard. At that time the meeting was formally adjourned, and additional smaller conversations ensued.
- IX. **After completing and submitting this document, please complete the [Overall Program Strength and Ongoing Viability Assessment](#) with your Dean before **May 12, 2023**.**

## SIGNATURE PAGE

Faculty, Director(s), Manager(s), and/or Staff Associated with the Program

**Instructional Programs: All full-time faculty in the program must sign this form. If needed, provide an extra signature line for each additional full-time faculty member in the program. If there is no full-time faculty associated with the program, then the part-time faculty in the program should sign. If applicable, please indicate lead faculty member for program after printing his/her name.**

**Instructional Programs: All full-time director(s), managers, faculty and/or classified staff in the program must sign this form. (More signature lines may be added as needed.)**

Susan Kline, Div. Chair	<i>S. Kline</i>	3/23/23
Division Chair/Director Name	Signature	Date
Randy Scovil	<i>Randy Scovil</i> <small>Randy Scovil (Apr 24, 2023 16:14 PDT)</small>	Apr 24, 2023
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

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## SUPPLEMENTAL DOCUMENTS

### FACULTY HIRING PRIORITIZATION INFORMATION (IF APPLICABLE)

If your program requested a faculty position for consideration, please attach or embed the following worksheets that were presented to the College Council. The guidelines for faculty prioritization can be found here: [Faculty Prioritization Process Handbook](#)

#### APPLICABLE SIGNATURES:

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<b>Vice President/Dean</b>	<b>Date</b>
----------------------------	-------------

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<b>Division Chair/Director/Designee</b>	<b>Date</b>
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<b>Other (when applicable)</b>	<b>Date</b>
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The above-signed individuals have read and discussed this review. The Director/Coordinator, Faculty, and staff in the program involved in the preparation of the CPPR acknowledge the receipt of a copy of the Vice President/Dean's narrative analysis. The signatures do not necessarily signify agreement.






# 2023 CPPR - Instructional CIS Signed

Final Audit Report

2023-04-24

Created:	2023-04-24
By:	Susan Kline (susan_kline@cuesta.edu)
Status:	Signed
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