All Fields

2022-2023 Computer Science Program Review

Cover

Overview
Program Review Year

Title 2022-2023 Computer Science Program Review

Year of Last Comprehensive Review Fall 2016

Year of Last Mini Update, if applicable

Originator Estrada, Henry

Area Dean Dr. Antoinette Herrera

Division
Math, Sci. & Engineering

Department
Computer Science

Subject

- COMSC - Computer Science

Is this a review for a degree/certificate or all the courses in the subject?

Co-Contributors

*Co-Contributor must be chosen before proposal is launched

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Overview

Evergreen Valley College guides all students to pathways that reach their educational and career goals through equity-centered, innovative academic programs and support services. By creating a learning environment where everyone feels welcomed and supported, we are committed to a culture of inquiry, growth, and respect that creates an equitable society in which all can participate and prosper.

1.Student-Centered: We provide access to quality and efficient programs and services to ensure student success.

- **Access**
- **Curriculum and programs**
- **Services**

2. Community Engagement: We will transform the college image and enhance partnerships with community, business and educational institutions.

Areas of focus are:

- **Increase visibility**
- **Develop strategic partnerships**
- **Building campus community**

3.Organizational Transformation: We create a trusting environment where everyone is valued and empowered.

Areas of focus are:

- **Communication**
- **Employee development**
- **Transparent Infrastructure**

- **1. Provide a brief summary of your program. Please include a brief history and discuss any factors that been important to the program's development.**

The Computer Science department was first added to what is now the Division of Business and Workforce Development at Evergreen Valley College in the Fall of 1990. It was developed to meet the needs of students who were intending to transfer to the University of California and the California State University systems and complete their baccalaureate degrees in Computer Science and Computer Engineering. Reflecting the recommendations of the Association for Computing Machinery (ACM) for Computer Science in the first two years of college, the department developed four courses for transfer: COMSC 072 (Discrete Mathematics), COMSC 075 (Computer Science I), COMSC 076 (Computer Science II), and COMSC 081 (Computer Organization).

Qualified faculty from the Computer Information Systems (CIS) and Mathematics departments taught these courses. Discrete Mathematics and Computer Science I were taught in the Fall of 1990, and again in the Spring of 1991, in addition to Computer Science II. These three courses were subsequently offered every semester throughout the 1990's. The Computer Organization course was never offered. It was, at that time, an upper division course at San Jose State University, thus the vast majority of our students waited to transfer to San Jose State to take the course.

By the end of the 1990's, the program was offering two sections of COMSC 072 and COMSC 075, as well as one section of COMSC 076 every semester. To address this growth of offerings, the department hired its first full-time instructor in Computer Science in 1998. But in the early 2000's Silicon Valley fell into a high-tech recession with the advent of the "dot bomb", and our enrollment declined. The instructor that was hired to teach Computer Science had to fill his teaching load with courses offered by the new Computers and Information Technology (CIT) department to supplement his reduced load in Computer Science. He subsequently retired in 2011.

Between 2011 and 2014 the department offered one section each of COMSC 072 and COMSC 076 every fall term, and one section of COMSC 075 every spring term. Since these courses were taught by qualified faculty in the Division of Mathematics, Science, Engineering, the administration made the decision to move the Computer Science department from the Division of Business and Workforce Development over to the Division of Mathematics, Science, and Engineering.

As the demand for our Computer Science courses began to grow, qualified faculty developed two new computer science courses: COMSC 020 – Introduction to Computer Programming, and COMSC 077 – Computer Organization and Systems in 2014. The president of the college then decided to hire a new full-time instructor in Computer Science and charged him with developing a new AS-T in Computer Science. Henry Estrada, who had previously taught Computer Information Systems (CIS), Computers and Information Technology (CIT), and Mathematics at Evergreen Valley College, was given the full-time assignment in Computer Science. Mr. Estrada worked collegially with the Mathematics and Physics departments to develop new courses in their departments to support a new AS-T in Computer Science. The department also changed the name of COMSC 077 to Introduction to Computer Systems, and developed the new course COMSC 080 – Discrete Structures to replace COMSC 072 – Discrete Mathematics (which was moved to the Mathematics department) and developed the AS-T in Computer Science. The AS-T degree in Computer Science at Evergreen Valley College was approved by the state of California in the Summer of 2021.

Since our last program review in 2015, the number of sections offered by the Computer Science department grew from five in the Fall 2016 to 10 in the Fall 2020. Those 10 sections were taught by five faculty members, two were full-time and three were associate faculty. By the end of the Spring of 2021, one of our full-time faculty, who had joined the department in the Fall of 2020, left the department to transfer back to his previous position in CIT. Since the department now offered 12 sections, two additional associate faculty had to be hired. The department expects to offer as many as 20 sections by the Fall of 2023. If so, given the way course loads are calculated for Computer Science courses, the department will have to hire three additional associate faculty to accommodate this growing number of students who want to enroll in our courses. Part of this growth reflects a growing population of students that want to take our core courses to complete an AS-T in Computer Science. The rest is due to the growth of interest in our COMSC 020 – Introduction to Programming for non-majors, high school students who take our courses as part of our dual enrollment agreement with our feeder high schools, and the two elective courses, COMSC 078 and COMSC 079C, that were subsequently added to the Computer Science curriculum.

- **2. Please provide an update on the program's progress in achieving the goals (3 years) set during the last comprehensive program review.**

  These are the goals that were set by the department in our last comprehensive program review:

  a. Offer two additional elective courses that transfer to the UC and/or CSU. (*This goal was completed with the addition of COMSC 078 – Structure and Interpretation of Computer Programs, and COMSC 079C – Programming in C).*
  b. Add hybrid and/or online courses to our offerings for students. (*All of the courses in Computer Science are now being offered in hybrid and fully online, as well as face-to-face modalities*).
  c. Forge a partnership with our feeder high school districts to effectively recruit more students for our Computer Science program, and perhaps a summer "Boot Camp" in computer programming aimed at high school students. (*With the advent of dual enrollment, many high school students from our feeder high schools are taking AP Computer Science A earlier in their academic pathway in order to take 2nd and 3rd courses in Computer Science at Evergreen Valley College. Moreover, there was no need to offer a "Boot Camp" as we were able to offer multiple sections in COMSC 020 – Introduction to Programming to middle school students and high school students who had not yet completed the mathematics prerequisite to enroll in courses that are part of the Computer Science major).*
  d. Offer an AS-T in Computer Science (*Evergreen Valley College was granted the right to offer an AS-T in Computer Science in the Summer of 2021*).

- **3. Please state and recent accomplishments for your program and show how it contribute to the College's mission and success.**

  The Computer Science department was able to work collegially with the Mathematics and Physics departments to develop new curriculum in their departments to provide support for an Associate in Science Degree for Transfer (AS-T) in Computer Science.

  We also increased opportunity and access by creating an AS-T degree in Computer Science and courses that middle and high school students can take early in their educational journey.

  This is clearly consistent with the part of the college mission which states: Evergreen Valley College guides all students to pathways that reach their educational and career goals through equity-centered, innovative academic programs.

- **4. If you received resource allocation for your last program review cycle, please indicate the resources you received and how these resources were utilized to impact student success and / or importance to your program. (The resources can be personnel or fiscal)**

  The Computer Science Department was able to hire a new full-time instructor beginning in the Fall 2020. In addition, the Math and Science Resource Center (MSRC) was able to receive help from our student tutors in the prior year to assist students in our COMSC 020 and COMSC 075 courses, where programming is introduced. The department witnessed an immediate improvement in success rates over the 2020-2021 academic year. Unfortunately, our full-time hire returned to his prior position in the CIT department when that position was reopened, and with the advent of the COVID pandemic, students were not able to receive tutoring, and our success rate slumped. To date, we are still challenged with recruiting student tutors to help our MSRC.

- **5. Please describe where you would like your program to be three years from now (program goals) and how these support the college mission, strategic initiatives and student success.**

The Computer Science department has set the following goals for the next three years:

a. Expand the departments' offerings so that Computer Science students have the option of learning the C++ and Python programming languages in addition to Java. Giving students the opportunity to select from different languages will facilitate their transferring to certain universities that strongly recommend that students learn a particular programming language.
b. Offer all of our courses in the five different modalities approved by the All-College Curriculum Committee.
c. Enable our students to pursue an AS-T degree online.
d. Offer a new introductory course in Computer Science to provide students with a better foundation before they enroll in Computer Science courses in the major.
e. Design a new degree and/or certificates in the emerging area of Data Science.
f. Keep articulation agreements up to date so that EVC is recognized as the place to enroll for students at San Jose State University and UC Berkeley who cannot find room in classes there.

These goals are consistent with Evergreen Valley College's mission as they guide our students to pathways that reach their educational and career goals through equity-centered, innovative academic programs.

They are also consistent with the following initiatives:

1. They are Student-Centered: providing access to quality and efficient programs and services to ensure student success. Areas of focus are:
   - Access
   - Curriculum and programs

2. They engage the community: Helping to transform the college image and enhance partnerships with the community, especially middle schools and high schools, as well as higher educational institutions.

   Areas of focus are:

   - Increase visibility among our feeder high schools
   - Building campus community by supporting a Computer Science Club

Program Set Standards (Summary Tab)

Overall, EVC's Institution Set Standard for success rate is 72%, and the aspirational goal for student success is 75%.

Success Rate (completion with "C" or better)	Program	EVC	Program Set Standard (established during last comprehensive PR)	Program Success Goal (new)
F'15-F'21 average		72.00%		

Program Success Rate 70.73

Program Set Standard **: It is recommended that programs identify a success standard. This standard should reflect the baseline success rate.**

Program Set Standard 63.66

Recommendation: **90% of the 6 year average success rate could be your program standard (average x 0.9).**

Program Success Goal **: It is recommended that programs identify a success goal. This goal should reflect the success rate to which your program aspires.**

Program Success Goal 72.00

- **Is your program success rate higher or lower than the campus?**

Lower

- **If your success rate is higher than the campus, how are you helping students succeed in and outside the classroom? If your program success rate is lower, what are some strategies your program is implementing to improve?**

Strategies to improve our success rates in Computer Science include the following:

1. The Computer Science Department will develop a new introductory course in Computer Science to provide students with a better foundation before they enroll in courses in the major; and
2. Work to acquire a new full-time instructor in Computer Science to accommodate current as well as projected growth in the number of sections offered by the department.
3. Work to acquire the financial resources needed to hire qualified students in the Mathematics and Science Resource Center (MSRC) to tutor our beginning students in COMSC 020 – Introduction to Programming, and COMSC 075 – Computer Science I: Introduction to Program Structures; and
4. Work to provide the financial resources to acquire the equipment needed by our Computer Science Club to pursue their projects; and
5. Determine if there are any socio-economic factors that are adversely affecting our success rates and identify mitigation strategies.

- **Is the current program success rate higher than the program set standard?**

Yes, it is higher.

- **How close is the program to meeting the program success goal?**

Our program success rate has been improving in recent years, and we are within two percentage points.

- **Are these measures (program set standard and program success goal) still current/accurate? If not, please describe here and reset the standards.**

Yes, they are.

Success Rates: Measures by IPEDs Race/Ethnicity

- **American Indian: 102 - 78.380%**

  Program Average Total Enrolled
  2.000

  Program Success Rate
  74.070

- **Asian: 9380 - 79.320%**

  Program Average Total Enrolled
  146.000

  Program Success Rate
  74.600

- **Black or African American: 464 - 61.430%**

  Program Average Total Enrolled
  2.000

  Program Success Rate
  24.620

- **Hawaiin/Pacific Islander: 95 - 65.790%**

  Program Average Total Enrolled
  2.000

  Program Success Rate
  25.000

- **Latinx: 9005 - 64.730%**

  Program Average Total Enrolled
  40.000

  Program Success Rate
  56.030

- **Two or More Races: 614 - 70.030%**

  Program Average Total Enrolled
  7.000

  Program Success Rate
  61.780

- **Unknown: 1655 - 72.640%**

  Program Average Total Enrolled
  15.000

  Program Success Rate
  75.500

- **White: 1256 - 73.480%**

  Program Average Total Enrolled
  10.000

  Program Success Rate
  75.100

Success Rates: Measures by Gender

- **Female: 12340 - 73.970%**

  Program Average Total Enrolled
  50.000

  Program Success Rate
  74.360

- **Male: 10154 - 69.610%**

  Program Average Total Enrolled
  171.000

  Program Success Rate
  69.510

- **No Value Entered: 77 - 72.590%**

Program Average Total Enrolled
2.000

Program Success Rate
72.220

Success Rates: Measures by Age

- **17 & Below: 736 - 86.260%**

  Program Average Total Enrolled
  16.000

  Program Success Rate
  89.750

- **18-24: 15285 - 69.350%**

  Program Average Total Enrolled
  147.000

  Program Success Rate
  69.200

- **25-39: 4470 - 75.390%**

  Program Average Total Enrolled
  54.000

  Program Success Rate
  69.200

- **40 & Over: 2065 - 78.860%**

  Program Average Total Enrolled
  5.000

  Program Success Rate
  66.990

- **Unknown: 16 - 71.080%**

  Program Average Total Enrolled
  1.000

  Program Success Rate
  66.670

- **a. With respect to disaggregated success rates, list any equity gaps that are identified and discuss interventions your program will implement to address these equity gaps? Please include a timeline of implementation and reassessment.**

  1. Equity gaps exist for students whose ethnicity is Latinx, Black or African-American, and Hawaiian/Pacific Islander.

     The addition of COMSC 010 - Introduction to Computer Science course before students begin taking core courses in the major, hiring more staff and recruiting more students as computer science tutors in the MSRC are important factors for closing these equity gaps.

     Timelines: COSMC 010 and tutors for COMSC 020 and COMSC 075 will be added to our curriculum and program by the Fall of 2023.

2. Gaps also exist for students whose ages are greater than 24.

We will produce a survey targeting this particular student population to discover the underlying factors for this equity gap (i.e., lack of a lower level introductory course, the need for tutors, the Computer Science schedule of classes, modalities for how the courses are offered).

Timeline: All of our students will be given this survey by the Fall of 2023, but we will be paying particular attention to this student population.

- **b. With respect to disaggregated success rates (ethnicity / race, gender and age), discuss student performance in reaching your program set standard for student success as well as reaching the program success goal.**

    1. We believe that the addition of an introductory computer course to the Computer Science curriculum together with the addition of tutors for the introductory courses in computer programming will go a long way to having Black or African American, Hawaiian/Pacific Islander, and Latinx students move toward our program set standard.
    2. To get these groups to our aspirational goal, the Computer Science department will engage with the Special Programs at Evergreen Valley College, as well as the high schools who have students in these groups who are taking our classes as dual enrollment.

- **c. If your program offers course sections fully online, please contact the office of Research, Planning and Institutional Effectiveness to obtain a student success report on the online sections. Address any differences in student success rates between fully online courses and classroom courses.**

    1. Students across all ethnic groups do better in face-to-face formats than on online courses. The difference between face-to-face minus online classes is 12.16 percentage points for Asian students, 6.71 percentage points for Latinx, and 6.21 percentage points for White students.
    2. Students also have higher success rates in face-to-face courses than on online courses for both women and men. For women, the difference is 15.74 percentage points, for men, 7.47 points.
    3. When we examined the data for our students by age, we discovered even greater disparities. For students of age 17 and below, the difference between successful students in face-to-face classes minus online classes was 29.5 percentage points. For students aged 18-24 years, the difference is 12.71 percentage points. For students aged 25-39 the difference is 5.9 percentage points.

Over the years, from the Fall 2015 and the Fall 2021, it appears that student profiles that included younger students, Asian students, and women were significantly more successful in face-to-face classes as opposed to online classes.

These are concerns that will be addressed with the following strategies: Over the short term, the Computer Science department will have its faculty engaged in professional development to improve the quality of online instruction. Over the longer term, we will be able to use the data above to provide better direction to students about which modalities are the best fits for them personally. This is especially so in Computer Science, where an increasing number of students are seeking online courses, as well as the department's decision to offer a fully online degree program.

The spreadsheets containing the data we obtained from the office of Research, Planning and Institutional Effectiveness have been included as attachments.

Program Awards - If Applicable

If the classes in your program lead to a degree or certificate, please visit the DataMart and indicate how many degrees/certificates were awarded in your program: http://datamart.cccco.edu/Outcomes/Program_Awards.aspx (http://datamart.cccco.edu/Outcomes/Program_Awards.aspx)

You will need to select drop down menus and then "select program type by major of study" (for example, select Legal for paralegal studies).

Then at the bottom of the report, select the box "program type- four digits TOP", then update report to get program specific information.

Degree Type

- **AA**

  Number of Awards (Examine 2017-18, 2018-19 data, 2019-20 data and 2020-21 data)

  Discussion

N/A

- **AS**

  Number of Awards (Examine 2017-18, 2018-19 data, 2019-20 data and 2020-21 data)

  Discussion
  N/A

- **AS-T**

  Number of Awards (Examine 2017-18, 2018-19 data, 2019-20 data and 2020-21 data)

  Discussion
  The Computer Science department was not able to grant AS-T degrees until the end of the Fall of 2021.

- **AA-T**

  Number of Awards (Examine 2017-18, 2018-19 data, 2019-20 data and 2020-21 data)

  Discussion
  N/A

- **Certficate less than 12 units**

  Number of Awards (Examine 2017-18, 2018-19 data, 2019-20 data and 2020-21 data)

  Discussion
  N/A

- **Certificate of 12-18 units**

  Number of Awards (Examine 2017-18, 2018-19 data, 2019-20 data and 2020-21 data)

  Discussion
  N/A

Student Enrollment Types

Student Enrollment Type: Day or Evening Student

- **Day: 4639 - 50.900%**

  Program Average Headcount
  59.000

Program Percentage of Total
28.000

- **Day & Evening: 2929 - 32.100%**

  Program Average Headcount
  114.000

  Program Percentage of Total
  54.000

- **Evening: 1022 - 11.200%**

  Program Average Headcount
  23.000

  Program Percentage of Total
  10.900

- **Unknown: 530 - 5.800%**

  Program Average Headcount
  15.000

  Program Percentage of Total
  7.100

Student Enrollment Type: Academic Load

- **Full Time: 2259 - 24.800%**

  Program Average Headcount
  74.000

  Program Percentage of Total
  36.800

- **Half Time or less than half time: 6084 - 66.700%**

  Program Average Headcount
  110.000

  Program Percentage of Total
  537.000

- **a. Discuss any changes in program enrollment types (day vs evening, full-time vs part-time) since your last program review?**

  The department offered five sections in the Fall of 2015. By the Fall of 2021, the department was offering as many as 12 sections.

  Evening classes have historically been low-enrolled in Computer Science. We have seen a trend for students to prefer all-online classes, especially since the advent of the COVID-19 pandemic.

- **b. Discuss how do your program enrollments (Pct of total) compare to EVC?**

  In comparison to EVC, the Computer Science department tends to have a much larger percentage of our students taking both day and evening classes. Nearly three times the percentage of students are full-time as compared to the college as a whole.

- **c. Based on the data, would you recommend any changes?**

Since the advent of the COVID-19 pandemic, we have witnessed a precipitous decline in evening enrollments. We suspect that most of our evening (only) students have difficult commutes from Silicon Valley jobs, and will be seeking courses that are offered synchronously (on Zoom) or fully asynchronously.

In the future, courses such as COMSC 010 - Introduction to Computer Science (to be developed) and COMSC 028 - Foundations of Data Science (scheduled for Fall 2023) will find an audience for more sections face-to-face as well as other modalities. Other than these new courses, the department will continue to offer the courses our students want. They should also facilitate our plans to develop a fully online AS-T for Computer Science.

Student Demographics - Headcount

Student Demographic: Gender

- **Female: 5008 - 54.950%**

  Program Headcount
  46.000

  Program Percentage of Total
  22.210

- **Male: 4075 - 44.640%**

  Program Headcount
  154.000

  Program Percentage of Total
  77.150

- **No Value Entered: 37 - 0.410%**

  Program Headcount
  2.000

  Program Percentage of Total
  0.920

Student Demographic: Age

- **17 & Below: 486 - 5.310%**

  Program Headcount
  15.000

  Program Percentage of Total
  6.740

- **18-24: 5493 - 60.210%**

  Program Headcount
  134.000

  Program Percentage of Total
  66.630

- **25-39: 2168 - 23.800%**

  Program Headcount
  47.000

Program Percentage of Total
24.210

- **40 & Over: 966 - 10.600%**

  Program Headcount
  5.000

  Program Percentage of Total
  2.280

- **Unknown: 8 - 0.090%**

  Program Headcount
  1.000

  Program Percentage of Total
  0.610

Student Demographic: Race/Ethnicity (IPEDs Classification)

- **American Indian: 40 - 0.430%**

  Program Headcount
  2.000

  Program Percentage of Total
  1.020

- **Asian: 3689 - 40.480%**

  Program Headcount
  132.000

  Program Percentage of Total
  64.870

- **Black or African American: 208 - 2.290%**

  Program Headcount
  2.000

  Program Percentage of Total
  1.120

- **Hawaiian/Pacific Islander: 36 - 0.400%**

  Program Headcount
  1.000

  Program Percentage of Total
  0.510

- **Latinx: 3636 - 39.850%**

  Program Headcount
  37.000

  Program Percentage of Total
  18.060

- **Two or More Races: 248 - 2.730%**

  Program Headcount
  6.000

  Program Percentage of Total

3.290

- **Unknown: 690 - 7.520%**

  Program Headcount
  13.000

  Program Percentage of Total
  6.900

- **White: 573 - 6.300%**

  Program Headcount
  10.000

  Program Percentage of Total
  4.980

- **a. Based on the program total headcount and percent change year to year, discuss if your program growing or declining. If so, what do you attribute these changes in enrollment to and what changes will the program implement to address them?**

  The total headcount in Computer Science was 106 in the Fall of 2014 and it was 288 in the Fall of 2020. This represents 171% growth. The headcount of students taking courses in Computer Science is clearly heading upward. Our headcount has continued to grow at an accelerated rate. A large part of the explanation is the department's new AS-T degree that was awarded to the department in 2021.

- **b. Discuss any gaps have you identified in your program. Discuss how your program enrollment is similar or different from the campus. Discuss which gender, age, and/or ethnic group are proportionally smaller than campus make up.**

    The most statistically significant gaps in headcount are for female and Latinx students. This is also a problem in the computing industry as a whole. One bright spot is the growing number of female and Latinx students who have joined our Computer Science Club, one of whom, a Latina, is the president of the club.

    As for Latinx students, we believe that if we develop an introductory course in Computer Science, and we can hire Computer Science staff tutors in the Mathematics and Science Resource Center, then we can make a difference in addressing this issue. In addition, Computer Science faculty will make presentations to the Enlace program and other programs at Evergreen Valley College and our feeder high schools that have successfully engaged Latinx students.

- **c. Discuss what interventions the program can implement to address any gaps in enrollment.**

    Two interventions we plan to implement are 1) develop a new course, titled Introduction to Computer Science, to provide students with a better foundation before they begin courses for the major, and 2) doing a better job of advertising the Computer Science Club.

Institutional Effectiveness (6.5 year average, see Summary Tab)

EVC Capacity: 61.70% EVC Productivity: 14.43

Program Capacity
66.56%

Program Productivity

14.97

Is your capacity rate higher or lower then the campus?
Higher

Is your productivity goal higher or lower than the campus?
Higher

If the program capacity and/or productivity is lower than the campus, please provide rationale:
N/A

Curriculum

Related Assessments

- **1. Identify and updates to curriculum since the last comprehensive program review, including and new programs and indicate the 6-year timeline for scheduled course outline revision. For CTE, the time line is 2 year.**

  There have been some changes to the curriculum that were addressed in our last program review. They include:

  a. All five of the courses in the original program were changed from 4 to 3 units each to conform to the C-ID specifications for an AS-T in Computer Science.
  b. The course title for COMSC 077 was changed from "Computer Organization and Systems" to "Introduction to Computer Systems" following the current trend among computer science departments.
  c. COMSC 072 – Discrete Mathematics was replaced in the major with COMSC 080 – Discrete Structures, to conform with C-ID specifications. Discrete Mathematics is now offered by the Department of Mathematics.
  d. Two courses were added to the Computer Science curriculum as lower division electives for transfer to the California State University and the University of California systems: COMSC 078 – Structure and Interpretation of Computer Programs (4 Units), and COMSC 079C – Programming in C (3 Units).
  e. Textbooks and assignments have been updated.
  f. All of the courses in our curriculum have been revised to include options for face-to-face, hybrid, and asynchronous fully online modalities. These courses will be further modified this year so they can be offered in one of five modalities that have been newly define by the All-College Curriculum Committee at Evergreen Valley College.
  g. The Computer Science department now offers an AS-T in Computer Science, effective 2021.

  All of the existing courses in the Computer Science curriculum will be updated according to the following timelines:

  COMSC 020 – Introduction to Programming Concepts and Methodologies: Last revision 04/33/20, Needs to be revised by 11/06/24.

  COMSC 075 – Computer Science I: Introduction to Program Structures: Last revision 04/11/19, Needs to be revised by 04/11/25

  COMSC 076 – Computer Science II: Introduction to Data Structures: Last revision 04/11/19, Needs to be revised by 04/11/25

  COMSC 077 – Introduction to Computer Systems: Last revision 04/06/17, Needs to be revised by 04/06/23

  COMSC 078 – Structure and Interpretation of Computer Programs: Last revision 02/12/19, Needs to be revised by 02/12/25

  COMSC 079C – Programming in C: Last revision 03/12/19, Needs to be revised by 03/12/25

  COMSC 080 – Discrete Structures: Last revision 05/09/17, Needs to be revised by 05/09/23

- **2. Identify all the courses offered in the program and describe how these courses remain relevant in the discipline. For courses your program has not offered in the past two years, please discuss a plan on how to deal with these courses (if your program is not going to de-activate these courses, please explain why).**

COMSC 020 – Introduction to Programming Concepts and Methodologies

COMSC 075 – Computer Science I: Introduction to Program Structures

COMSC 076 – Computer Science II: Introduction to Data Structures

COMSC 077 – Introduction to Computer Systems

COMSC 078 – Structure and Interpretation of Computer Programs

COMSC 079C – Programming in C

COMSC 080 – Discrete Structures

COMSC 020 is the Computer Science department's programming course for non-majors.

COMSC 075, 076, 077, and 080 are core courses in the AS-T for Computer Science. Along with two courses in mathematics and two courses in physics, many of our students will take these four core computer science courses over four consecutive semesters in ascending order by course number. But since COSMC 075 is the only prerequisite for all of the higher-numbered courses in the Computer Science curriculum, students have various routes to complete the major.

COMSC 078 and COMSC 079C are offered as lower division elective courses that have been articulated for transfer to the California State University and the University of California systems.

Each of the seven courses listed above is now offered every semester, including 2-3 sections of COMSC 020, 4-5 sections of COMSC 075, and three sections of COMSC 076.

- **3. If you have a degree or certificate, please include a diagram of your program's guided pathways program map. (A program map indicates courses suggested for each semester, across two years, upon completion a student would qualify for a degree/certificate).**

AS-T Computer Science

High School Preparation: Courses in physics, chemistry, and four years of high school mathematics are required. If this preparation is not complete, Evergreen Valley College offers courses to meet this preparation. If the preparation is not complete, it may take more than two years to complete this degree.

Map is for reference only for the 2022-2023 catalog year. It represents one possible pathway through the program. Be sure to make an appointment with a counselor to create an education plan that is customized to meet your needs.

For courses that meet the below graduation requirements, refer to the appropriate general education pattern you are following (CSU GE or IGETC for CSU).

Term 1 Units CSU GE IGETC FOR CSU NOTES

COMSC 075 3

MATH 066 4 B4 2A CORE

ENGL 001A 3 A2 1A

GE 3 A1 1C

GE 3 C1 3A

Total Units 16

Term 2 Units CSU GE IGETC FOR CSU NOTES

COMSC 076 3

MATH 067 4 B4 2A CORE

GE 3 A3 1B

GE 3 C2 3B

GE 3 E Transferable Elective

Total Units 16

Term 3 Units CSU GE IGETC FOR CSU NOTES

COMSC 077 3 CORE

PHYS 007A 4 B1/B3 5A/5C CORE

GE 3 C1 or C2 3A or 3B

GE 3 D 4 US-1, US-2, US-3*

Transferable Electives 1 unit As needed to reach a minimum of 60 units

Total Units 14

Term 4 Units CSU GE IGETC FOR CSU NOTES

COMSC 080 3 B4 A2

BIOL 004A 5 B2/B3 5B/5C Be sure to consult with a counselor on science requirements for the transfer institution that you are interested in. Many universities require Computer Science majors to take PHYS 007A and PHYS 007B along with a biological science.

GE 3 D 4 US-1, US-2, US-3*

GE 3 F 4

Total Units 14

> * CSU Graduation Requirement: Student must complete a set of courses that meet the US-1, US-2, and

- **4. Identify and describe innovative strategies or pedagogy your department/program developed/offered to maximize student learning and success. How did they impact student learning and success?**

  We implemented the following innovative strategies/pedagogy to maximize student learning and success:

  - Increased engagement with students
  - Added group work
  - Added group projects
  - Held two online office hours per week
  - Held after-class office hours
  - Increased faculty support and tutoring in the Mathematics and Science Resource Center (MSRC)
  - Assisted and provided financial support for hardware and software for students working on the projects that are being conducted by the Computer Science Club

  All of the above have contributed to improvement in scores on graded work and higher success rates.

- **5. Discuss plans for future curricular development and/or program degrees & certificates included) modification.**

  The Computer Science department will begin offering our students who choose to major in Computer Science a new introductory sequence in C++:

  COMSC 041 – Programming Concepts and Methodologies I

  COMSC 042 – Programming Concepts and Methodologies II

  This new sequence will be recognized as consistent with C-ID courses by the California State Universities and will be articulated with several Universities of California that have this sequence as a requirement for Computer Science majors.

  Future plans call for the department to add two additional courses for students in computer science.

  COMSC 010 – Introduction to Computer Science

  COMSC 050 – Linux Operating Systems (elective course)

  The department will also develop a new degree program and/or certificates in Data Science which will include:

  COMSC 028 – Foundations of Data Science (already approved by the All-College Curriculum Committee)

  COMSC 078 – Structure and Interpretation of Computer Programs (already part of the Computer Science curriculum).

  COMSC 086 – Data Structures and Algorithms for Data Science (to be developed in the Spring of 2023).

  COMSC 088 – Techniques for Data Science (to be developed in the Fall of 2023)

- **6. Describe how your program is articulated with High School Districts, and/or other four year institutions. (Include articulation agreements, CID, ADTs...)**

  Evergreen Valley College has an agreement with the Eastside Union High School District to accept the high school AP Computer Science A as equivalent to our COMSC 75 – Computer Science I: Introduction to Program Structures. High school students can earn dual high school and college credit for any of the courses they take in Computer Science.

  The department also now offers an AS-T Degree in Computer Science which transfers to the entire California State University system. All of the courses in the AS-T Degree also transfer to most of the University of California system.

- **7. If external accreditation or certification is required, please state the certifying agency and status of the program.**

  N/A

Student Learning Outcome and Assessment

Related Assessments

Student Learning Outcomes

Program Learning Outcomes

- **1. On the program level, defined as a course of study leading to degree or certificate, list the Program Learning Outcomes (PLOs), and how they relate to the GE/ILOs. Please also indicate how the course SLOs have been mapped to the PLOs. If you are completing this program review as a department or discipline and do not offer any degrees or certificates, please write N/A in this space.**

The PLO to ILO and SLO Mappings for the AS-T in Computer Science are the following:

PLO #1: Analyze a problem, and identify and define the computer requirements appropriate to its solution.

This program aligns to the following Institutional Outcomes:

- Inquiry and Reasoning: The student will critically evaluate information to interpret ideas and solve problems.

Student Learning Outcome Map:

- COMSC 075: Analyze problem descriptions, apply problem-solving methods, and use design tools to develop algorithms to solve simple problems. I - The PLO is introduced: Yes
- COMSC 075: Identify and describe the properties of a variable such as its associated address, type, value, scope, persistence, and size. I - The PLO is introduced: Yes
- COMSC 075: Summarize the history and evolution of programming languages including paradigms in current use. M - The PLO is mastered and measured in the course: Yes
- COMSC 076: Compare and contrast how analysis and design are performed in the object-oriented versus the procedural (or structured) programming paradigm. I - The PLO is introduced: Yes
- COMSC 076: Explain how encapsulation, data hiding, and other abstraction mechanisms support reusability of software components. I - The PLO is introduced: Yes
- COMSC 077: Describe the architectural components of a computer system. M - The PLO is mastered and measured in the course: Yes
- COMSC 080: Use logic to analyze algorithms and database structures, and prove program correctness. M - The PLO is mastered and measured in the course: Yes
- COMSC 080: Analyze different traversal methods for graphs and trees. M - The PLO is mastered and measured in the course: Yes

PLO #2: Apply knowledge of computing and mathematics appropriate to the solution of a problem.

This program aligns to the following Institutional Outcomes:

- Inquiry and Reasoning: The student will critically evaluate information to interpret ideas and solve problems.

Student Learning Outcome Map:

- COMSC 075: Design, code, debug, test, and document programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods). I - The PLO is introduced: Yes
- COMSC 075: Analyze problem descriptions, apply problem-solving methods, and use design tools to develop algorithms to solve simple problems. I - The PLO is introduced: Yes
- COMSC 076: Design and write programs that use each of the following data structures: arrays, records, strings, linked lists, stacks, queues, trees, and hash tables. I - The PLO is introduced: Yes
- COMSC 076: Design, implement, test, and debug programs that employ simple recursive functions. I - The PLO is introduced: Yes
- COMSC 080: Apply symbolic logic to analyze equivalence of statements and validity of arguments. I - The PLO is introduced: Yes
- COMSC 080: Use logic to analyze algorithms and database structures, and prove program correctness. M - The PLO is mastered and measured in the course: Yes
- COMSC 080: Use induction for proofs and definitions. I - The PLO is introduced: Yes
- COMSC 080: Model and solve linear recursive equations. M - The PLO is mastered and measured in the course: Yes
- COMSC 080: Apply the binomial theorem to independent $_{events}$. M - The PLO is mastered and measured in the course: Yes
- COMSC 080: Apply Bayes' theorem to dependent events. M - The PLO is mastered and measured in the course: Yes

- MATH 066: d. Apply differential calculus to sketch the graph of a function, to obtain the equation of the tangent line to a function, and to solve applications such as optimization and related rate problems. M - The PLO is mastered and measured in the course: Yes
- MATH 067: Apply divergence and convergence tests to sequences and series, and represent functions as power series using different techniques including the Taylor theorem. M - The PLO is mastered and measured in the course: Yes

PLO #3: Design, implement, and evaluate a computer-based system, process, or program to meet desired specifications.

This PLO aligns to the following Institutional Outcome:

- Inquiry and Reasoning: The student will critically evaluate information to interpret ideas and solve problems.

Student Learning Outcome Map:

- BIOL 004A: Use the scientific method to formulate and test hypotheses and related predictions, design experimental tests, and evaluate data. M - The PLO is mastered and measured in the course: Yes
- COMSC 075: Design, code, debug, test, and document programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods). I - The PLO is introduced: Yes
- COMSC 075: Analyze problem descriptions, apply problem-solving methods, and use design tools to develop algorithms to solve simple problems. I - The PLO is introduced: Yes
- COMSC 076: Design and write programs that use each of the following data structures: arrays, records, strings, linked lists, stacks, queues, trees, and hash tables. I - The PLO is introduced: Yes
- COMSC 076: Design, implement, test, and debug programs that employ simple recursive functions.I - The PLO is introduced: Yes
- COMSC 076: Employ software engineering principles in the design, implementation, testing, and debugging of large programs in an object-oriented programming language. I - The PLO is introduced: Yes
- COMSC 077: Describe the architectural components of a computer system. I - The PLO is introduced: Yes
- COMSC 077: Convert between decimal, binary, and hexadecimal notations. I - The PLO is introduced: Yes
- COMSC 077: Write simple assembly language program segments. I - The PLO is introduced: Yes
- COMSC 077: Write and debug assembly programs that use load/store, arithmetic, logic, branches, call/return and push/pop instructions. I - The PLO is introduced: Yes
- COMSC 077: Demonstrate how fundamental high-level programming constructs are implemented at the machine-language level. I - The PLO is introduced: Yes
- PHYS 007A: Report the uncertainties of physical quantities unveiled in lab exercises, with special care on displaying reasonable number of significant figures. M - The PLO is mastered and measured in the course: Yes
- PHYS 007B: Analyze AC and DC circuits containing inductors, resistances, capacitors, and power supplies, predicting the characteristics of unknown circuit components. (C-ID: Lecture 4; C-ID: Laboratory 1,2) M - The PLO is mastered and measured in the course: Yes

- **2. Since your last program review, summarize SLO assessment activities and results at the course and program level. Please include dialogue regarding SLO Assessment results with division/department/college colleagues and/or GE areas. Provide evidence of the dialogue (i.e. department meeting minutes or division meeting minutes, etc.) List any SLOs or PLOs that have not been assessed in the last two years and provide an explanation of why they have not been assessed. This will be reviewed by the IEC to determine if your Program Review is approved or not.**

All of the assessments have been completed for all of the courses that were offered by the Computer Science department within the last two years, except for COMSC 078, which is being offered for the first time this Fall 2022. Unfortunately, two of the four SLOs for the course cannot be addressed until the final three weeks of the course. Assessments for the course are, thus, forthcoming at the end of the term.

We were unable to complete PLO assessments because when we submitted online supplements to all our courses, CurricQunet caused the courses in the program map to be outdated. Consequently, PLO assessment will have to await a resolution of this issue.

- **3. What plans for improvement have been implemented to your courses or program as a result of SLO assessment? Please share one or two success stories about the impacts of SLO assessment on student learning.**

For COMSC 079C

SLO: Explain how abstraction mechanisms support the creation of reusable software components.

Rating 1: Few (0-49%) of the students have mastered the competency.

For each SLO, summarize results of all classes assessed, keeping results from each instructional modality separated (i.e., online sections results grouped together, face-to-face results grouped together). Indicate the number of students assessed, how you determined level of mastery (e.g., scoring a "C" or above), and discuss what needs and issues were revealed.

All online Fall 2021. Three out of seven students completed the assignment and all of them got B or above.

The instructor for the course decided to provide the students with some articles on this topic that are appropriate for the level of the students in this course and have the students read them before doing the assignment. In the current ongoing class, 8 out or 13 students finished this assignment with a B grade or better.

For COMSC 080

SLO: Apply the binomial theorem to independent events.

Rating 2: Some (50-69%) of the students have mastered the competency.

For each SLO, summarize results of all classes assessed, keeping results from each instructional modality separated (i.e., online sections results grouped together, face-to-face results grouped together). Indicate the number of students assessed, how you determined level of mastery (e.g., scoring a "C" or above), and discuss what needs and issues were revealed.

11/16 (68.8%) scored 70% or higher

The problem that was used to assess this SLO was on probability and was on the final exam. Although, in this case, 68.8% scored 70% or higher, thus, barely missing Level 3, the instructor decided to follow up and determine what happened. After checking their notes, the instructor felt they were unable to spend sufficient time on ideas that are often subtle and counterintuitive for students. The solution in this case was to simply spend more time on the topic, with more examples and a few more homework problems.

Our final success story revolves around our COMSC 076 course. The SLO in question expects students to complete a substantial capstone programming project that makes use of most of the concepts and methodologies that were addressed during the semester, as well as from the COMSC 075 course. Earlier assessments showed that students were teetering near the bottom of Rating 3. In order to conform to current software engineering practice, the department decided to change the assignment from an individual project to a group project. Moreover, we learned to incorporate methods used in our online courses, such as group discussions, across all the modalities in which the course was offered. Finally, earlier program assignments were redesigned to place more emphasis on concepts and methodologies consistent with what students needed to know to successfully complete this capstone project. Below you can see the significant difference these changes made in our most recent assessment.

For COMSC 076

SLO: Employ software engineering principles in the design, implementation, testing, and debugging of large programs in an object-oriented programming language.

Rating 4: Almost all (90%+) of the students have mastered the competency.

For each SLO, summarize results of all classes assessed, keeping results from each instructional modality separated (i.e., online sections results grouped together, face-to-face results grouped together). Indicate the number of students assessed, how you determined level of mastery (e.g., scoring a "C" or above), and discuss what needs and issues were revealed.

Face-to-Face: 12/15 (=80%) of the students scored 70% or higher on the term project. Date: 05/18/21 Hybrid: 25/26 (=96%) of the students scored 70% or higher on the term project. Date: 05/18/21 Online: 26/26 (=100%) of the students scored 70% or higher on the term project. Date: 05/19/21.

Faculty and Staff

Part D: Faculty and Staff

- **1. List current faculty and staff members in the program, areas of expertise, and describe how their positions contribute to the success of the program.**

Henry Estrada – Full-time Faculty

Mr. Estrada is currently the only full-time instructor in the Computer Science Department. He began teaching Data Processing at Evergreen Valley College in the Fall of 1982. He revised the curriculum in the department and developed a new Associate in Science degree in Computer Information Systems (CIS) in 1987. He also wrote and developed the four courses that were originally included in our transfer program in Computer Science in 1989. In addition to his load in CIS, he began teaching COMSC 072 – Discrete Mathematics, COMSC 075 – Computer Science I, and COMSC 076 – Computer Science II during the 1990 – 1991 academic year. He subsequently took the lead in the development of a new curriculum for an associate's degree in Computers and Information Technology (CIT). It was approved in 1998 and the CIT program replaced the CIS program in the Division of Business and Workforce Development.

Beginning in 2005, Mr. Estrada transferred to the Division of Mathematics, Science, and Engineering, assuming a full-time position as an instructor in the Department of Mathematics. He mainly taught Elementary Statistics, Precalculus, Calculus I, II, and III, and Linear Algebra. He was the principal designer of the AS-T in Mathematics, which was approved in 2012. He joined the Computer Science department in 2016, and provided leadership in the design and development, as well as teaching, of all of the courses offered by the department. His courses have been offered in face-to-face, hybrid, and asynchronous fully online modalities. With the assistance of associate faculty, he was the principal designer of the AS-T in Computer Science, which was approved in the Summer of 2021.

Prior to joining Evergreen Valley College, Mr. Estrada was employed as an Account Manager at a small start-up company in Southern California, and as a Staff Scientist who did computer modeling of engineering/economic analysis for the Energy and Environment Division of the Lawrence Berkeley National Laboratory. He has also been a consultant to the U.S. Department of Energy and the IBM Corporation.

Mr. Estrada holds a bachelor's degree in Applied Mathematics from UCLA, and a master's degree in Computer Science from UC Berkeley. While employed at Evergreen Valley College, his continuing education has included professional development and coursework in UNIX/Linux System and Network Administration, Oracle Database Administration, SQL programming, and advanced Java programming. He has also taken upper division/graduate level courses in Advanced Linear Algebra and Matrix Analysis, Mathematical Modeling, Graph Theory, Probability Theory, and Mathematical Statistics. With this added foundational knowledge, Mr. Estrada plans to develop a new associate's degree and/or certificates in the rapidly emerging discipline of Data Science. He has also completed EDIT 022 at Evergreen Valley College and, except for COMSC 079C and COMSC 080, he has offered all the remaining courses in the department online, in addition to face-to-face and hybrid modalities. In addition, Mr. Estrada was responsible for assessing Program Learning objectives, and assessments of Students Learning Objectives for COMSC 020, 075, 076, and 078.

Philip Chang – Associate Faculty

Mr. Chang did his undergraduate work in Mathematics and Physics, before migrating into the realm of the computer sciences. He holds a master's degree in Computer Science. He started his career in software design and development, soon after graduation, in the field of computer communications. He worked on projects building satellite communications networks in the East Coast. Then he moved to the Bay Area in late 1990s and continued his career in the field of computer networking until 2020. During his many years in the industry, he has had opportunities to work on many different types of projects of vastly different sizes and complexities, ranging from super-mini projects, which he worked by himself, to projects with over a hundred engineers/programmers.

These opportunities allowed him to learn first-hand about the details of software engineering more deeply. He hopes to pass along what he has learned to the next generation of software engineers through the computer science classes that he teaches at Evergreen Valley College. Mr. Chang has completed EDIT 022 at EVC and now teaches both COSMC 020 – Introduction to Programming, and COMSC 079C – Programming in C, as asynchronous fully online courses. In addition, Mr. Chang worked on the collection of data and the assessment of SLOs for COMSC 079C.

David Eisenberg – Associate Faculty in Computer Science

J. David Eisenberg has written several books. Two of them, Ètudes for Erlang and Ètudes for Elixir are books of exercises that are companion books to Introducing Erlang and Introducing Elixir (of which he is a co-author). He has also written an introductory book for the ReasonML language (now called ReScript): Web Development with ReasonML. He has developed a series of videos and a book of exercises to accompany the Think Java book that we are using in Computer Science 075. David has also created a series of videos to accompany the Think Python book used in Computer Science 020. David has also recorded several courses for LinkedIn Learning, covering ReasonML, JavaScript Conditionals and Loops, and HTML Images. He is one of the first authors to re-record the JavaScript course for LinkedIn Learning's partnership with GitHub codespaces (https://www.linkedin.com/business/learning/blog/productivity-tips/introducing-new-ways-you-can-accelerate-your-career-in-tech-with-linkedin-learning-and-github-codespaces (https://www.linkedin.com/business/learning/blog/productivity-tips/introducing-new-ways-you-can-accelerate-your-career-in-tech-with-linkedin-learning-and-github-codespaces)). Eisenberg has completed EDIT 022 at Evergreen Valley College, and has taught COMSC 020 – Introduction to Programming, COMSC 075 – Computer Science I: Introduction to Program Structures, and COMS 079C – Programming in C, asynchronously online, as well as in face-to-face, and Hybrid modalities. In addition, David Eisenberg collected the data and completed the assessments of SLOs for COMSC 020 and 075.

Jack Ho – Associate Faculty

Mr. Ho is a seasoned hi-tech professional who has been in software development for over 20 years. He has worked on various software applications in the field of networking security, network device management, electronic design automation and cybersecurity. He has held various individual contributor and management roles with experience in leading an international team of over 20 people. Over the years, he has been a consultant to software and hardware design teams at companies including Apple and Microsoft, advising them on design methodologies, hardware/software co-simulation and tool usage. Mr. Ho currently works at a cybersecurity startup and helps companies identify cybersecurity flaws in their systems.

Mr. Ho graduated with honors from Rensselaer Polytechnic Institute with a bachelor's degree in Electrical and Systems Engineering and a minor in Computer Science. He also holds a master's degree in Electrical Engineering from Santa Clara University and an MBA from University of Massachusetts, Amherst. He has been an avid contributor in various hardware and cybersecurity conferences over the years. He has also taken and completed EDIT – 022 at Evergreen Valley College, and teaches COMSC 020 – Introduction to Programming, COMSC 075 – Computer Science I, and COMSC 077 – Introduction to Computer Systems, asynchronously fully online as well as face-to-face and hybrid modalities. In addition, Mr. Ho collected the data and completed assessments of SLO's for COMSC 075 and 077.

Kathy Jensen – Associate Faculty

Kathy Jensen holds a bachelor's degree in computer science from the University of Washington, a master's in mathematics from the University of South Florida, and a master's in scientific computing and computational mathematics from Stanford University.

For over 15 years, Kathy Jensen has taught mathematics and computer science at various colleges throughout the Bay Area and the University of South Florida. She has taught courses in discrete math, calculus, statistics, differential equations, finite math, precalculus, algebra, and programming (Python and Java). In addition, Kathy Jensen has several years of experience tutoring high school students in mathematics.

Upon graduating from the University of Washington, Kathy Jensen worked as a Quality Assurance Engineer at Frame Technology Cooperation, and she has performed mathematical modeling in Matlab for the United States Geological Survey (USGS). Kathy Jensen served as a co-PI on the California Education Learning Lab (CELL)-funded Seed Project "Closing Equity and Access Gaps in Discrete Mathematics" (2020-2022). She is currently a Senior Personal consultant for the CELL Scaling Success project entitled "Expanding Equity and Access in Discrete Mathematics".

Ms. Jensen also collected the data and completed assessments for SLOs in COMSC 020, 075, and 080.

Manjit Kang – Associate Faculty

Dr. Kang has more than 20 years of experience working with students. He has helped hundreds of college students in last 20 years to be successful in their educational goals. He is also an independent CTO/CIO and has more than 25 years of high-tech experience with many projects in software for the web, cloud, and mobile applications development. He has also developed software for network management applications, cyber security, central processing design, graphics chip design, system level validation, web application design and testing, and Cisco Networking system administration projects, at many companies including INTEL, IBM, California Business and Technology, Broad Com, ITT-TECH, DeVry, and other customer sites.

He has been teaching Math/Computer Science at Evergreen Valley College for several years. He is a Peer Online Course Review (POCR) and Distance Education (DE) certified faculty member of the California community colleges chancellor's office. He was also Co-Chair for EVC faculty work group / faculty at EVC. In addition, he has many years of faculty administration or management experience with the California community colleges and other private colleges and universities.

He holds a Doctorate in Information Technology (Cyber Security Strategic/ Executive Leadership Administration) from Walden University. In addition, he holds four Master of Science (MS) degrees in the areas of : Information Business & Technology / Engineering (Strategic Leadership), Applied Mathematics, Pure Mathematics, and Computer Science/Engineering. His BS degree is in Electronics Engineering.

He teaches COMSC 020 – Introduction to Computer Programming, COMSC 075 – Computer Science I, and COSMC 076 – Computer Science II, asynchronously online as well as in face-to-face and hybrid modalities. In addition, Dr. Knag collected data for the assessment of SLOs for COMSC 075.

- **2. In addition to major professional development activities completed by faculty and staff in the past, in particular with regards to students' success, equity, distance education, SLO assessment, guided pathways and/or innovative teaching/learning strategies, are there any additional professional development needs of your department in the future? What are they? Please provide details about a timeline.**

  All of the faculty in the Computer Science department will be taking the courses they need to offer the courses they teach in any one of the five different modalities recognized at Evergreen Valley College. This should facilitate our goal of offering an AS-T degree in Computer Science fully online. Computer Science faculty will also be working collegially with faculty in departments (Mathematics, Physics, and Biology) that offer core courses that are part of the AS-T in Computer Science.

  In addition, full- time faculty will undergo training to become certified as Peer Online Course Reviewers (POCRs).

  Timeline: The next two years.

  These goals are consistent with Evergreen Valley College's mission as they guide our students to pathways that reach their educational and career goals through equity-centered, innovative academic programs.

  They are also consistent with the following initiatives:

  1. They are Student-Centered: providing access to quality and efficient programs to ensure student success. Areas of focus are:
     - Access
     - Curriculum and programs

2. They engage the community: Helping to transform the college image and enhance partnerships with the community, especially middle schools and high schools, as well as higher educational institutions.

Areas of focus are:

- Increased visibility among our feeder high schools

Budget Planning

Part E: Budget Planning

- **1. With your Dean, review the department Fund 10 budget (operational budget) and discuss the adequacy of the budget in meeting the program's needs.**

  The Computer Science Department is one of the few departments in the Mathematics, Science, and Engineering Division that has no budget. This is largely true because lab assignments at this level are based on software (i.e., programming) not hardware, most of our sections are offered with zero-cost textbooks, and since we have no computer printers in our computer lab, we have not needed supplies (i.e., paper, ink). Moreover, nearly all of our students have their own computing devices.

  In order to successfully complete our future goals, we will need the resources to hire a permanent part-time to full-time tutor in the Math and Science Resource Center (MSRC) as well as recruit five Computer Science student tutors in the (MSRC) to tutor our students in beginning programming classes such as COMSC 020 and COMSC 075.

  Also, the number of sections offered by our department has grown from five in 2017 to 10 in 2020, and is projected to grow to 20 sections by the Fall of 2023. These growth rates offer a rationale for why our department must add an additional full-time instructor as well (we currently have only one). The emerging pattern suggests that the number of sections offered by the Computer Science department doubles every three years. This is not inconceivable, with our new AS-T in Computer Science as well as the addition of Data Science courses that the department will be offering beginning next Fall 2023. Thus, if this trend continues, there will be a need for a third full-time instructor within the next four years.

- **2. List all external funds, i.e. fund 17, the department/program receives, and describe their primary use.**

  N/A

Technology and Equipment

Part F: Technology and Equipment

- **Review the current department technology and equipment needed and assess program adequacy. List and changes to technology or equipment since the last program review. If changes were made please indicate how the change impacted student success.**

  The Computer Science Lab will need to be updated with state-of-the art computer systems and software. This includes some commercial software such as MATLAB.

  Moreover, we would like to purchase the latest in Raspberry Pi computing systems for working on advanced projects for our Computer Science Club and possibly future STEM Summer Bridge Programs.

The changes will provide students with more opportunities to get to know other students, and they also allow students to work with more cutting-edge technology. These additions will incentivize more of these students to achieve success in their classes.

Additional Information

Part G: Additional Information

- **Please provide any other pertinent information about the program that these questions did not give you an opportunity to answer.**

The Computer Science department is planning to complete development of a new degree program and/or certificates in the coming Spring 2023. We will offer COMSC 028 – Foundations of Data Science next Fall 2023, COMSC 078 – Structure and Interpretation of Computer Programs in the Spring of 2024. The last two courses in this newly proposed Data Science curriculum will be developed in the Spring of 2023, and offered as COMSC 086 – Data Structures and Algorithms for Data Science in the Fall of 2024, and COMSC 088 – Techniques of Data Science.

All of these courses will be transferrable to the University of California and California State University systems. Since Data Science is now the fastest growing area of STEM, we believe that we will have explosive growth in our offerings of these courses. In many ways Data Science is where Engineering and Computer Science were 30 years ago. It is the only STEM subject offering excellent pay without the need for an advanced degree (masters or Ph.D).

The department expects that Data Science alone will occupy all the attention of one of our full-time faculty, and that the department will have to hire a third full-time instructor to sustain our Computer Science degree, as well as the expected growth in our new Data Science program.

Future Needs and Resource Allocation Request

Based on the areas noted below, please indicate any unmet needs for the program to maintain or build over the next Comprehensive Review. Please provide rationale on how the request connects back to SLO/PLO assessment, strategic initiatives or student success. If no additional requests are needed in any of the areas, put N/A.

1. **Faculty Request**

   Ongoing Budget Needs
   Full-time Computer Science Instructor

   One-Time Expenditure

   Total Expenses (Staffing and Faculty Requests include Salary and Benefits)
   175000.000

   Request linked to SLO/PLO #
   COMSC 020, SLO #3 Write programs that employ structured programming and be able to design, implement, and test programs using currently accepted methodologies; COMSC 075, SLO #1: Design, code, debug, and test programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods); and COMSC 076, SLO #2 Design, implement, test, and debug programs that employ simple recursive functions, and SLO #4: Compare and contrast how analysis and design are performed in the object-oriented versus the procedural (or structured) programming paradigm.

   Strategic Initiatives (student centered, organizational transformation, community engagement)
   Yes

   Improving student success rates
   Yes

Achievement of program set standard for student success
Yes

2. **Faculty Request**

   Ongoing Budget Needs
   Full-time Data Science Instructor

   One-Time Expenditure

   Total Expenses (Staffing and Faculty Requests include Salary and Benefits)
   180000.000

   Request linked to SLO/PLO #
   COMSC 020, SLO #3 Write programs that employ structured programming and be able to design, implement, and test programs using currently accepted methodologies; COMSC 075, SLO #1: Design, code, debug, and test programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods); and COMSC 076, SLO #2: Design, implement, test, and debug programs that employ simple recursive functions, and SLO #4: Compare and contrast how analysis and design are performed in the object-oriented versus the procedural (or structured) programming paradigm.

   Strategic Initiatives (student centered, organizational transformation, community engagement)
   Yes

   Improving student success rates
   Yes

   Achievement of program set standard for student success
   Yes

3. **Classified Professional Request**

   Ongoing Budget Needs
   MSRC Staff: Instructional Support Assistant, Lab Lead Range 86 Salary (PT) Step A, 9.5 months, 20 hrs/wk $35000 + $20000 (Benifits).

   One-Time Expenditure

   Total Expenses (Staffing and Faculty Requests include Salary and Benefits)
   55000.000

   Request linked to SLO/PLO #
   COMSC 020, SLO #3 Write programs that employ structured programming and be able to design, implement, and test programs using currently accepted methodologies; COMSC 075, SLO #1: Design, code, debug, and test programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods); and COMSC 076, SLO #2: Design, implement, test, and debug programs that employ simple recursive functions, and SLO #4: Compare and contrast how analysis and design are performed in the object-oriented versus the procedural (or structured) programming paradigm.

   Strategic Initiatives (student centered, organizational transformation, community engagement)
   Yes

   Improving student success rates
   Yes

   Achievement of program set standard for student success
   Yes

4. **Facilities**

   Ongoing Budget Needs
   As the number of sections in Computer Science grows and we begin to include courses in Data Science the department will require another computer lab in the next 2-4 years. This lab will have to include new computer

systems and the necessary software to offer courses.

One-Time Expenditure

Request linked to SLO/PLO #

Strategic Initiatives (student centered, organizational transformation, community engagement)
Yes

Improving student success rates
Yes

Achievement of program set standard for student success
No

5. **Technology**

   Ongoing Budget Needs

   One-Time Expenditure
   Four iUniker Raspberry Pi 4 8GB Kit, 5V 4A Raspberry Pi 4 Power Supply, 4K HDMI Cable, Heatsink Raspberry Pi 4 Case - 64GB Edition (8GB RAM): $1000 Total Cost

   Request linked to SLO/PLO #
   COMSC 020, SLO #3 Write programs that employ structured programming and be able to design, implement, and test programs using currently accepted methodologies; and COMSC 075, SLO #1: Design, code, debug, and test programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods).

   Strategic Initiatives (student centered, organizational transformation, community engagement)
   Yes

   Improving student success rates
   Yes

   Achievement of program set standard for student success
   Yes

6. **Technology**

   Ongoing Budget Needs

   One-Time Expenditure
   10 User Site License for MATLAB/Data Science; $7000 total cost

   Request linked to SLO/PLO #
   COMSC 020, SLO #3 Write programs that employ structured programming and be able to design, implement, and test programs using currently accepted methodologies; and COMSC 075, SLO #1: Design, code, debug, and test programs that use the following fundamental constructs: basic computation and sequencing, simple I/O, decision and iterative structures, and the definition of functions (methods).

   Strategic Initiatives (student centered, organizational transformation, community engagement)
   Yes

   Improving student success rates
   Yes

   Achievement of program set standard for student success
   Yes

Total Cost
<u>Faculty Request</u>
Ongoing Budget Needs: Full-time Computer Science Instructor
One-Time Expenditure:
Total Expenses (Staffing and Faculty Requests include Salary and Benefits): 175000.000

<u>Faculty Request</u>
Ongoing Budget Needs: Full-time Data Science Instructor
One-Time Expenditure:
Total Expenses (Staffing and Faculty Requests include Salary and Benefits): 180000.000
<u>Classified Professional Request</u>
Ongoing Budget Needs: MSRC Staff: Instructional Support Assistant, Lab Lead Range 86 Salary (PT) Step A, 9.5 months, 20 hrs/wk $35000 + $20000 (Benifits).
One-Time Expenditure:
Total Expenses (Staffing and Faculty Requests include Salary and Benefits): 55000.000
<u>Facilities</u>
Ongoing Budget Needs: As the number of sections in Computer Science grows and we begin to include courses in Data Science the department will require another computer lab in the next 2-4 years. This lab will have to include new computer systems and the necessary software to offer courses.
One-Time Expenditure:
Total Expenses (Staffing and Faculty Requests include Salary and Benefits):
<u>Technology</u>
Ongoing Budget Needs:
One-Time Expenditure: Four iUniker Raspberry Pi 4 8GB Kit, 5V 4A Raspberry Pi 4 Power Supply, 4K HDMI Cable, Heatsink Raspberry Pi 4 Case - 64GB Edition (8GB RAM): $1000 Total Cost
Total Expenses (Staffing and Faculty Requests include Salary and Benefits):
<u>Technology</u>
Ongoing Budget Needs:
One-Time Expenditure: 10 User Site License for MATLAB/Data Science; $7000 total cost
Total Expenses (Staffing and Faculty Requests include Salary and Benefits):

Attach Files

Attached File
Copy of Program_Review_EVC_ComSc_online.xlsx (/Form/Module/_DownloadFile/3047/43425?fileId=286)

Copy of Program_Review_EVC_ComSc_f2f.xlsx (/Form/Module/_DownloadFile/3047/43425?fileId=287)

CS_Dept_Meeting_Minutes_12_17_2021.docx (/Form/Module/_DownloadFile/3047/43425?fileId=288)

IEC Reviewers

IEC Mentor
Vicki Brewster

IEC Second Reader
Robert Brown