



Information Technology/Cyber Security

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Instructional Program Review

Business and Information Technology Department

Cerro Coso Community College

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Executive Summary

The Computer Information Systems (CIS) Program began in 1997 as one of Cerro Coso's first online degree programs. In the early 2000s, there were several certificates that were moved into their own program including the Computer Application Specialist and the Programming Certificates. As programs and employer's needs evolve, the college programs are increased and sometimes spun off, as was the case for the Computer Applications and Computer Science focuses. In 2016, the CIS Program was modified and renamed the Information Technology (IT) and Cyber Security Program to meet the needs of the employers. Additionally, three certificates were re-developed including the Information Technology Plus, the Information Technology Certificate and the Cyber Security Certificate which were in existence, however, they became part of the Information Technology and Cyber Security program. The Data Analyst I certificate is also included in this program. Two new certificates were developed during the past six years but have not yet run in their entirety. These new certificates are the Linux Administration and Cloud Computing Certificate of Achievement (COA

The entry-level course, IT C101 Introduction to Computer Information Systems has been offered online and at the Indian Wells Valley (I WV) and Eastern Sierra College Center (ESCC) campuses. Beginning in the fall 2022 term, IT C101 will be offered at the Tehachapi (EKTC) campus annually for the launching of the Entrepreneurship Certificate of Achievement. Since the last program review in 2016, the degree and certificate offerings in the CIS area have gone through three significant changes as a result of the previous program review. The first is that all the courses were changed from the CSCI designation to the IT designation in order to align with the new direction of the program. Secondly, as mentioned above, there are four certificates within the program that had to be resubmitted due to the course designation changes. These include the IT Plus COA, the IT COA, the Cyber Security COA and the Data Analyst I COA. Third, as mentioned above, the two new certificates were developed as the advisory committee advised that there was significant movement in the requirements for Linux administration and cloud computing. The evolution of the industry changes rapidly and it is imperative that the programs maintain currency to fill the needs of employers. The two new certificates started in the 2021-22 year, so they will not be evaluated in this program review. The new cloud computing program is currently involved with a pilot grant program with the Chancellor's Office and Amazon Web Services (AWS) and may change/update upon completion. This was an exciting opportunity for the college to work directly with Amazon and other colleges to ensure that the cloud curriculum would meet the new needs of employers.

The IT/Cyber Security program has many strengths. The courses, degrees, and certificates are popular with students and enrollments and completions in both certificates have grown over the past six years. The structure of the program and the stair-stepped certificates have been popular and have aided in the continuation of students from one certificate to the next as well as to complete the AS degree.

The IT C101 Introduction to Computer Information Systems course serves the IT program as well as other programs at the college. Full-time and adjunct instructors work together to teach and assess the courses in the program. Additionally, they meet regularly with their advisory committees in the Ridgecrest and Bishop/Mammoth Lakes areas and participate in multiple forms of ongoing professional development. This ongoing commitment to currency has focused the department to align its offerings with industry certifications. Students are being prepared for certifications, transfer, and employment. As

enrollments and new courses have grown, additional full-time faculty and a dedicated space were needed, requested, and approved.

Although the IT program has many strengths and the faculty in the department have worked hard to increase the program's currency, some areas need improvement. While student success increased from 58% to 70.8% there is work to be done. Additionally, the program is primarily made up of white male students and efforts need to be made to recruit students from different groups (Hispanic, African American, and females) that are more representative of our service area. While students are completing certificates and degrees in the current program, there is an area that needs to come back to the program offerings. In the past, as noted above, the Computer Specialist certificate program was moved to the Business Office Technology program and was redesigned. There are employer needs for students that have higher-level skills in both Microsoft Office (Word, Excel, PowerPoint, Access, etc.) and other software applications (Adobe Acrobat) without the office technology emphasis. There has been much discussion about moving this certificate back under the umbrella of the Information Technology area and refocusing the outcomes to be comprised of software application and information technology skills. Additionally, this would provide IT students with an alternative focus and certificate.

Finally, upon review of the Math requirements for the programs, these were embedded in the certificates for transferability without consideration that students may not necessarily need the Math courses to be successful in other courses. This was included primarily for the programming course, however, after in depth conversation, we need to consider that in the transferability of coursework, students will need to complete Math and it does not necessarily need to be part of the certificate. There is also a concern that this requirement may be a barrier to completion of the certificate(s). Further discussion on this topic is part of our goals.

This program review recommends several actions including:

- identify strategies to improve success of program students including recruiting tutors;
- increase marketing efforts and outreach activities to the Hispanic, African American, and female populations/communities;
- complete the planning and implementation of the Cyber Laboratory on the IWV campus;
- assess prerequisites and course sequencing especially in mathematics;
- explore and develop a Computer Application Specialist COA option for students;
- complete the pilot program with the Chancellor's Office and AWS and make required changes to maintain currency with industry standards;
- increase internships and placement opportunities;
- continue updating and assessing courses and programs for currency; and
- begin succession planning and mentoring of new faculty as the seasoned retire.

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Part 1: Program Overview

1.1 Program Definition

1.1.1 College Mission

The mission of Cerro Coso Community College is to improve the life of every student it serves. Through traditional and distance delivery, Cerro Coso Community College brings transfer preparation, workforce education, remedial instruction, and learning opportunities that develop ethical and effective citizenry to the rural communities and unincorporated areas of the Eastern Sierra. In doing so, we promise clarity of educational pathways, comprehensive and equitable support services, and a commitment to equity.

1.1.2 Program Mission

The program mission is to prepare students to enter the Information Technology (IT) or the Cyber Security workforce. The program mission is in alignment with the college mission to prepare students to enter the workforce. The department meets twice a year with employers on the Advisory Committees both in the IWV and ESCC. The advisory committees consist of a broad base of employers both in aerospace, military, and higher education representatives. The committee members review curriculum and program data and documentation and provide input on students once they have been placed. The department also regularly reviews the student learning outcomes at the course and program level to maintain the quality of our program. A new Cyber Security Laboratory is scheduled to open in the Fall 2022 term which will provide students access to hands-on experiences which will impact their starting wages in the field as well as their ability to successfully pass the industry certification exams. As mentioned, students in the IT/Cyber areas sit for industry certification exams that are aligned with our courses. Students frequently report back to faculty about their success on these industry certification exams and comment on how the courses have or have not assisted them in preparing for these exams that they are required to have for employment.

1.1.3 Program Catalog Description

INFORMATION TECHNOLOGY PLUS Certificate of Achievement

INFORMATION TECHNOLOGY PLUS CERTIFICATE OF ACHIEVEMENT is designed for students pursuing professional employment in information technology for business. This certificate program provides students with skills to enter the job market as help desk providers, computer support specialists, computer repair technicians, networking technicians, information assurance technicians, and cyber security technicians. Designed for both full and part-time students, this program is appropriate to both those currently employed and those seeking to enter this field. Complete each course to be applied toward the certificate with a "C" or better.

CC Information Technology Plus Certificate of Achievement

Complete all of the following

Complete the Required Courses

Complete the following number of credits:

ITC101 - Introduction to Computer Information Systems (3 units)

ITC142 – Information & Communication Technology Essentials (4 units)

ITC143 – Computer Network Fundamentals (3 units)

ITC146 - Introduction to Information Systems Security (3 units)

INFORMATION TECHNOLOGY CERTIFICATE OF ACHIEVEMENT

INFORMATION TECHNOLOGY CERTIFICATE OF ACHIEVEMENT is designed for students pursuing professional employment in information technology for business. This certificate provides students with skills to enter the job market as help desk providers, computer support specialists, entry level programmers, networking technicians, information assurance technicians, and cybersecurity technicians. Complete each course to be applied toward the certificate with a “C” or better.

CC Information Technology

Complete all of the following

Complete the Required Courses

Complete the following number of credits:

ITC101 - Introduction to Computer Information Systems (3 units)

ITC142 - Information & Communication Technology Essentials (4 units)

ITC143 - Computer Network Fundamentals (3 units)

ITC146 - Introduction to Information Systems Security (3 units)

ITC251 - Introduction to Programming Concepts and Methodologies (3 units)

ITC270 - Introduction to Database Design/Management (3 units)

Math Elective (Take one class)

MATHC121 - Elementary Probability and Statistics (4 units)

MATHC121H - Elementary Probability and Statistics – Honors (5 units)

MATHC130 - Finite Mathematics (4 units)

MATHC131 - Basic Functions and Calculus for Business (4 units)

MATHC151 - Analytic Geometry and Calculus I (4 units)

INFORMATION TECHNOLOGY (IT) ASSOCIATE OF SCIENCE DEGREE

INFORMATION TECHNOLOGY (IT) ASSOCIATE OF SCIENCE DEGREE is designed for students pursuing professional employment in information technology for business. This degree program provides students with skills to enter the job market as help desk providers, computer support specialists, entry-level programmers, networking technicians, information assurance technicians, and cybersecurity technicians. Designed for both full and part-time students, this program is appropriate to both those currently employed and those seeking to enter this field. Students completing the IT AS degree are prepared to transfer to a Baccalaureate program in Information Technology,

CC Information Technology

Complete all of the following

Complete the Required Courses

Complete the following number of credits:

ITC101 - Introduction to Computer Information Systems (3 units)

ITC142 - Information & Communication Technology Essentials (4 units)

ITC143 - Computer Network Fundamentals (3 units)

ITC146 - Introduction to Information Systems Security (3 units)

ITC251 - Introduction to Programming Concepts and Methodologies (3 units)

ITC270 - Introduction to Database Design/Management (3 units)

Math Elective (Take one class)
MATHC121 - Elementary Probability and Statistics (4 units)
MATHC121H - Elementary Probability and Statistics – Honors (5 units)
MATHC130 - Finite Mathematics (4 units)
MATHC131 - Basic Functions and Calculus for Business (4 units)
MATHC151 - Analytic Geometry and Calculus I (4 units)

CYBER SECURITY TECHNOLOGY Certificate of Achievement

CYBER SECURITY TECHNOLOGY Certificate of Achievement. The Cyber Security Certificate of Achievement (29-30 units) is designed to develop skills for information security for business. Upon completion of this certificate, students will be able to enter the job market as information assurance technicians, information security analysts, network security professionals and cyber security technicians. Designed for both full-time and part-time students, this certificate is appropriate to both those currently employed and those seeking to enter the field. Complete each course to be applied toward the certificate with a “C” or better.

Cyber Security Technician

Complete all of the following

Required Core

ITC101 - Introduction to Computer Information Systems (3 units)
ITC142 - Information & Communication Technology Essentials (4 units)
ITC143 - Computer Network Fundamentals (3 units)
ITC146 - Introduction to Information Systems Security (3 units)
ITC248 - System and Network Administration (3 units)
ITC251 - Introduction to Programming Concepts and Methodologies (3 units)
ITC255 - Introduction to Cybersecurity: Ethical Hacking (3 units)
ITC259 - Introduction to Systems Analysis and Design (3 units)

Math Elective (Take one class)

MATHC121 - Elementary Probability and Statistics (4 units)
MATHC121H - Elementary Probability and Statistics – Honors (5 units)
MATHC130 - Finite Mathematics (4 units)
MATHC131 - Basic Functions and Calculus for Business (4 units)

CYBER SECURITY Associate in Science Degree

CYBER SECURITY Associate in Science Degree. The Cyber Security Associate in Science Degree (60 units total, 29-30 units in the major) prepares students for careers as information assurance technicians, information security analysts, network security professionals and cyber security technicians. Designed for both full-time and part-time students, this program is appropriate to both those currently employed and those seeking to enter the field. This degree program is also transferable to California State University at San Bernardino. Courses required for the major at Cerro Coso Community College may not be the same as those required for the major at a four-year school. Students who plan to transfer should consult a counselor or advisor and <http://www.assist.org/> to identify the courses needed for the major at the transfer school and to develop an educational plan. Students must complete a minimum of 60

units, including the courses listed in the major and general education requirements, with an overall GPA of 2.0 or better, and a grade of "A," "B," or "C," in all courses for the major. A minimum of 12 units must be completed at Cerro Coso Community College. Completion of the Cerro Coso local general education pattern does not prepare students for transfer. Students should consult with a counselor or educational advisor regarding general education options. Courses Note: Some courses within the major may have a required prerequisite. If you feel you have equivalent knowledge and skills to those included in the prerequisite course through professional experience, licensure or certification, you have the opportunity to submit a Prerequisite Challenge to be reviewed by the faculty chair. For the Prerequisite Challenge to be considered, you must submit documentation/verification to substantiate the basis for the challenge. Please consult a counselor for more information regarding Prerequisite Challenge.

Cyber Security Technology

Complete all of the following

Required Core

ITC101 - Introduction to Computer Information Systems (3 units)

ITC142 - Information & Communication Technology Essentials (4 units)

ITC143 - Computer Network Fundamentals (3 units)

ITC146 - Introduction to Information Systems Security (3 units)

ITC248 - System and Network Administration (3 units)

ITC251 - Introduction to Programming Concepts and Methodologies (3 units)

ITC255 - Introduction to Cybersecurity: Ethical Hacking (3 units)

ITC259 - Introduction to Systems Analysis and Design (3 units)

Math Elective (Take one class)

MATHC121 - Elementary Probability and Statistics (4 units)

MATHC121H - Elementary Probability and Statistics – Honors (5 units)

MATHC130 - Finite Mathematics (4 units)

MATHC131 - Basic Functions and Calculus for Business (3 units)

DATA ANALYST I CERTIFICATE OF ACHIEVEMENT

The purpose of this certificate is to prepare students for positions in data collection, data processing, and data analysis and to provide a foundation for future training in data science and big data analysis. Courses in the program provide students with the skills to work with others to manage large projects; design and manipulate databases with SQL (Structured Query Language) and database management systems; write computer programs to access and manipulate data files and databases; and work with electronic spreadsheets and database management systems to create models and analyze results.

Data Analyst I COA

Complete all of the following

BSAD C220 Principles of Project Management (3 units)

BSAD C222 Data Analytics for Business (3 units)

IT C251 Introduction to Programming Concepts and Methodologies (3 units)

IT C170 Introduction to Database Design/Management (3 units)

The catalog descriptions for the degrees and certifications reflect up-to-date courses that will prepare students for transfers to a university or a job in the field. The program's certifications and degrees and have been scrutinized by universities' representatives and local work force employers. Upon review of the Math requirements for the programs, these were embedded in the certificates for transferability without consideration that students may not necessarily need the Math courses to be successful in

other courses. This was included primarily for the programming course, however, after in depth conversation, we need to consider that in the transferability of coursework, students will need to complete Math and it does not necessarily need to be part of the certificate. There is also a concern that this requirement may be a barrier to completion of the certificate(s). Further discussion on this topic is part of our goals. There has been conversation about replacing the mathematics course with computer forensics.

1.2 Program Pathway

1.2.1 Conditions of Enrollment

There are no conditions for enrollment. Students can enter the program at any time.

There are prerequisites for the 200-level courses in the IT and Cyber Security programs. The current prerequisite is IT C101 Introduction to Computer Information Systems. This course provides a baseline of information and skills that students need to be successful in the program. If a student has been in industry and/or has previous educational awards, they can request that the prerequisite be waived. Enrollments in individual courses and the program do not seem to be impacted by the prerequisites. If the Mathematics course stays in the program, students need to take it in the first year prior to programming. We have changed the program pathways below in 1.2.2. It is very likely, however, that it will be removed, and students can take the upper-level Math courses if they intend to transfer.

Additional prerequisites were added for the Cloud Computing and Linux Administration COAs as students need the first course in order to have the skill set for the second course. These new COAs have not been fully offered so we do not know if it is impacting enrollment at this time.

1.2.2 Program Pathway

Recommended Pathway -IT Plus COA

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT Plus COA			
IT C101	IT C142	IT C143	IT C146
IT COA- Fast Track			
IT C101 IT C142	IT C143 IT C146		

Recommended Pathway -IT COA

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101 IT C142	IT C143 IT C146	IT C270	IT C251

Recommended Pathway -IT AS Degree

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101	IT C143	IT C270	IT C251
IT C142	IT C146	General Education (AS)	General Education (AS)
MATH	MATH	General Education (AS)	General Education (AS)
General Education (AS)	General Education (AS)	General Education (AS)	General Education (AS)
General Education (AS)	General Education (AS)	General Education (AS)	General Education (AS)

Recommended Pathway -Cyber Security COA

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101	IT C143	IT C270	IT C251
IT C142	IT C146	IT C248	IT C259
	IT C251	IT C255	

Recommended Pathway -Cyber Security AS Degree

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101	IT C143	IT C270	IT C251
IT C142	IT C146	IT C248	IT C259
MATH	MATH	IT C255	General Education (AS)
General Education (AS)	General Education (AS)	Gen Ed (AS)	General Education (AS)
General Education (AS)	General Education (AS)	General Education (AS)	General Education (AS)

Recommended Pathway –Data Analyst I COA

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
BSAD C220	BSAD C222	IT C270	IT C251

There is no difference between the on ground and online pathways. Except for IT C101 and some of the math courses, our courses are only offered online so students need to take the courses in sequence online. The sequencing of the program is aligned with the industry standard skills required to take industry certification exams. The alignment with the classes matches the objectives from the industry exams. The certificates are stackable and are the milestones of the program. Students take the IT Plus COA courses and then move up to either the IT COA courses or the Cyber Security COA. The IT Plus courses are required for both the upper level certificates. Faculty include the pathways image in the resources in the class modules and use it in discussions and announcements to ensure that students

understand the program and the sequence of courses. In IT C101 and IT C142, materials and information on the pathway are not only in the courses as a resource, but announcements and responses to journals and/or discussions are reinforced with the visual IT/Cyber Security Roadmap images (in Appendix). The changes made from the last program review were disseminated to students via email, and through Counseling. The only changes were the designation of IT instead of CSCI and some of the course numbers were changed in order to reflect the proper sequence of courses.

1.2.3 Long-Term Schedule

Long-term Schedule

*Information Technology Plus Certificate of Achievement
Long-term Schedule (O = Online, I = IWV, E = ESCC, EKTC)*

Courses	Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101	OIT	OI	OIT	OIE
IT C142	O	O	O	O
IT C143	O	O	O	O
IT C146	O	O	O	O

Information Technology Certificate of Achievement/AS Degree

Long-term Schedule (O = Online, I = IWV, E = ESCC, T=EKTC)

Courses	Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101	OIT	OI	OIT	OI
IT C142	O	O	O	O
IT C143	O	O	O	O
IT C146	O	O	O	O
IT C251		O		O
IT C270	O		O	
MATH C121	OI	OIE	OI	OIE
MATH C130	O		O	
MATH C131		O		O
General Education				

Cyber Security Technician Certificate of Achievement/Cyber Security Technology AS Degree

Long-term Schedule (O = Online, I = IWV, E = ESCC, T=SK)

Courses	Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C101	OIT	OI	OIT	OI
IT C142	O	O	O	O
IT C143	O	O	O	O

Courses	Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
IT C146	O	O	O	O
IT C248	O		O	
IT C251		O		O
IT C255	O		O	
IT C259		O		O
MATH C121	OI	OIE	OI	OIE
MATH C130	O		O	
MATH C131		O		O

*Data Analyst I Certificate of Achievement
Long-term Schedule (O = Online, I = IWV, E = ESCC, T-SK)*

Courses	Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
BSAD C220	O			
BSAD C222		O		
IT C270			O	
IT C251				O

The IT and Cyber Security programs are designed in a stair-stepped method also called stackable. The four courses in IT Plus COA are the baseline for both the IT Plus COA and the Cyber Security Technician COA. The four baseline classes (IT C101, C142, C143, and C146) are scheduled in both primary terms so students can enter in any term. Students can either take one class a semester for the IT Plus COA or take the accelerated pathway where they take two courses and complete in two semesters. The IT and Cyber Security programs then progress to the higher-level courses and the offerings are scheduled and numbered to reflect the recommended sequence in which to take the courses. All classes are offered online. The first class (IT C101) is offered every semester at IWV and every other fall in ESCC. The EKTC campus will begin offering IT C101 each fall term as it is a requirement for the new Entrepreneurship program that is being launched. With the opening of the new Cyber Security lab, we will begin to offer additional on-campus classes. Beginning Spring 2023, IT C101 and IT C142 will be offered at the IWV campus, and we anticipate rotating the offerings. This is due to requests from students and employers for classes since hands-on learning is instrumental in student success on the job. The baseline course (IT C101) has been offered on the same day and at the same time for many years and enrolls well. The additional courses will likely be scheduled in the evening in order to be available to those that work full time on the base and surrounding areas.

1.2.4 Cost to Student

Estimated Cost IT Plus COA

	CA Residents	Non-residents
Units	13	13
Cost per unit	46.00	329.00
Tuition	598.00	4,277.00
Books and Supplies	780.00	780.00
Total	1,378.00	5,057.00
Per semester (2) Cost	1,272.00	5,057.00

Estimated Cost IT Technology COA

	CA Residents	Non-residents
Units	23	23
Cost per unit	46.00	329.00
Tuition	1,058.00	7,567.00
Books and Supplies	1,380.00	1,380.00
Total	2,438.00	\$8,947.00
Per semester (2) Cost		

Estimated Cost IT Technology AS

	CA Residents	Non-residents
Units	60	60
Cost per unit	46.00	329.00
Tuition	2,760.00	19,974.00
Books and Supplies	3,600.00	3,600.00
Total	6,360.00	23,340.00
Per semester (4) Cost	1,590.00	5,835.00

Estimated Cost Cyber Security Technician COA

	CA Residents	Non-residents
Units	30	30
Cost per unit	46.00	329.00
Tuition	1,380.00	9,870.00
Books and Supplies	1,800.00	1,800.00
Total	3,180.00	11,670.00
Per semester (3) Cost	1,060.00	3,890.00

Estimated Cost Cyber Security AS

	CA Residents	Non-residents
Units	60	60
Cost per unit	46.00	329.00
Tuition	2,760.00	19,974.00
Books and Supplies	3,600.00	3,600.00
Total	6,360.00	23,340.00
Per semester (4) Cost	1,590.00	5,835.00

Estimated Cost Data Analyst I COA

	CA Residents	Non-residents
Units	12	12
Cost per unit	46.00	329.00
Tuition	552.00	3,948.00
Books and Supplies	720.00	720.00
Total	1,272.00	4,668.00
Per semester (4) Cost	1,272.00	4,668.00

The department faculty have explored using Open Education Resources (OER); however, the quality and currency of the materials are problematic.

We have developed partnerships with Cisco, Microsoft, CompTIA, Red Hat, Amazon Web Services (AWS) and VMware to provide our students with materials that would be at no cost to them. Additionally, these partnerships provide students with 30-50% discount vouchers to take their industry certification exams. Our Cisco, AWS, and Red Hat partnerships are beneficial as they have materials that we could use in place of some of the publisher materials. Faculty continually evaluate and review potential resources that could be used in place of publisher content and simulators, but quality and currency continue to be an issue.

We are currently exploring using grant funding to purchase site licenses for our online publisher simulators that we use to teach students. This would provide the simulator licenses at no cost to the students and remove the barrier. These simulators are crucial for online learning as students need hands-on experiences. Additionally, we have requested to purchase lab textbook sets and library copies so students can use the materials in and out of class. As far as the cost to students being proportional to the eventual prevailing wage, the IT/Cyber fields are high wage jobs. An entry level position in IT and Cyber Security position ranges from \$37,009 to \$125,706. Typically, our local students place at \$37,009 while they are still in school and benefit immediately upon completing their IT Plus COA. With each completion of a certificate and/or degree, their wages are raised. In the addendum, there is a marketing document that compares IT, Cyber and Computer Science jobs in knowledge and skills, job duties, and job titles. Additional salary information is in the addendum to this document. Finally, the college is opening a new Cyber Security Lab which will provide students with hands-on experiences with technology which will increase their knowledge. This hands-on experience in the Cyber Lab will provide them with vital experience which will increase their starting pay in the field.

1.3 Program Connections

1.3.1 Relationship to Other Programs

The degrees and certificates in this program are related and share many courses. With the exception of the Data Analyst I COA, each certificate builds on the lower-level certificates in the program and culminates in an Associate's degree. The IT C101 course is required in other programs including Business, Web Professional, Nursing, and Engineering. And, the programming course, IT C251, is an elective in the Math program. These courses are not offered at the Incarcerated Student Education Program (ISEP) due to the lack of technology and security. The courses in the program are aligned with the C-ID model and are transferrable. The courses are aligned with the CSU system and are similar to programs offered at Antelope Valley and Bakersfield colleges.

1.3.2 Intersegmental Alignment

In the past five years, there has been no offering via dual enrollment for IT/Cyber. High school students are taking the courses via concurrent enrollment. Faculty are interested in exploring a dual enrollment option at high schools in our service area if qualified high school teachers are identified and interested in offering the program. There is one teacher at Burroughs High School that is working on her qualifications to teach our IT/Cyber courses so there may be an opportunity.

There has been alignment with two private schools for transfer for our students. Bellevue University and Grand Canyon University are active members of the advisory committee and there have been transfers to Bellevue. Grand Canyon is interested in offering our students a tour of their campus and to articulate with our courses. Additionally, all the courses in the IT/Cyber program are aligned with the C-ID requirements and should transfer to the CSU system. When we developed our program, we aligned our offerings with Cal State San Bernardino.

1.3.3 Professional Development

Faculty attend Faculty Flex training, attend professional conferences, summer training camps and self-train using LinkedIn learning. Professional development is a vital component of the ever-changing world of technology, and it is imperative that faculty engage with updating their skills as well as networking with peers across the state. The WATSC conference has been a tool that current faculty have used to update their skills and interact with others across the state. This conference also provides a curriculum that is approved and transferable to the CSU system. Summer training through the WATSC group has also been vitally important to keep faculty aligned with industry standards. There is additional professional training through vendors and organizations (AWS, Linux, Microsoft) that are valuable for both full-time and adjunct faculty that could be requested.

1.3.4 Describe Marketing and Outreach

The faculty within the department have developed marketing materials and worked with the PIO on developing brochures, banners, and flyers. In the pre-COVID time, faculty attended the senior outreach day at the college, university day, and worked community fair booths. Materials and direct contact with interested students seem to be effective as enrollments and interest in the program are visible through the email traffic and inquiries as well as with enrollment. We did notice drops in the program due to COVID, but it appears to be rebounding. Additional marketing assistance to re-engage students would likely help.

1.4 Employment (CTE Only)

1.4.1 Labor Market

Labor Market data for IT/Cyber programs reflects continual growth for employers. Employers need qualified technicians to enter the field. Both EMSI and Half data reflects an ongoing and increasing workforce need. According to the Information Communication Technologies & Digital Media Sector group that is funded by the California Chancellor's Office (<https://ictdmsector.org/it-cybersecurity/>), there are 32,650 openings statewide. The Advisory Committee's employers continue to select our students as well as recommend our program to their employees. Indeed.com continues to show openings in the Ridgecrest area in both IT and Cyber Security (56 in IT and 12 in Cyber on 10/28/21). These are changing, of course, every day.

Challenges in the programs are to serve more students to prepare them for the workforce. Limited full-time faculty and retiring full time faculty will be a challenge in the next few years.

1.4.2 Employment

The IT and Cyber Security programs do not appear to do well in Perkins Core Indicator Data for Employment, but the tracking system at the state is problematic. Some of this is due to privacy issues and the inability of the state to track student placements. VTEA reports and the California Dashboard also measured using different criteria and so they do not align. This external data does not always reflect what is happening with employment. Anecdotally employers in the IWV Advisory Committee report their incumbent work force and newly hired students are performing well.

The Chancellor's Office recently notified the college that Cerro Coso Community College was being recognized for the placement/employment of our graduates at a higher level of pay. Employers are hiring and/or promoting the students that earn our certificates and degrees in IT/Cyber. Employers check in regularly and let us know how our students are performing and generally they are well prepared.

1.4.3 Employer Relationships

The IT and Cyber Security programs Advisory Committee continues to be the pivotal point in program development. The committee meets twice a year to review curriculum and program success and completion data. Ongoing emails and conversations occur throughout the year and if an employer has an immediate need, they reach out to faculty or our Job Development Specialist. There have been several internship programs over the past six year and students have been placed in those opportunities as well as in apprenticeship and entry level positions. Meetings are held both in IWV and ESCC. Employers are contacting the college for internship programs, job openings and directing employees into the program for job advancement.

1.4.4 Advisory Committee

The Advisory Committees meet one to two times a year for Information Technology and Cyber Security. In the past six years the IWV's CIS Advisory Committee has been comprised of members from various industries that represent our service area including aerospace, mining, manufacturing, recreation, small business, banking, and education. Members have been responsible, generally, for the hiring of entry-level information technology workers and other STEM related positions. Recruitment of members comes

in a variety of ways including senior management of NAWC China Lake designating specific managers to attend, aerospace contractors that serve the base and other businesses that have a need for the specialization for their employees.

Members of the Advisory Committees provide faculty and college administration with valuable input into program development and critical components for industry. Additionally, they hire our graduates and provide feedback on preparedness to enter the workforce and technical skills. Members review all student and program learning outcomes prior to the final submittal to the State of California and validate the alignment with industry requirements. The IWV Advisory Committee has also provided expertise in new program development in Cyber Security and served on a subcommittee to review and write new courses and program outcomes to align with the California State Model Curriculums.

Over the past six years, the Advisory Committees have been shaping forces in the development of the IT certificates and degree, the Cyber Security certificate and degree, and the Data Analyst I certificate. Both the IWV and ESCC committees review all the programs and provide input.

Additionally, the partnerships developed with the Advisory Committee have resulted in experts coming into the on-campus classrooms (IWV) each semester (pre-COVID) and being filmed for online students to deepen their understanding of what is required for the information technology field. Lastly, Advisory Committee has been the mechanism to develop and place students in internships and full-time positions. Employers regularly solicit faculty and the Job Development Specialist for recommendations for positions at their companies and have provided feedback on the performance. This has provided Cerro Coso Community College with a three hundred sixty-degree review of our program on a continual basis.

The minutes of the Advisory Committee meetings both at IWV and ESCC are attached for review in the addendum.

Part 2: Outcomes

2.1 Overview of Outcomes

2.1.1 Culture of Outcomes

The Business & Information Technology Department has had a long-standing history of regular discussions with full-time and adjunct faculty about student learning outcomes and program learning outcomes. We continually review the alignment, rigor, and academic integrity of our courses in Information Technology and Cyber Security with the corresponding industry certification examinations. When the certification exams are updated for currency and relevance, our simulation programs are updated, and we update our classes. The exams are revised every 18 to 24 months (about 2 years). Since the program has been dependent upon our specialized adjunct faculty, these conversations have happened at least twice a year during the advisory committee meetings as well as during discipline-specific meetings. During the last program review, the faculty decided to do all the assessments for the courses over two sequential semesters in order to take a snapshot in time.

2.2 Program Learning Outcomes

2.2.1 List of Program Learning Outcomes

Information Technology Plus COA

Program Learning Outcomes

1. Interpret and use technical information in communications to solve common business programs using Information Technology systems and applications.
2. Apply support strategies in client computing and user support, including the ability to configure, install, diagnose, and support hardware and software issues.
3. Design, analyze, and support computer networks.
4. Evaluate and apply network security solutions related to servers, storage, and virtualization.

Information Technology COA/AS

Program Learning Outcomes

1. Demonstrate competency in client computing and user support including the ability to configure, install, diagnose, and support hardware and software issues.
2. Demonstrate competency in database and information management including the ability to design, implement, query, and manage relational databases.
3. Demonstrate competency in networking and convergence including the ability to design, analyze, and support computer networks.
4. Demonstrate competency in problem-solving, programming, and application development including the ability to design, test, debug, and implement complex computer programs.
5. Demonstrate competency in working with servers, storage, and virtualization including implementing and evaluating network security solutions.
6. Demonstrate an ability to read and interpret technical information, as well as communicate with and write clearly for wide ranges of audiences.

Cyber Security COA/AS

Program Learning Outcomes

1. Configure, install, diagnose, and support hardware and software issues.
2. Utilize identifying tools and methodologies that hackers use to break into a network computer and defend a computer and local area network against a variety of different types of security attacks using a number of hands-on techniques.
3. Design, analyze, and support computer networks.
4. Apply problem solving, programming, and application development including the ability to design, test, debug, and implement complex computer programs.

5. Operate servers, storage, and virtualization including implementing and evaluating network security solutions.
6. Read and interpret technical information, as well as communicate with and write clearly for wide ranges of audiences.

Data Analyst I COA

Program Student Learning Outcomes

1. Manage multiple components, timelines, technology, and people related to data analysis projects.
2. Design, create, query, and manage databases for analytic processing using SQL (Structured Query Language) and DBMS (Database Management System) applications.
3. Write computer programs to access and manipulate data files and databases.
4. Analyze data using forecasting, optimization, and changing scenarios and prepare reports using spreadsheets, word processing, and database management programs.

The PLOs for each degree and certificate are designed to identify the skills required for students to enter the workforce, advance in the workforce, or, in the case of the associate degrees, transfer to a four-year university. The PLOs as listed above for each degree and certificate are realistic, achievable, and measurable.

The Information Technology Plus COA, Information Technology COA/AS, and Cyber Security Technician COA/AA certificates and degrees prepare students for entry-level information technology or cyber security positions. The Data Analyst I COA prepares students for entry-level positions in data analysis and data science. The program learning outcomes appropriately identify the key knowledge and skills that students need to enter the identified fields. Several of the courses align with industry certification training and exams and C-IDs for CSU transfer.

Employers that sit on the IWV advisory committee recommended that students complete the IT Plus COA in addition to the three industry certification exams (CompTIA A+, Net+ and Security+) in order to meet the baseline requirements for employment. Three of the four classes are aligned with the CompTIA industry certification exams, so students should be successful in passing the exam. While not all employers require the industry certification exam upon entry into the workforce, many require that incoming employees pass at least the CompTIA Security+ exam within six months of hire. At the Naval Air Warfare Center at China Lake, incoming employees are required to be certified in the CompTIA Security+ exam before hiring. Employers have reported that students that complete their IT Plus COA are performing well in jobs and have the knowledge and skills required.

Students that complete the IT COA/AS or Cybersecurity Technician COA/AS are prepared to either transfer to a university or enter the workforce with the skills identified in the PLOs. Students that enter the workforce, as mentioned above, are prepared to pass the industry certification exams. Their knowledge is a baseline for entry into the industry and, as they gain hands-on experience in the job, they learn to apply their skills in troubleshooting, problem-solving, and the ability to work with a variety of IT equipment including servers, storage, security systems as well as utilizing virtualization in organizations. Employers and students often report back to faculty on their success in the field. They also report back to faculty on the passing of the certification exams.

For those students who are transferring to either a private institution or CSU campus, the courses have been aligned with the C-ID system to ensure that they are prepared to take the next sequence of classes. So, the courses are not only aligned with industry certification but also with the C-ID of the CSU system. As such, students wishing to transfer to CSU have met the PLOs for the certificate/degree. If students do not wish to transfer to a CSU, CC also has a partnership with Bellevue University where students can maximize their transfer units. Bellevue has evaluated our courses and they align with their curriculum. While this is an early partnership and not many students have transferred to Bellevue University, those that have provided feedback that our courses have met the requirements. The PLOs are realistic, achievable, and anecdotally measurable as students take industry exams and are passing or transferring to other institutions.

2.2.2 Institutional and General Education Learning Outcomes

Matrix of Program Learning Outcomes and Institutional Learning Outcomes Alignment – IT Plus COA

SLO	ILO A (Communication)	ILO B (Information Competency)	ILO C (Critical Thinking)	ILO D (Citizenship)
IT C146 SLO #4 Evaluate and discuss challenging technical concepts to determine effective and appropriate strategies and security technologies required to maintain security in a corporate environment.			96.15%	
IT C142 SLO #5 Describe how to provide appropriate customer support for different types of support requests.	100%			
IT C142 SLO #4 Explain how to properly and safely diagnose, resolve, and document common hardware and software issues and apply troubleshooting skills.		100%		
IT C143 SLO #5 Describe how to provide appropriate customer support as a network technician.				83.33%

Matrix of Program Learning Outcomes and Institutional Learning Outcomes Alignment – IT AS/COA

SLO	ILO A (Communication)	ILO B (Information Competency)	ILO C (Critical Thinking)	ILO D (Citizenship)
IT C251 SLO #1 Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, simple I/O, standard conditional and iterative structures, and the definition of functions			78.26%	
IT C142 SLO #5 Describe how to provide appropriate customer support for different types of support requests.	100%			
IT C270 SLO #1 Design and implement a relational database in 3rd Normal Form using an industrial-strength database management system.		93.1%		

SLO	ILO A (Communication)	ILO B (Information Competency)	ILO C (Critical Thinking)	ILO D (Citizenship)
IT C143 SLO #5 Describe how to provide appropriate customer support as a network technician.				83.33%

Matrix of Program Learning Outcomes and Institutional Learning Outcomes Alignment – Cyber Security AS/COA

SLO	ILO A (Communication)	ILO B (Information Competency)	ILO C (Critical Thinking)	ILO D (Citizenship)
IT C251 SLO #1 Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, simple I/O, standard conditional and iterative structures, and the definition of functions			78.26%	
IT C259 SLO #1 Propose Information Technology (IT)-based solutions for business needs, including planning for prioritized implementation using formal project management methods.	100%			
IT C142 SLO #4 Explain how to properly and safely diagnose, resolve, and document common hardware and software issues and apply troubleshooting skills.		100%		
IT C259 SLO #4 Apply principles leading to high-level logical system characteristics (security, user interface design and experience, design of data and information requirements) while addressing potential ethical, cultural, and legal issues involved.				100%

Matrix of Program Learning Outcomes and Institutional Learning Outcomes Alignment – Data Analyst I COA

SLO	ILO A (Communication)	ILO B (Information Competency)	ILO C (Critical Thinking)	ILO D (Citizenship)
IT C251 SLO #1 Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, simple I/O, standard conditional and iterative structures, and the definition of functions			78.26%	
BSAD C220 SLO #1 Assess methods involved in initiating, planning, executing, monitoring, controlling, and closing projects.	100%			
IT C270 SLO #1 Design and implement a relational database in 3rd Normal Form using an industrial-strength database management system.		93.1%		

SLO	ILO A (Communication)	ILO B (Information Competency)	ILO C (Critical Thinking)	ILO D (Citizenship)
BSAD C222 SLO #1 Manage and manipulate data from internal and external systems for inclusion in analysis and reporting.				85%

2.2.3 Course Matrix

Matrix of Courses and Program Learning Outcomes Alignment

Information Technology Plus COA

Program Learning Outcomes

1. Interpret and use technical information in communications to solve common business programs using Information Technology systems and applications.
2. Apply support strategies in client computing and user support, including the ability to configure, install, diagnose, and support hardware and software issues.
3. Design, analyze, and support computer networks.
4. Evaluate and apply network security solutions related to servers, storage, and virtualization.

Course	PLO 1	PLO 2	PLO 3	PLO 4
IT C101	X			
IT C142	X	X		X
IT C143	X		X	X
IT C146	X		X	X

Information Technology COA/AS

Program Learning Outcomes

1. Demonstrate competency in client computing and user support including the ability to configure, install, diagnose, and support hardware and software issues.
2. Demonstrate competency in database and information management including the ability to design, implement, query, and manage relational databases.
3. Demonstrate competency in networking and convergence including the ability to design, analyze, and support computer networks.
4. Demonstrate competency in problem-solving, programming, and application development including the ability to design, test, debug, and implement complex computer programs.
5. Demonstrate competency in working with servers, storage, and virtualization including implementing and evaluating network security solutions.

6. Demonstrate an ability to read and interpret technical information, as well as communicate with and write clearly for wide ranges of audiences.

Course	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
IT C101	X					
IT C142	X					X
IT C143			X			X
IT C146					X	
IT C251				X		
IT C270		X				
MATH C121				X		
MATH C121H				X		
MATH C130				X		
MATH C131				X		

Cyber Security COA/AS

Program Learning Outcomes

1. Configure, install, diagnose, and support hardware and software issues.
2. Utilize identifying tools and methodologies that hackers use to break into a network computer and defend a computer and local area network against a variety of different types of security attacks using a number of hands-on techniques.
3. Design, analyze, and support computer networks.
4. Apply problem solving, programming, and application development including the ability to design, test, debug, and implement complex computer programs.
5. Operate servers, storage, and virtualization including implementing and evaluating network security solutions.
6. Read and interpret technical information, as well as communicate with and write clearly for wide ranges of audiences.

Course	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
IT C101						X
IT C142	X					X

Course	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
IT C143			X			X
IT C146		X			X	
IT C248					X	
IT C251				X		
IT C255		X				
IT C259		X				
MATH C121				X		
MATH C121H				X		
MATH C130				X		
MATH C131				X		

Data Analyst I COA

Program Learning Outcomes

1. Manage multiple components, timelines, technology, and people related to data analysis projects.
2. Design, create, query, and manage databases for analytic processing using SQL (Structured Query Language) and DBMS (Database Management System) applications.
3. Write computer programs to access and manipulate data files and databases.
4. Analyze data using forecasting, optimization, and changing scenarios and prepare reports using spreadsheets, word processing, and database management programs.

Course	PSLO 1	PSLO 2	PSLO 3	PSLO 4
IT C251			X	
IT C270		X		
BSAD C220	X			
BSAD C222				X

The Data Analyst I COA is designed to provide a small certificate for students to be able to complete quickly and provide skills for immediate use on the job. This certificate is new (approved Spring 2016) and is an additional certificate for both business and IT/Cyber majors. All courses are offered online and provide students with adequate access to complete it. Since the certificate only has four courses, the pathway and program learning outcomes are clear. The courses complement each other and partner IT courses (IT C251 and IT C270) with two management courses (BSAD C220 and BSAD C222) from existing curriculum. Employers are embracing the certificate and have asked about a Data Analyst II certificate as “big data” is becoming a new focus for Business, IT and Cyber Security.

The IT certificates and degrees provide clear paths to achieving the program learning outcomes and the design of the program where certificates are stacked (IT Plus/IT COA) is intentional for that purpose. The IT AS and Cybersecurity AS programs were designed to align with the California State Model Curriculum and each course fulfills the program learning outcomes and prepares students for employment or transfer. The first course (IT C101) provides students baseline knowledge to move through each of the courses in the program. There is no unnecessary duplication but a continual building of knowledge and applied skills. The courses and the program are aligned with industry requirements (industry certifications) that are required for employment. The baseline certificate (IT Plus) has four courses that prepares students for the higher-level courses and certificates. The initial course (IT C101) builds a base of knowledge that is added to each subsequent course. There is little duplication, and we strongly suggest that students take the courses in the sequence to be most successful.

The IT and Cybersecurity degrees and certificates are designed so students can complete the degrees and certificates entirely online. Students start with the first four classes that culminate in a small certificate called Information Technology Plus (13 units). They then take two additional classes and a math class and earn the IT certificate (19 units) or Cybersecurity Technician certificate (19 units). Lastly, students complete the General Education requirements and earn one of the two degrees.

The pathways and the long-term schedule are designed as a suggested sequence for students to complete the degree within two years. The entry class (IT C101) is taught every semester online and at IWW. It is taught every spring at ESCC utilizing interactive television.

Each class in the IT pathway is aligned with an industry certification as well as aligning to the program learning outcomes. Each course is unique in its SLOs as students start with the baseline course (IT C101) where topics (hardware, software, networking, internet, security) are introduced and with each course, the depth of each area is covered. For example, IT C101 covers various topics in hardware, software, networking, internet, security and then students enter the next course IT C142 which is aligned with the CompTIA A+ certification exam and the model curriculum. In that course, students cover in depth each of the hardware components for example at a level that is not covered in IT C101. When they move to the IT C143 class which is aligned with the CompTIA Networking+ exam and model curriculum, there is an expectation that students understand the content of IT C142. In the course outline of record, it is strongly recommended to students that they take that class first as an advisory. This recommendation is reinforced by Counseling and area faculty within the first two courses (IT C101 and C142).

2.2.4 Assessment History

	Information Technology Plus COA PLO Assessment Results
PLO 1:	Interpret and use technical information in communications to solve common business programs using Information Technology systems and applications.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C101, IT C142, ITC143, and IT C146.
Assessment Date:	Fall 2021
Recent Results:	94.87%

	Information Technology Plus COA PLO Assessment Results
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 2:	Apply support strategies in client computing and user support, including the ability to configure, install, diagnose, and support hardware and software issues.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C142.
Assessment Date:	Fall 2021
Recent Results:	100%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 3:	Design, analyze, and support computer networks.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C143 and IT C146.
Assessment Date:	Fall 2021
Recent Results:	88.89%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 4:	Evaluate and apply network security solutions related to servers, storage, and virtualization.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C142, IT C143, and IT C146.
Assessment Date:	Fall 2021
Recent Results:	94.55%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.

	Information Technology COA and AS PLO Assessment Results
PLO 1:	Demonstrate competency in client computing and user support including the ability to configure, install, diagnose, and support hardware and software issues.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C101 and IT C142
Assessment Date:	Fall 2021
Recent Results:	100%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 2:	Demonstrate competency in database and information management including the ability to design, implement, query, and manage relational databases.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C270.
Assessment Date:	Fall 2021
Recent Results:	93.1%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 3:	Demonstrate competency in networking and convergence including the ability to design, analyze, and support computer networks.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C143.
Assessment Date:	Fall 2021
Recent Results:	83.33%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 4:	Demonstrate competency in problem-solving, programming, and application development including the ability to design, test, debug, and implement complex computer programs.
Target:	70%

Information Technology COA and AS PLO Assessment Results	
Assessment Method:	Assessed with mapped CSLOs in IT 251, MATH C121 and MATH C130. MATH C131 was not included in the original PLO mappings. This was an oversight, and it will be mapped and assessed in the next cycle.
Assessment Date:	Fall 2021
Recent Results:	75.92%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 5:	Demonstrate competency in working with servers, storage, and virtualization including implementing and evaluating network security solutions.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C146.
Assessment Date:	Fall 2021
Recent Results:	96.15%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 6:	Demonstrate an ability to read and interpret technical information, as well as communicate with and write clearly for wide ranges of audiences.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C142 and IT C143
Assessment Date:	Fall 2021
Recent Results:	91.67%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.

Cyber Security COA and AS PLO Assessment Results	
PLO 1:	Configure, install, diagnose, and support hardware and software issues.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C142
Assessment Date:	Fall 2021

Cyber Security COA and AS PLO Assessment Results	
Recent Results:	100%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 2:	Utilize identifying tools and methodologies that hackers use to break into a network computer and defend a computer and local area network against a variety of different types of security attacks using a number of hands-on techniques.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C146, IT 255, and IT 259.
Assessment Date:	Fall 2021
Recent Results:	97.1%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 3:	Design, analyze, and support computer networks.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C143.
Assessment Date:	Fall 2021
Recent Results:	80.77%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 4:	Apply problem solving, programming, and application development including the ability to design, test, debug, and implement complex computer programs.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C251, MATH 121/H, and MATH 130.
Assessment Date:	Fall 2021
Recent Results:	75.95
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review. MATH C131 was not included in the original PLO mappings. This was an oversight, and it will be mapped and assessed in the next cycle.

Cyber Security COA and AS PLO Assessment Results	
PLO 5:	Operate servers, storage, and virtualization including implementing and evaluating network security solutions.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C146 and IT C248.
Assessment Date:	Fall 2021
Recent Results:	97.4%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 6:	Read and interpret technical information, as well as communicate with and write clearly for wide ranges of audiences.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C101, C142 and IT C143.
Assessment Date:	Fall 2021
Recent Results:	94.44%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.

Data Analyst I COA PLO Assessment Results	
PLO 1:	Manage multiple components, timelines, technology, and people related to data analysis projects.
Target:	70%
Assessment Method:	Assessed with mapped CSLO in BSAD C220.
Assessment Date:	Fall 2021
Recent Results:	94.12%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 2:	Design, create, query, and manage databases for analytic processing using SQL (Structured Query Language) and DBMS (Database Management System) applications.
Target:	70%

Data Analyst I COA PLO Assessment Results	
Assessment Method:	Assessed with mapped CSLOs in IT C270.
Assessment Date:	Fall 2021
Recent Results:	80%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 3:	Write computer programs to access and manipulate data files and databases.
Target:	70%
Assessment Method:	Assessed with mapped CSLOs in IT C251.
Assessment Date:	Fall 2021
Recent Results:	78.26%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.
PLO 4:	Analyze data using forecasting, optimization, and changing scenarios and prepare reports using spreadsheets, word processing, and database management programs.
Target:	70%
Assessment Method:	Assessed with mapped CSLO in BSAD C222.
Assessment Date:	Fall 2021
Recent Results:	95%
Analysis and Plan for Improvement and Reassessment:	The students performed above the expected target. As a result, there is no plan for improvement. The program will be reassessed during the next program review.

PLO Assessment History Summary

PLO #	Target	Semester	Met?
Information Technology Plus COA			
PLO 1	70%	FA21	94.87%
PLO 2	70%	FA21	100%
PLO 3	70%	FA21	88.89%
PLO 4	70%	FA21	94.55%
Information Technology COA/AS			
PLO 1	70%	FA21	100%
PLO 2	70%	FA21	93.1%
PLO 3	70%	FA21	83.33%
PLO 4	70%	FA21	75.92%
PLO 5	70%	FA21	96.15%

PLO #	Target	Semester	Met?
PLO 6	70%	FA21	91.67%
Cyber Security COA/AS			
PLO 1	70%	FA21	100%
PLO 2	70%	FA21	97.1%
PLO 3	70%	FA21	80.77%
PLO 4	70%	FA21	75.95%
PLO 5	70%	FA21	97.4%
PLO 6	70%	FA21	94.44%
Data Analyst I COA			
PLO 1	70%	FA21	94.12%
PLO 2	70%	FA21	80%
PLO 3	70%	FA21	78.26%
PLO 4	70%	FA21	95%

2.2.5 Evaluation of Program Learning Outcomes

Students in the IT/Cyber Security programs are doing well and meeting the overall targets for the program. Two additional certificates (Cloud Computing COA and Linux Administration COA) were developed over the past six years. Neither certificate is included in this program review as data collection has not begun.

The gap in the targets from 75%-90% are reflective of the different instructors in the programs. IT C101 and IT C142 are taught by multiple instructors that work together to identify the same assessment tool. The other courses in the program are taught by individual faculty members who select the assessment tool for their courses.

2.3 Course Student Learning Outcomes

2.3.1 Assessment History

SLO Assessment 5-Year History

Course	SLO #	Target	Semester	Met?	Semester	Met?
IT C101	SLO 1	70%	SP20	85.87%		
	SLO 2	70%	SP20	87.78%		
	SLO 3	70%	SP20	100%		
IT C142	SLO 1	70%	FA19	100%		
	SLO 2	70%	FA19	100%		
	SLO 3	70%	FA19	93.75%		
	SLO 4	70%	FA19	100%		
	SLO 5	70%	FA19	100%		
	SLO 6	70%	FA19	100%		
IT C143	SLO 1	70%	FA19	83.33%		

Course	SLO #	Target	Semester	Met?	Semester	Met?
	SLO 2	70%	FA19	75%		
	SLO 3	70%	FA19	62.5%	FA20	80.77%
	SLO 4	70%	FA19	87.5%		
	SLO 5	70%	FA19	83.33%		
IT C146	SLO 1	70%	FA21	97%		
	SLO 2	70%	FA19	96.15%		
	SLO 3	70%	FA19	96.15%		
	SLO 4	70%	FA19	96.15%		
	SLO 5	70%	FA19	96.15%		
IT C248	SLO 1	70%	FA19	100%		
	SLO 2	70%	FA19	100%		
	SLO 3	70%	FA19	100%		
	SLO 4	70%	FA19	100%		
IT C251	SLO 1	70%	FA19	78.26%		
	SLO 2	70%	FA19	87.23%		
	SLO 3	70%	FA19	93.88%		
IT C255	SLO 1	70%	FA19	53.85%	FA21	86.00%
	SLO 2	70%	FA19	57.69%	FA21	89.00%
	SLO 3	70%	FA19	53.85%	FA21	93.00%
IT C259	SLO 1	70%	SP20	100%		
	SLO 2	70%	SP20	100%		
	SLO 3	70%	SP20	100%		
	SLO 4	70%	SP20	100%		
	SLO 5	70%	SP20	100%		
IT C270	SLO 1	70%	FA19	93.1%		
	SLO 2	70%	FA19	66.67%	FA20	80%
	SLO 3	70%	FA19	93.1%		
BSAD C220	SLO 1	70%	SP20	100%		
	SLO 2	70%	SP20	94.12%		
	SLO 3	70%	SP20	94.12%		
BSAD 222	SLO 1	70%	SP20	85%		

Course	SLO #	Target	Semester	Met?	Semester	Met?
	SLO 2	70%	SP20	95%		
	SLO 3	70%	SP20	90%		
	SLO 4	70%	SP20	90%		
MATH C121	SLO 1	70%	SP20	73.6%		
	SLO 2	70%	SP20	76.7%		
	SLO 3	70%	SP20	60.6%	SP20	80%
	SLO 4	70%	SP20	77.5%		
MATH C121H	SLO 5	70%	SP20	80.5%		
MATH C130	SLO 1	70%	FA20	33.3%	FA20	72%
	SLO 2	70%	FA20	41.6%	FA20	74.2%
	SLO 3	70%	FA20	33.3%	FA20	73%
MATH C131	SLO 1	70%	SP 19	90.9%		
	SLO 2	70%	SP 19	86.3%		
	SLO 3	70%	SP 19	54.5%	SP 20	77.4%
	SLO 4	70%	SP 19	86.3%		
	SLO 5	70%	SP 19	77.2%		
	SLO 6	70%	SP 19	90.9%		
	SLO 7	70%	SP 19	90.9%		
	SLO 8	70%	SP 19	54.5%	SP 20	71%
	SLO 9	70%	SP 19	86.4%		
	SLO 10	70%	SP 19	77.2%		

It should be noted that the Linux and Cloud Computing courses were not assessed as the IT C280 Cloud Computing class was offered once in the Fall 2021 while this was being written and IT C290 Linux Administration I is currently being taught this Spring 2022 term. The courses will be assessed on the same schedule as the other IT/Cyber courses in the next program review.

2.3.2 Evaluation of Student Learning Outcomes

Students are achieving the stated learning outcomes for the courses in the IT/Cyber Security/Data Analyst certificates and degrees. The targets for the student learning outcomes were set at 70% and with a few exceptions, student exceeded the targets. Overall students are meeting the SLOs for the courses and the programs. The gap in the targets from 75%-90% are reflective of the different instructors in the programs. IT C101 and IT C142 are taught by multiple instructors that work together to

identify the same assessment tool. The other courses in the program are taught by individual faculty members who select the assessment tool for their courses.

The following three courses did not meet their initial SLO targets. The course name, SLO(s) and re-evaluation summaries are included.

IT C143 Computer Network Fundamentals

- SLO #3. Analyze and design a simple Ethernet network using routers and switches.

The initial evaluation of the SLO was 62.5%. Additional focus was placed on the instruction for the section and, upon reassessment the following semester, students met the SLO at 80.77%.

IT C255 Introduction to Cybersecurity: Ethical Hacking

- SLO #1. Describe and categorize the tools and methods a "hacker" uses to break into a computer or network. 53.85%
- SLO #2. Defend a computer and a Local Area Network (LAN) against a variety of different types of security attacks using a number of hands-on techniques, 57.69%.
- SLO #3. Evaluate and demonstrate safe techniques on the World Wide Web, 53.85%.

In IT C255, the adjunct instructor left the college. In fall 2020, another adjunct taught the course and left before completing the assessments. Subsequently, in fall 2021, the course was assessed by a full-time instructor of the course. To avoid this in the future, the department chair will need to monitor these assessment data since regular full-time faculty do not have access to data other than their own in eLumen.

IT C270 Intro to Database Design/ Management

- SLO #2. Use the data definition, data manipulation, and data control language components of Structured Query Language (SQL) in the context of one widely used implementation of the language. 66.67%

In the Fall 2020 reassessment of SLO #2, students were reminded several times of the amount of work necessary for the assignment. The SLO was met at 80%.

Overall, SLO targets have been met. Faculty reviewed the target and determined that the SLOs reflect required standards

2.4 Planning

2.4.1 Planned Assessment Cycles for PLOs and SLOs

Assessments will be done for the IT/Cyber program during the Fall 2024 and Spring 2025 term. PLO assessments will be done in Fall of 2025.

PLO Assessment Cycle

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
PLO 1							X	

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
PLO 2							X	
PLO 3							X	
PLO 4							X	

SLO Assessment Cycle

Information Technology Plus COA

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
IT C101								
SLO 1					X			
SLO 2					X			
SLO 3					X			
IT C142								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C143								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C146								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			

Information Technology COA/AS

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
IT C101								
SLO 1					X			
SLO 2					X			
SLO 3					X			
IT C142								
SLO 1					X			

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C143								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C146								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C251								
SLO 1						X		
SLO 2						X		
SLO 3						X		
SLO 4						X		
SLO 5						X		
SLO 6						X		
IT C270								
SLO 1					X			
SLO 2					X			

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			

Cyber Security COA/AS

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
IT C101								
SLO 1					X			
SLO 2					X			
SLO 3					X			
IT C142								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C143								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			
IT C146								
SLO 1					X			
SLO 2					X			
+SLO 3					X			
SLO 4					X			
SLO 5					X			

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
SLO 6					X			
IT C248								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
IT C251								
SLO 1						X		
SLO 2						X		
SLO 3						X		
SLO 4						X		
SLO 5						X		
SLO 6						X		
IT C255								
SLO 1					X			
SLO 2					X			
SLO 3					X			
IT C259								
SLO 1						X		
SLO 2						X		
SLO 3						X		
SLO 4						X		
SLO 5						X		

Data Analyst I COA

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
BSAD C220								
SLO 1					X			

	FA 2022	SP 2023	FA 2023	SP 2024	FA 2024	SP 2025	FA 2025	SP 2026
SLO 2					X			
SLO 3					X			
SLO 4					X			
BSAD C222								
SLO 1						X		
SLO 2						X		
SLO 3						X		
SLO 4						X		
SLO 5						X		
IT C251								
SLO 1						X		
SLO 2						X		
SLO 3						X		
SLO 4						X		
SLO 5						X		
SLO 6						X		
IT C270								
SLO 1					X			
SLO 2					X			
SLO 3					X			
SLO 4					X			
SLO 5					X			
SLO 6					X			

The faculty found that our strategy of doing all the assessments in the same year provided us a snapshot in time of how the programs were doing. We had adequate time to review assessments and then re-assess where necessary.

Part 3: Trends

3.1 Student Experience and Trends

It has been mentioned previously that our courses are aligned with industry recognized certifications. These certifications are through the CompTIA organization. While faculty get anecdotal information

from students on how they do on the exams, it is not comprehensive. As with employment reporting and the privacy issues, it is difficult to assess how the students perform on the exams. We plan to explore through CompTIA if there is a way that we can capture this information.

3.1.1 Student Majors

The breakdown of majors among the degrees and certificates is provided below. This table includes only unduplicated headcounts. It does not reflect students that might be enrolled in more than one program or who may earn a certificate on their way toward earning a degree.

IT Majors -- Unduplicated Headcount

IT Majors		2016-17	2017-15	2018-19	2019-20	2020-21
Information Technology Plus Certificate	Total	6	8	12	9	13
	% of Total	4%	4%	5%	3%	4%
	Yr to Yr Change	0%	33%	50%	-25%	44%
Information Technology & Computer Information Systems Cert	Total	31	29	34	36	42
	% of Total	19%	14%	13%	12%	14%
	Yr to Yr Change	0%	-6%	17%	6%	17%
Information Technology & Computer Information Systems AS	Total	105	117	138	153	137
	% of Total	65%	57%	53%	50%	45%
	Yr to Yr Change	0%	11%	18%	11%	-10%
Cyber Security Certificate	Total		8	12	15	16
	% of Total	0%	4%	5%	5%	5%
	Yr to Yr Change		0%	50%	25%	7%
Cyber Security AS	Total	16	42	60	86	92
	% of Total	10%	20%	23%	28%	30%
	Yr to Yr Change	0%	163%	43%	43%	7%
Data Analyst I Certificate	Total	4	2	5	7	7
	% of Total	2%	1%	2%	2%	2%
	Yr to Yr Change	0%	-50%	150%	40%	0%
IT Program Total	Total	162	206	261	306	307

IT Majors		2016-17	2017-18	2018-19	2019-20	2020-21
	Yr to Yr Change	0%	27%	27%	17%	0%
	% of College	2%	2%	3%	3%	4%
College-wide	Total	8,978	9,556	10,146	9,967	8,614
	Yr to Yr Change	0%	6%	6%	-2%	-14%

The total number of students majoring in IT program degrees and certificates has risen over the past five years but the choice of degree and/or certificate has slowly shifted from Information Technology to Cybersecurity. In 2016-17, Information Technology (IT Plus, IT/CIS Cert, and IT/CIS AS) represented 88% of the program's majors. In 2020-21, that percentage dropped to 63%. The Information Technology AS degree is still the most popular major (45%) but the Cybersecurity AS is growing (30%). The Data Analyst I certificate is the least popular and has remained static with about 2% of the program's majors. The IT program is a popular program at Cerro Coso with about 4% of the students declaring one of the program's majors. This percentage has slowly increased as the college's numbers have decreased.

Many non-majors take some of our courses, especially our gateway course, IT C101. This survey course provides majors and non-majors with broad exposure to many of the topics and procedures related to information technology. The course is required by several non-IT programs and is taken by other students as a course to determine if IT is a career that they would like to pursue. The table below (IT C101 Course Enrollment by Major) shows the breakdown of majors of students that have enrolled in the course over the past five years. The number of non-IT program majors has fluctuated. The reason for this is unknown at this time. The table also shows most of the students are Cerro Coso students. The lowest percentage of Cerro Coso students was 82% in 2018-19 prior to COVID. Since that time, it appears that students from the other colleges have opted to take the courses at their home college or have done something else. This is to be expected as the other colleges in the district offer a similar course. We have been fortunate that our programs have bounced back from the "COVID effect" and seem to be doing well.

IT C101 Course Enrollments by Major

CSCI/IT C101 Course Enrollments by Major		2016-17	2017-18	2018-19	2019-20	2020-21
All Majors	Total	334	301	340	310	257
	% of Total	100.0%	100.0%	100.0%	100.0%	100.0%
	Yr to Yr Change	0.0%	-9.9%	13.0%	-8.8%	-17.1%
CSCI/IT/Cyber	Total	60	77	58	85	86
	% of Total	18.0%	23.1%	17.4%	25.4%	25.7%
	Yr to Yr Change	0.0%	28.3%	-24.7%	46.6%	1.2%
Business	Total	77	62	97	80	58

CSCI/IT C101 Course Enrollments by Major		2016-17	2017-18	2018-19	2019-20	2020-21
	% of Total	23.1%	18.6%	29.0%	24.0%	17.4%
	Yr to Yr Change	0.0%	-19.5%	56.5%	-17.5%	-27.5%
Office Tech	Total	6	3	2	8	11
	% of Total	1.8%	0.9%	0.6%	2.4%	3.3%
	Yr to Yr Change	0.0%	-50.0%	-33.3%	300.0%	37.5%
Web Design	Total	4	11	7	10	16
	% of Total	1.2%	3.3%	2.1%	3.0%	4.8%
	Yr to Yr Change	0.0%	175.0%	-36.4%	42.9%	60.0%
Engineering	Total	16	4	4	7	1
	% of Total	4.8%	1.2%	1.2%	2.1%	0.3%
	Yr to Yr Change	0.0%	-75.0%	0.0%	75.0%	-85.7%
Nursing	Total	15	6	12	9	7
	% of Total	4.5%	1.8%	3.6%	2.7%	2.1%
	Yr to Yr Change	0.0%	-60.0%	100.0%	-25.0%	-22.2%
Other	Total	156	138	160	111	78
	% of Total	46.7%	41.3%	47.9%	33.2%	23.4%
	Yr to Yr Change	0.0%	-11.5%	15.9%	-30.6%	-29.7%
Bakersfield College		36	27	59	12	9
Cerro Coso Community College		295	272	279	297	245
Porterville College		2	2	2	1	3
Unknown Home College		1				
Cerro Coso Students %		88%	90%	82%	96%	95%

3.1.2 Student Demographics and Equity

The tables below show a consolidated views of the gender, ages, and ethnicity of all IT majors. Also included are the consolidated percentages of all Cerro Coso majors. It should be noted that the Cerro Coso percentage includes the IT majors.

IT Majors -- Gender

IT Majors -- Gender		2016-17	2017-18	2018-19	2019-20	2020-21
Men	Total	110	150	175	216	212
	Program %	68%	73%	67%	71%	69%
	Cerro Coso %	59%	57%	56%	56%	54%
Women	Total	50	54	82	87	91
	Program %	31%	29%	31%	28%	30%
	Cerro Coso %	40%	42%	43%	42%	45%
Not Reported	Total	2	2	4	3	4
	Program %	1%	1%	2%	1%	1%
	Cerro Coso %	1%	1%	1%	1%	1%
Total		162	206	261	306	307

The above table (IT Majors -- Gender) shows that the number of students is increasing but the percentage of male/female students is relatively flat. Male students make up the majority of students in the program at a higher rate than that of the college overall. We will be exploring strategies to attract females into the IT/Cyber programs.

IT Majors -- Ages

IT Majors -- Ages		2016-17	2017-18	2018-19	2019-20	2020-21
17 or Younger	Total	23	27	49	53	64
	Program %	14%	13%	19%	17%	21%
	Cerro Coso %	10%	10%	13%	13%	14%
18-19	Total	15	21	24	38	43
	Program %	9%	10%	9%	13%	14%
	Cerro Coso %	12%	11%	11%	12%	11%
20-24	Total	23	40	58	70	67
	Program %	14%	19%	22%	23%	22%
	Cerro Coso %	23%	22%	21%	20%	18%
25-29	Total	25	30	33	41	40
	Program %	15%	15%	13%	13%	13%
	Cerro Coso %	17%	17%	16%	15%	14%

IT Majors -- Ages		2016-17	2017-18	2018-19	2019-20	2020-21
30-34	Total	20	25	30	33	34
	Program %	12%	12%	11%	11%	11%
	Cerro Coso %	12%	12%	12%	12%	14%
35-39	Total	20	18	21	31	28
	Program %	12%	9%	8%	10%	9%
	Cerro Coso %	8%	9%	9%	9%	10%
40-49	Total	24	30	24	24	24
	Program %	15%	15%	9%	8%	8%
	Cerro Coso %	11%	12%	11%	11%	12%
50 and Older	Total	12	15	22	16	7
	Program %	7%	7%	8%	5%	2%
	Cerro Coso %	7%	7%	7%	7%	7%
Total		162	206	261	306	307

The above table (IT Majors -- Ages) shows that, currently, close to 60% of the program's majors are under the age of 24. At the beginning of this period, that number was 37%. This percentage is about 10% higher than Cerro Coso's overall but both appear to show an increase in the number of younger students and a decrease in the number of older students. This could, however, be attributed to the COVID pandemic.

IT Majors - Ethnicity

IT Majors -- Ethnicity		2016-17	2017-18	2018-19	2019-20	2020-21
African American	Total	6	6	7	11	17
	Program %	4%	3%	3%	4%	6%
	Cerro Coso %	5%	6%	7%	7%	7%
American Indian	Total	1	1	4	4	4
	Program %	1%	0%	2%	1%	1%
	Cerro Coso %	1%	2%	1%	1%	2%
Hispanic/ Latino	Total	50	61	81	90	98
	Program %	31%	30%	31%	29%	32%

IT Majors -- Ethnicity		2016-17	2017-18	2018-19	2019-20	2020-21
	Cerro Coso %	40%	41%	43%	44%	45%
Asian	Total	4	9	7	14	8
	Program %	2%	4%	3%	5%	3%
	Cerro Coso %	3%	3%	3%	3%	3%
Filipino	Total	4	2	7	7	6
	Program %	2%	1%	3%	2%	2%
	Cerro Coso %	1%	1%	1%	1%	1%
Pacific Islander	Total	0	0	1	1	2
	Program %	0%	0%	0%	0%	1%
	Cerro Coso %	0%	0%	0%	0%	0%
White	Total	88	111	130	159	155
	Program %	54%	54%	50%	52%	51%
	Cerro Coso %	43%	40%	38%	37%	36%
Two or More Races	Total	9	16	22	19	16
	Program %	6%	8%	8%	6%	5%
	Cerro Coso %	5%	5%	5%	4%	4%
Not Reported	Total	0	0	2	1	1
	Program %	0%	0%	1%	0%	0%
	Cerro Coso %	1%	3%	2%	2%	1%
Total		162	206	261	306	307

The above table (IT Majors Ethnicity) shows a slightly decreasing majority percentage of White students in the IT Program. While the numbers have fluctuated slightly, the ethnicity breakdown has been around 50% White, 30% Hispanic/Latino, 6% Two or More Races, and 5% African American. This breakdown does not mirror the college's current overall breakdown of 36% White, 45% Hispanic/Latino, 4% Two or More Races, and 7% African American. We will be focusing on closing the gap in African American and Hispanic/Latino students. There has been conversation about whether the ISEP student population has shifted the demographics from our program.

IT Majors -- Consolidated Ed Plan		2016-17	2017-18	2018-19	2019-20	2020-21
Abbreviated	Total	22	26	30	35	36
	Program %	14%	13%	11%	11%	12%
	Cerro Coso %	16%	15%	15%	12%	10%
Comprehensive	Total	65	71	70	77	93
	Program %	40%	34%	27%	25%	30%
	Cerro Coso %	21%	20%	19%	23%	28%
Both (Abbrev. and Comp.)	Total	16	33	47	64	47
	Program %	10%	16%	18%	21%	15%
	Cerro Coso %	21%	20%	19%	23%	28%
Follow up Ed Plan	Total	2	1	1	2	2
	Program %	1%	0%	0%	1%	1%
	Cerro Coso %	0.4%	0.2%	0.1%	0.1%	0.1%
Exempt	Total	3	9	10	7	2
	Program %	2%	4%	4%	2%	1%
	Cerro Coso %	5%	6%	4%	3%	1%
No Ed Plan	Total	54	66	103	121	127
	Program %	33%	32%	39%	40%	41%
	Cerro Coso %	43%	42%	43%	43%	44%
	Total	162	206	261	306	307

The above table (IT Majors -- Consolidated Ed Plan) shows that an increasing number of students (now 41%) do not have an Ed Plan in place. This is concerning as it points to students' probable lack of awareness and understanding of the department's long-term schedule and prerequisite/advisory sequencing.

The Information Technology program at Cerro Coso is a growing program. The demographics for the program, however, clearly show that the program is made up of younger, white, male students. While

the college, overall, is changing demographically, the IT Program is not. The static demographics breakdown may be due to the inability to teach IT courses in the growing incarcerated student program. The increasing number of students without an education plan reflects a certain lack of direction for completion of degrees and certificates at Cerro Coso.

The IT Program faculty constantly update our curriculum and the supplemental material for the students through applicable articles, instructional videos, and ability to obtain industry certification. We provide tutoring each semester along with additional library resources including databases, embedded librarian, and other links. We use the most current textbook materials along with the most current supplemental sources available and address additional needs in the annual unit plan.

We have a Job Development Specialist at Cerro Coso that works very closely with industry to place students in internships, job-shadowing, part-time, and full-time placements. Postings at the college give students a listing of the various opportunities. The Job Development Specialist works directly with both students and industry partners to successfully place qualified students in appropriate positions. Our yearly advisory committee meetings also provide a source for additional position opportunities and feedback for the local business leaders.

3.1.3 Student Demand

The tables below display the demand for courses in the IT Program’s degrees and certificates. As noted elsewhere, there is a large amount of crossover between the courses offered in the degrees and certificates. Additionally, the traditionally delivered courses include only IT C101 and several of the math courses.

Information Technology Plus COA

Distance Ed

IT Plus COA – Distance Ed	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	4	4	4	4	4
Section Count	14	19	17	17	19
First Day Enrollment	558	684	713	601	619
Census Enrollment	436	536	579	502	557
Mean Students per Section	31.1	28.2	34.1	29.5	29.3
First Day Waitlist	36	7	25	24	9

Traditional

IT Plus COA – Traditional	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	1	1	1	1	1
Section Count	3	3	3	2	1
First Day Enrollment	74	49	47	43	13
Census Enrollment	67	42	49	47	13
Mean Students per Section	22.3	14.0	16.3	23.5	13.0
First Day Waitlist	0	0	0	0	0

Total

IT Plus COA – Total	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	4	4	4	4	4
Section Count	17	22	20	19	20
First Day Enrollment	632	733	760	644	632
Census Enrollment	503	578	628	549	570
Mean Students per Section	29.6	26.3	31.4	28.9	28.5
First Day Waitlist	36	7	25	24	9

Information Technology AS/COA

Distance Ed

IT AS/COA – Distance Ed	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	10	10	10	10	10
Section Count	27	31	30	33	43
First Day Enrollment	1,121	1,147	1,206	1,172	1,365
Census Enrollment	877	926	1,015	982	1,194
Mean Students per Section	32.5	29.9	33.8	29.8	27.8
First Day Waitlist	70	50	73	61	15

Traditional

IT AS/COA – Traditional	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	4	3	4	4	4
Section Count	11	14	20	33	20
First Day Enrollment	224	272	435	725	472
Census Enrollment	233	282	465	704	460
Mean Students per Section	21.2	20.1	23.3	21.3	23.0
First Day Waitlist	19	15	17	15	4

Total

IT AS/COA – Total	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	11	10	11	10	10
Section Count	38	45	50	66	63
First Day Enrollment	1,345	1,419	1,641	1,897	1,837
Census Enrollment	1,110	1,208	1,480	1,686	1,654
Mean Students per Section	29.2	26.8	29.6	25.5	26.3
First Day Waitlist	89	65	90	76	19

Cyber Security AS/COA

Distance Ed

Cyber AS/COA – Distance	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	8	10	10	11	11
Section Count	24	30	29	33	43
First Day Enrollment	1,007	1,101	1,161	1,163	1,352
Census Enrollment	781	892	978	974	1,191
Mean Students per Section	32.5	29.7	33.7	29.5	27.7
First Day Waitlist	63	42	71	60	15

Traditional

Cyber AS/COA – Traditional	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	3	2	4	3	3
Section Count	9	11	17	29	16
First Day Enrollment	207	219	426	683	443
Census Enrollment	206	224	430	650	414
Mean Students per Section	22.9	20.4	25.3	22.4	25.9
First Day Waitlist	19	15	17	15	4

Total

Cyber AS/COA – Total	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	9	10	11	11	11
Section Count	33	41	46	62	59
First Day Enrollment	1,214	1,320	1,587	1,846	1,795
Census Enrollment	987	1,116	1,408	1,624	1,605
Mean Students per Section	29.9	27.2	30.6	26.2	27.2
First Day Waitlist	82	57	88	75	19

Data Analyst I

Distance Ed

Data Analyst – Distance	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	4	4	4	4	4
Section Count	4	4	5	5	5
First Day Enrollment	166	149	180	165	144
Census Enrollment	125	113	142	146	123
Mean Students per Section	31.3	28.3	28.4	29.2	24.6
First Day Waitlist	20	25	1	12	3

Traditional

Data Analyst – Traditional	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	0	0	0	0	0
Section Count	0	0	0	0	0
First Day Enrollment	0	0	0	0	0
Census Enrollment	0	0	0	0	0
Mean Students per Section	0.0	0.0	0.0	0.0	0.0
First Day Waitlist	0	0	0	0	0

Total

Data Analyst – Total	2016-17	2017-15	2018-19	2019-20	2020-21
Course Count	4	4	4	4	4
Section Count	4	4	5	5	5
First Day Enrollment	166	149	180	165	144
Census Enrollment	125	113	142	146	123

Data Analyst – Total	2016-17	2017-15	2018-19	2019-20	2020-21
Mean Students per Section	31.3	28.3	28.4	29.2	24.6
First Day Waitlist	20	25	1	12	3

The above tables show the overall picture of enrollments during the review period. There have been some fluctuations in the number of sections offered and first day waitlists. This has largely been the result of adding additional sections of courses prior to the first day of class based on demand.

The table below (IT Program Demand Summary) displays a summary of the total (distance and traditional) mean students per section, a percentage of drops between the first day of classes and the Census date over the time period, and a comparison to the overall college demand. The mean number of students (on Census Day) in the IT Program is higher than the college overall. This makes sense since the IT Program is mostly online with higher seat counts. However, the percentage of students that drop between the first day of the course and the Census date is higher except for the 2020-21 year where it is the same or closer to it. The prior year differences may also be attributed to the online delivery method as well, but the lowering of the drop rate is a good trend.

IT Program Demand Summary

IT Program Demand Summary		2016-17	2017-18	2018-19	2019-20	2020-21
Information Technology Plus COA						
	Mean Students per Section	29.6	26.3	31.4	28.9	28.5
	Census Drop %	20%	21%	17%	15%	10%
Information Technology AS/COA						
	Mean Students per Section	29.2	26.8	29.6	25.5	26.3
	Census Drop %	17%	15%	10%	11%	10%
Cyber Security AS/COA						
	Mean Students per Section	29.9	27.2	30.6	26.2	27.2
	Census Drop %	19%	15%	11%	12%	11%
Data Analyst I COA						
	Mean Students per Section	31.3	28.3	28.4	29.2	24.6
	Census Drop %	25%	24%	21%	12%	15%
Total Cerro Coso						
	Mean Students per Section	21.1	21.6	22	21.9	23.4
	Census Drop %	13%	10%	7%	9%	10%

As discussed previously, our traditional course delivery consists of face-to-face offerings of IT C101 at the IWV and ESCC campuses. Additionally, several of the math courses are taught on-campus. All courses are taught online as well – students do not have to take courses in the traditional environment.

The number of sections offered over the period of this review has generally increased. This is due to demand and good enrollment management. The decrease in the pre-Census drop rate and high number of mean students per section also points to better enrollment management. This is important especially in light of the current COVID situation.

3.1.4 Course Retention and Success

Completion rates for IT Program courses are described in the table below (IT Program Course Completion Rate). The table cells with asterisks reflect courses that are below the overall Cerro Coso average completion rate for that year. The IT Program courses, on average, are below the Cerro Coso Average. Overall, for this timeperiod, 46 of the 65 courses (72%) have retention rates that are below the Cerro Coso average for their respective year.

IT Program Course Completion Rate

Completion Rate	2016-17	2017-18	2018-19	2019-20	2020-21
BSAD 220	75%*	71%*	79%*	75%*	79%*
BSAD 222	73%*	77%*	80%*	81%*	79%*
IT/CSCI C101	90%	88%	84%*	87%	82%*
IT/CSCI C142	93%	88%	86%*	76%*	78%*
IT/CSCI C143	92%	80%*	88%*	80%*	86%*
IT/CSCI C146	86%*	88%	92%*	94%	91%
IT C248/CSCI C193		87%*	89%*	86%*	93%
IT/CSCI C251	83%*	75%*	78%*	86%*	78%*
IT C255/CSCI C190	83%*	71%*	92%	90%	97%
IT C259/CSCI C195		100%	94%	96%	93%
IT/CSCI C270	80%*	77%*	86%*	84%*	76%*
MATH C121	81%*	86%*	85%*	80%*	82%*
MATH C121H	80%*		100%		
MATH C130	56%*	63%*	57%*	70%*	95%
Cerro Coso Overall	89%	88%	90%	87%	90%

*Reflect courses that are below the overall Cerro Coso average completion rate for that year

Success rates for IT Program courses are described in the table below (IT Program Course Success Rate). The table cells with asterisks reflect courses that are below the overall Cerro Coso average success rate for that year. The IT Program courses on average are below the Cerro Coso Average. Overall, for this period, 45 of the 65 courses (69%) have success rates that are below the Cerro Coso average for their respective year. IT C101 is a prerequisite for IT C248, C251, C259, C255, and C270. Most courses have advisories as well but, as advisories, they are not enforced. It should be noted that the average success rate for IT courses in the previous program review was 58%. The average success rate for IT courses in this program review is 70.8%. This is a substantial improvement. While this improvement is substantial, questions about the success rate and the data have come up. The success rates in some of the entry level courses (IT C101 and IT C142) seem abnormally low as compared to data kept by instructors. With IR not being staffed at the time of this program review, it was impossible to verified how the data was gathered and calculated.

IT Program Course Success Rate

Success Rate	2016-17	2017-18	2018-19	2019-20	2020-21
BSAD C220	61%*	47%*	57%*	50%*	80%
BSAD C222	60%*	65%*	55%*	76%	80%
IT/CSCI C101	74%	74%*	69%*	72%*	68%*
IT/CSCI C142	71%*	79%	70%*	69%*	69%*
IT/CSCI C143	82%	74%*	83%	70%*	77%*
IT/CSCI C146	70%*	65%*	68%*	61%*	75%*
IT C248/CSCI 193		83%	82%	81%	82%
IT/CSCI C251	74%	63%*	62%*	82%	65%*
IT C255/CSCI C190	57%*	52%*	67%*	45%*	79%
IT C259/CSCI C195		95%	90%	83%	86%
IT/CSCI C270	66%*	77%	67%*	74%*	70%*
MATH C121	62%*	69%*	68%*	60%*	65%*
MATH C121H	80%*		80%		
MATH C130	33%*	44%*	19%*	48%*	68%*
Cerro Coso Overall	74%	75%	78%	76%	79%

*Reflect courses that are below the overall Cerro Coso average completion rate for that year

The table below (IT Program Course Headcount) shows the headcount of program courses over the past five years. This does not show the number of sections. Enrollments have fluctuated somewhat. Many courses show increasing enrollment trends but several peaked pre-pandemic in 2018-19. As the feeder, required course, the decline of IT C101 enrollments is something that should be monitored carefully. IT C101, however, is one of the few face-to-face (traditional) courses in the program. The pandemic has affected enrollments in those courses without a doubt.

IT Program Course Headcount

Course Headcount	2016-17	2017-18	2018-19	2019-20	2020-21
BSAD 220	28	17	21	28	15
BSAD 222	20	17	20	25	15
IT/CSCI C101	334	301	340	310	257
IT/CSCI C142	41	153	120	118	120
IT/CSCI C143	49	84	93	74	93
IT/CSCI C146	79	40	71	72	99
IT C248/CSCI 193		30	55	21	28
IT/CSCI C251	42	40	65	56	56
IT C255/CSCI C190	23	21	24	29	33
IT C259/CSCI C195		20	31	29	30
IT/CSCI C270	35	39	36	43	37
MATH C121	396	412	574	896	827
MATH C121H	5		5		
MATH C130	18	16	21	23	19

The overall IT Program retention and success rates are summarized below.

IT Program Retention Rate

Retention Rate	2016-17	2017-18	2018-19	2019-20	2020-21
Traditional	94%	95%	83%	88%	62%
Distance Education	86%	85%	86%	82%	84%
Total	87%	85%	86%	82%	84%
Cerro Coso	89%	88%	90%	87%	90%

IT Program Success Rate

Success Rate	2016-17	2017-18	2018-19	2019-20	2020-21
Traditional	76%	74%	86%	81%	84%
Distance Education	68%	71%	71%	68%	74%
Total	69%	71%	75%	72%	76%
Cerro Coso	74%	75%	78%	76%	79%

The IT program includes degrees and certificates that are attractive to students. The program offers attractive employment possibilities. However, the program includes courses that can be difficult for many students. Overall, the success and retention rates are generally lower than those of the college overall but the faculty in the program feel that the level of difficulty in the courses is appropriate and is reflected in these rates.

The rate differences between delivery methods varies but is not necessarily a valid component of this review. As mentioned elsewhere in this review, the only IT course that is offered in the traditional format is IT C101. Some of the math courses are offered in that format as well but all courses are offered via distance education.

Even with the pandemic interruptions, the increasing success rate (from 58% to 70.8%) over the past program review is encouraging for the program.

3.1.5 Program Completion

The following table (IT Program Completion) displays the number of degrees and certificates that have been awarded during this period. Unlike the number of declared majors table that was displayed previously, this table includes duplicated headcounts. That means, that a student that earned a certificate on the way toward earning a degree is represented multiple times in this table.

IT Program Completion

IT Program Completion		2016-17	2017-18	2018-19	2019-20	2020-21
Information Technology Plus COA	Total	2	18	31	24	30
	% of Total	6%	55%	94%	73%	91%
	Yr to Yr Change	0%	800%	72%	-23%	25%
Information Technology & Computer Information Systems COA	Total	8	11	20	19	14
	% of Total	24%	33%	61%	58%	42%
	Yr to Yr Change	0%	38%	82%	-5%	-26%
Information Technology & Computer Information Systems AS	Total	11	11	19	20	22
	% of Total	33%	33%	58%	61%	67%
	Yr to Yr Change	0%	0%	73%	5%	10%
Cybersecurity COA	Total		4	8	19	11
	% of Total		12%	24%	58%	33%
	Yr to Yr Change		0%	100%	138%	-42%
Cybersecurity AS	Total		5	5	17	16
	% of Total		15%	15%	52%	48%
	Yr to Yr Change		0%	0%	240%	-6%
Data Analyst I COA	Total	3	2	6	3	2
	% of Total	9%	6%	18%	9%	6%
	Yr to Yr Change	0%	-33%	200%	-50%	-33%
IT Program Total	Total	24	51	89	102	95
	Yr to Yr Change	0%	113%	75%	15%	-7%
	% of College	4%	8%	10%	11%	10%
College-wide	Total	599	648	850	915	912
	Yr to Yr Change	0%	8%	31%	7%	-0.3%

The table below (IT/Cyber VTEA Core Indicator Data 2017-2021) show the VTEA Data for the 07-program group (IT/Cyber) and displays progression and a stability in our programs. Initially in 2017, Core Indicator 1 (Skill Attainment –Students earning a passing grade) was at an all-time high. The numbers have declined but stayed fairly high. Core Indicator 2- Completion (students finishing our certificate/degree) has risen over the past four years. Core Indicator 3 – Persistence (students enrolling from one semester to the next) is also high suggesting program design is working. Core Indicator 4 - Employment (are students getting jobs after the completion of the program) has been a struggle for all programs. Employment tracking both in VTEA data and other data sources is difficult due to the mechanisms that are not available (tracking by social security number or voluntary reporting). Additionally, the incumbent work force taking classes may or may not be counted as they were already employed, and employers' corporate offices are out-of-state, so they do not report some of the data within California. Core Indicator 5 and 5a - Non-traditional participation and completion (women in IT/Cyber) has met the federal targets as well as completion.

IT/Cyber VTEA Core Indicator Data 2017-2021

	Core 1 Skill Attainment	Core 2 Completion	Core 3 Persistence	Core 4 Employment	Core 5a NT Participation	Core 5b NT Completion
2017-18	89.13%	85.00%	81.82%	69.23%	23.91%	28.57%
2018-19	80.00%	100.00%	96.67%	40.00%	40.00%	46.67%
2019-20	81.25%	95.00%	89.58%	60.00%	25.00%	28.57%
2020-21	86.89%	100.00%	96.67%	56.25%	31.15%	28.57%

VTEA Core Indicator data is measured based on negotiated targets between Kern Community College District and the California Chancellor’s Office. Each year the targets are different. For example, in the VTEA Targets for 2020-21 below, you will see that Cerro Coso Community College missed the Core Indicator 1 and Core Indicator 4. We met Core Indicator 2, Core Indicator 3, Core Indicator 5a and Core Indicator 5b. These targets are also set on cohorts of students that started in 2017-2018. In order for a student to be included in the cohort, they have to have completed 12 units within the designated TOPS Code and have completed within six semesters. The data we receive from VTEA is very specific and does not necessarily reflect the success of a college program, however, this is how we are measured in order to receive funding from the federal government.

VTEA 2020/21 Targets

	Core 1 Skill Attainment	Core 2 Completion	Core 3 Persistence	Core 4 Employment	Core 5a NT Participation	Core 5b NT Completion
2021	85.09%	89.00%	91.00%	73.23%	21.74%	24.36%

The number of program completers has fluctuated somewhat but, with the exception of this past year, has generally been increasing. The percentage of overall college completers that the IT program completers represent has also been rising. The Information Technology Plus COA, Information Technology COA, and Cybersecurity COA are subsets of the Information Technology AS and Cybersecurity AS so students can earn the certificate on the way to earning the degree. That increases the number of completers and is reflected in the above table. There are also students that describe plans to complete both associate degrees and the corresponding certificates. When that happens, that one student may be counted several times in the completers table.

3.2 Faculty Experience and Trends

3.2.1 Faculty Load and Productivity

The IT Program currently includes three full-time faculty and several adjuncts. Two of the full-time faculty members are assigned to the IWV campus where they teach several IT courses on campus and online. The other full-time faculty member’s load is split between IT and Business and is assigned to ESCC where he teaches BSAD C100, IT C101, ECON C102, and ECON C103 on campus and several BSOT, BSAD, and IT courses online. It is important to note that the second full-time position at IWV is new this year (2021-22) and his contribution is not reflected in the tables below. The table below (IT Program FTES/FTEF Ratio) shows traditional, distance education, and total FTES/FTEF (productivity) ratios over the program review timeline. Those ratios that are lower than the Cerro Coso overall ratio are identified with an asterisk by the number. As discussed previously, the only IT course that is taught in a traditional

format is IT C101. The other traditional courses in the program are in the Math department. Overall, the ratio numbers are higher than those of the college in this review except for the years 2018-19 and 2019-20. The reason for these lower ratios is not completely understood but could be attributed to the addition of several lower enrolled, late start classes. Those sections were added to accommodate wait lists and student demand.

IT Program FTES/FTEF Ratio

FTES/FTEF Ratio		2016-17	2017-18	2018-19	2019-20	2020-21
Information Technology Plus Certificate	Traditional	11.7*	7.3*	10*	10.3*	6.8*
	Distance Education	15.6	16.3	11.6*	13.1*	15.3
	Total	14.8	15.1	11.5*	12.8*	14.9
Information Technology & CIS COA and AS	Traditional	13.0	12.1	15.6	13.1	14.0
	Distance Education	15.8	16.2	12.6*	12.3*	15.1
	Total	15.1	15.1	13.4*	12.7*	14.8
Cyber Security COA and AS	Traditional	13.2	10.2*	14.4	13.0	14.9*
	Distance Education	15.9	16.1	12.6*	12*	15.2
	Total	15.2	14.6	13.1*	12.5*	15.1
Data Analyst I Certificate	Traditional	-	-	-	-	-
	Distance Education	16.3	17.2	11.8*	12.9*	14.2
	Total	16.3	17.2	11.8*	12.9*	14.2
College-wide	Traditional	11.8	11.8	13.5	12.4	15.4
	Distance Education	13.7	14.1	13.7	13.7	12.3
	Total	12.8	12.9	13.6	13.0	13.4

**Reflect courses that are below the overall Cerro Coso average completion rate for that year*

As can be seen in table below (IT Program FTEF by Contract Type), full-time and adjunct load have fluctuated during this period. The IT Plus and Data Analyst I certificates include only IT courses. The others include math courses as well as IT courses and, consequently have much higher Full-time and Overload numbers. There is an increase in the Adjunct load for both IT and Cybersecurity AS/COA due to increased demand in those areas. This led to the hiring of a new full-time instructor this year but is not reflected in the load numbers below. So far, there has been an adequate pool of qualified instructors to cover all courses across all sites although the adjunct pool could be expanded.

IT Program FTEF by Contract Type

FTEF by Contract Type		2016-17	2017-18	2018-19	2019-20	2020-21
Information Technology Plus Certificate	Full-Time	3.13	2.40	2.80	3.00	2.33
	Adjunct	1.13	2.27	2.20	1.67	2.40
	Overload	0.20	1.53	1.20	0.93	0.53
	Summer	0.67	1.07	1.00	0.67	1.40
Information Technology & CIS COA and AS	Full-Time	5.86	5.13	7.53	12.33	10.34
	Adjunct	2.00	3.07	2.47	4.47	5.33
	Overload	1.20	3.06	3.13	3.27	2.20
	Summer	1.53	1.93	1.60	2.00	3.27
Cyber Security COA and AS	Full-Time	5.33	4.80	7.14	11.87	9.60
	Adjunct	1.67	3.70	3.27	5.10	5.60
	Overload	1.07	2.40	2.53	2.87	2.07
	Summer	1.20	1.60	1.27	1.73	3.00
Data Analyst I Certificate	Full-Time	0.67	0.40	0.80	0.73	1.07
	Adjunct	0.00	0.00	0.00	0.00	0.00
	Overload	0.40	0.67	0.60	0.67	0.33
	Summer	0.00	0.00	0.00	0.00	0.00

3.2.2 Program Evaluation

The IT Program is a vital and important program at Cerro Coso. The program's completers represent a growing portion of the college's completers. The offerings are important to the communities served by the college and the world in general. Enrollments are generally good, and the degrees and certificates offered are attractive to students. However, there are things that can be improved.

The program's demographics point to higher proportions of younger, white, male students. This does not entirely match the college's demographics and is an area of concern that the department has identified in unit plans over the past few years. The department has been working to improve this by including more access to support outside of the classroom. Some of the strategies employed by faculty are private journals between students and faculty, just in time help using Pronto, emails and office hours.

The materials for courses can be somewhat expensive as well so the department has been actively trying to find funding for those materials and looking at incorporating Open Education Resources and grant funding where possible.

The department faces some personnel challenges. One full-time faculty member is retiring at the end of the year, and another has resigned. Both positions have been approved for replacement and are currently in the recruitment process.

The faculty and administration in the area are in the process of participating in a pilot state grant for cloud computing curriculum with Amazon Web Services (AWS) and three other colleges in the state. The grant will complete in May 2022 and the results of the gap analysis and curriculum updates will benefit the students. The new high-tech lab has been approved for the IWV campus and will be equipped with current equipment and technology. It is expected that both will increase enrollments and participation of students in the program. With the use of this Cyber lab, we will be able to offer classes at the Ridgecrest campus and build enrollment. Additionally, the lab will be used by the Computer Technology Exploration Club (CTEC) on the weekends to provide hands-on learning experiences to online students as well as on ground students. Employers frequently attend these CTEC sessions and observe our student for internships and jobs.

3.2.3 Response to Previous Goals

2016 Two Year Goals

The two-year goals from the 2016 Computer Information Systems Program Review were as follows:

1) Improve marketing efforts to increase enrollments in courses, completion of program, and hiring of graduates for service area jobs. This includes brochures, program differentiation media, banners for outreach events and other marketing outreach efforts.

This goal was completed. Brochures, banners, and recruiting materials were developed and used at outreach events including Preview Day, Fall Fair and other events to promote the program. Additionally, marketing including ads and articles were done.

2) Assess prerequisites and sequences of courses and implement course revisions to enforce prerequisites.

Goal completed. Faculty completed this goal and assessed prerequisites and renumbered courses to identify the proper sequence of courses for students. Marketing materials were developed to inform students of the sequence of courses to take. Additionally, students were counseled by faculty in online and on campuses courses using recruiting materials.

3) Work with advisory committees to develop additional internship and placement programs.

Goal completed. Faculty and the Job Development Specialist worked with the IT/Cyber Security Advisory Committee to develop internships, apprenticeships, and placement programs. NDTI is working with the college on a new internship program (Fall 2021) and the Naval Air Warfare Center at China Lake continues to work with the Job Development Specialist and faculty on the apprenticeship program. Lastly, employers contact faculty/Job Development Specialist when positions are identified for employment for students. Students are prepared for interviews and have successfully been placed. The state recently identified Cerro Coso Community College as a high placement program for IT and Cyber Security.

2016 Five Year Goals

The five-year goals from the 2016 Computer Information Systems Program Review were as follows:

1) Revise all CSCI courses and change to ITIS prefix to differentiate CIS courses from CS.

This goal was completed. All the CSCI courses were transitioned to IT prefix for the IT/Cyber Security courses. Certificates and degrees were renamed from Computer Information Systems to Information Technology and/or Cyber Security.

2) Improve data collection for new program courses. Complete course and program outcomes assessments in one year (2019) to obtain a snapshot view of all courses, degrees, and certificates.

This goal was completed. Since all CSCI courses were changed to the IT designation, we were able to capture all the IT/Cyber data without mixing it with Business Office Technology or Computer Science. All courses were assessed during the 2019-2020 academic year. The two courses that did not meet their targets were reassessed in the Fall 2020 term and met their targets.

3) Work with Advisory Committees to update courses, degrees, and certificates to align with industry/workforce needs.

This goal was completed. Ongoing consultation with the Advisory Committee has resulted in employment and meeting the needs of the workforce. Two additional certificates of achievement were developed because of this consultation. The Cloud Computing and Linux Administration Certificates of Completion were designed, developed, taken through the curriculum process, and approved by the California State Chancellor’s Office. We have just started these two certifications. The Cloud Computing COA has resulted in Cerro Coso Community College being selected for a state AWS grant.

Part 4: Looking Ahead

4.1 Goals

4.1.1 Two-Year Goals

Action Plan for 2-Year Strategy 1

Concise Description of Strategy	Create Computer Application Specialist COA for additional pathway for students.
Measurement of Completion	COA will be completed
Timeline	2022-24
Responsible Person	Department Faculty, Department Chair

Action Plan for 2-Year Strategy 2

Concise Description of Strategy	Participate in Chancellor’s Office AWS Project
Measurement of Completion	Successfully complete requirements
Timeline	2022-23
Responsible Person	Department Faculty, Department Chair

Action Plan for 2-Year Strategy 3

Concise Description of Strategy	Review Math requirements in certificates
Measurement of Completion	Math requirements either removed or maintained in certificates
Timeline	2022-23
Responsible Person	Department Faculty

Action Plan for 2-Year Strategy 4

Concise Description of Strategy	Setup of IT/Cyber Security Lab
Measurement of Completion	Lab will be equipped and setup ready for instruction
Timeline	2022-23
Responsible Person	Department Faculty

4.1.2 Five-Year Goals

Action Plan for 5-Year Strategy 1

Concise Description of Strategy	Review prerequisite courses for upper-level courses
Measurement of Completion	Reported in AUP process
Timeline	2022-25
Responsible Person	Department Faculty

Action Plan for 5-Year Strategy 2

Concise Description of Strategy	Explore new courses to keep program current
Measurement of Completion	AUP process reporting
Timeline	Ongoing
Responsible Person	Department Faculty

Action Plan for 5-Year Strategy 3

Concise Description of Strategy	Cloud Computing COA – Program updated
Measurement of Completion	COA updated
Timeline	2023-25
Responsible Person	Department Faculty

Action Plan for 2-Year Strategy 4

Concise Description of Strategy	Develop strategies to attract women, African American and Hispanic/Latino students.
Measurement of Completion	Participation from these groups will increase
Timeline	2022-24
Responsible Person	Department Faculty

Action Plan for 5-Year Strategy 5

Concise Description of Strategy	Succession Planning for IT/Cyber program
Measurement of Completion	New faculty will be trained for the transition to lead the program
Timeline	2022-27
Responsible Person	Department Faculty

4.2 Program Needs

4.2.1 Dialogue

The IT/Cyber Security faculty have ongoing conversations regarding staffing, professional development, technology, facilities and physical resources, safety and security, and marketing and outreach throughout the year as issues and needs arise. Additionally, during the Annual Unit Planning time in the

fall, we review the needs and potential issues in the programs. The annual planning cycle brings all of these issues forward and sparks the conversations about the budgetary needs and other needs of the programs. Finally, the faculty have conversations with the Advisory Committee twice a year and discuss the same issues.

4.2.2 Staffing

The staffing needs for the IT/Cyber Security programs are of paramount concern as we are having one full-time person (Matthew Hightower) retiring in June 2022 and another full-time faculty member (Valerie Karnes) that will be retiring in the next few years. The new IT/Cyber faculty member that has just been hired has resigned so we will be in the process of replacing that position as well. The program will immediately need one full-time faculty member in ESCC to replace Professor Hightower, however, the discipline will be in the business area. While a business faculty member can teach the entry-level IT C101 class, they will not be able to fill the role that Professor Hightower did in programming and database concepts and the data analyst courses. We will need to hire additional adjunct faculty members and when the second team member retires will need to replace that faculty member with an IT and/or Cyber Security specialist to meet the needs of the programs. To provide for a seamless transition, we will be requesting a new faculty member in 2022-23 to ensure there are enough full-time faculty to meet the needs of the program and provide time for mentoring of new faculty.

4.2.3 Professional Development

Professional development for faculty is an ongoing need. Attendance at flex days, WASTC training, state and national conferences needs to be supported by the college. Both full time and adjunct faculty will need funding to attend training.

4.2.4 Technology

The technology needs of the faculty/staff are crucial to providing students with a state-of-the-art hands-on lab environment which is imperative for developing current skills to enter the workforce. These ever-changing needs need to be monitored and the administration needs to identify funding sources to ensure that the lab is equipped with current technology. Ongoing conversations need to be had every year during the planning cycle to ensure the currency of the lab is maintained. Industry members also can provide input to the requirements for incoming employees.

4.2.5 Facilities and Physical Resources

The IT/Cyber Security faculty advocated for five years for a dedicated cyber laboratory. Since the lab has now been identified and will be operational (hopefully) in the Fall 2022 for instruction, we will need to continue to identify additional needs for facilities and physical resources as they arise during the annual unit planning process. Final designation of a room for the Cyber Lab needs to be done. Funding for equipment, supplies, tools, and supplemental resources also needs to be addressed and granted.

4.2.6 Safety and Security

Security for the IT/Cyber Security program includes both physical security of the lab and equipment and the security of the networks that the students develop their skills on. Faculty and staff will need to maintain and secure the network. Designated and segmented network needs to be setup and maintained to ensure that students and/or hackers cannot impact the college network. Physical security

including locks and secured buildings need to be maintained to protect the equipment, supplies and resources for students.

4.2.7 Marketing and Outreach

Marketing and outreach for the IT/Cyber Security program are important components of the program. Marketing of the program and the options for students include keeping the Counseling department, high school system, and communities apprised of the offerings so students can enter the program(s). Social media marketing and other new avenues need to be used to reach potential students. Old fashioned traditional marketing (news articles, flyers, brochures, etc.) can still be used but are not always effective with the new populations.

Outreach to high school (dual enrollment options) needs to be explored to create a pathway into college. Other outreach to potential students across the state will also facilitate program growth and expansion and needs to include the incumbent workforce, veterans, and expansion into different nontraditional (female) groups and expansion of recruitment to other ethnic groups (African American, American Indian, and Hispanic populations) that are not currently engaged and/or successful in the programs.

Part 5: Supporting Documentation and Appendices

CERRO COSO COMMUNITY COLLEGE INFORMATION TECHNOLOGY CERTIFICATES

Information Technology (23 Units)

- IT C101** Introduction to Computer Information Systems
- IT C142** Information & Communication Tech Essentials (A+)
- IT C143** Computer Network Fundamentals (Net+)
- IT C146** Introduction to Information Systems Security (Security+)
AND
- IT C251** Introduction to Programming Concepts & Methodologies
- IT C270** Introduction to Database Management/Design
AND
- MATH C121** Elementary Probability and Statistics
OR
- MATH C130** Finite Mathematics
OR
- MATH C131** Basic Functions and Calculus for Business

Cyber Security Technician (29 Units)

- IT C101** Introduction to Computer Information Systems
- IT C142** Information & Communication Tech Essentials (A+)
- IT C143** Computer Network Fundamentals (Net+)
- IT C146** Introduction to Information Systems Security (Security+)
AND
- IT C248** Systems and Network Administration (Server+)
- IT C251** Introduction to Programming Concepts & Methodologies
- IT C255** Introduction to Cyber Security: Ethical Hacking
- IT C259** Introduction to System Analysis and Design
AND
- MATH C121** Elementary Probability and Statistics
OR
- MATH C130** Finite Mathematics
OR
- MATH C131** Basic Functions and Calculus for Business

Cloud Computing (19 Units)

- IT C101** Introduction to Computer Information Systems
- IT C142** Information & Communication Technology Essentials (A+)
- IT C143** Computer Network Essentials (Net+)
- IT C251** Introduction to Programming Concepts & Methodology (Python)
- IT C280** Introduction to Cloud Computing
- IT C282** Cloud Architecture

Information Technology Plus (13 Units)

- IT C101** Introduction to Computer Information Systems
- IT C142** Information & Communication Technology Essentials (A+)
- IT C143** Computer Network Fundamentals (Net+)
- IT C146** Introduction to Information Systems Security (Security+)

Linux System (16 Units)

- IT C101** Introduction to Computer Information Systems
- IT C142** Information & Communication Technology Essentials (A+)
- IT C143** Computer Network Essentials (Net+)
- IT C290** Linux System Administration I
- IT C292** Linux System Administration II

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For More Information
Contact Valerie Karnes
760-384-6261
vkarnes@cerrocoso.edu

This was previously the Computer Information Systems program and the new program was effective Summer 2019

What's the difference between Information Technology (IT), Cyber Security and Computer Science?



Information Technology

Knowledge & Skills

- Users of technology
- Use existing operating systems, software, and applications to solve a business need
- May interact with clients, co-workers
- Study network and database design

Job Duties

- Provides users with help in the use of computers
- Sets up and configures computers
- Install software and hardware
- Troubleshoot and repair computers
- Configure network software

Job Titles

- Business Analysts
- Computer Repair
- Computer Technician
- Help Desk Technician
- Network Technician
- Network Administrator
- Systems Administrators
- Systems Analysts
- Technical Support Specialists

Required for Entry to Field

Certificate/A.S. Degree

Industry Certifications

A+, Net+, Security+

Advancement Education

B.S. in IT

Salaries range from

\$37,009 - \$125,706

depending on location



Cyber Security

Knowledge & Skills

- Users of technology
- Use existing operating systems, software, and applications to solve a business need
- Interacts with clients, co-workers
- Study network and database design and evaluates potential
- Understands how hackers infiltrate a network
- Ability to use intrusion tools

Job Duties

- Development and execution of security policies/plans/procedures
- Design and implementation of data network security measure
- Network intrusion detections and forensics
- Information system security incident handling

Job Titles

- Chief Information Security Officer (CISO)
- Computer Crime Investigator
- Cyber Security Technician
- Disaster Recovery Analyst
- Incident Responder
- Information Assurance Analyst
- Intrusion Detection Specialist
- Network Security Engineer
- Security Analyst
- Security Operations Center Analyst
- Security Systems Administrator
- Security Software Developer
- Virus Technician
- Web Penetration Tester

Required for Entry to Field

Certificate/A.S. Degree

B.S. in IT or Cyber Security helpful

Industry Certifications

A+, Net+, Security+, Server+

Advancement Education

B.S. in IT/Cyber Security

Salaries range from

\$37,009 - \$125,706

depending on location



Computer Science

Knowledge & Skills

- Focus on the theory of computation applications
- Learn linear and discrete mathematics
- Software design and development
- Understand how and why computer processes operate the way they do

Job Duties

- Design and develop of all types of usable hardware and software, operating systems, and interactive games and apps
- Employs the use of mathematical algorithms, the understanding of computer theory, and the writing of code to utilize the latest in computer technology
- Writes computer programs

Job Titles

- Hardware Engineer
- Programmer
- Software Developers
- Software Engineer
- Software Programmer
- Systems Engineers
- System Monitoring & Control Engineers

Required for Entry to Field

B.S. Degree

Advancement Education

B.S. in Computer Science

Salaries range from

\$37,009 - \$125,706

depending on location



This was previously the Computer Information Systems program and the new program will be effective Spring 2019

www.cerrocoso.edu

What is Information Technology (IT)?

Information Technology (IT) prepares the operators and practitioners that maintain and use computer systems, software, and networks for the processing and distribution of data. IT professionals use the programs developed by computer scientists and focus on the practical application of computers in everyday life. IT professionals may help to explain to a client how to solve a technology issue or work with businesses to implement new technology plans that meet their needs. Information Technology (IT) has become an integral piece of every business plan for both small and large businesses. There are generally more jobs in Information Technology (IT) than in Computer Science.

What Can You Do With a Degree in Information Technology (IT)?

Information Technology (IT) encompasses a wide spectrum of material and offers a variety of positions. Some of the most common positions in this field include: systems administrators, network administrator, security professional, business analysts/systems analysts and technical support specialists. Salaries range from \$37,009-\$125,706 depending on location and level of certificate and degree.

What is Cyber Security Technology?

Cyber Security prepares professionals to inspect, evaluate and protect computer networks and data from intrusion and to counteract potential threats. While some professionals work in an informal atmosphere, with unconventional working hours, and shifting work responsibilities, there are opportunities in nearly every industry including the military, the Department

of Defense, banks, technology firms, manufacturing, law enforcement and health care. There are a broad range of knowledge, skills and abilities required for Cyber Security. Baseline knowledge of information technology is required with additional skills to detect threats that may try to infiltrate networks. Cyber Security professionals need the ability to rapidly respond to threats as soon as they are detected and keep their skills current with ongoing education and training. Professionals must also possess a range of technical abilities to perform a variety of activities, and be able to work in different locations and environments including domestic to international assignments. Duties of a Cyber Security Professional may include development and execution of security policies/plans/procedures; design and implementation of data network security measure, network intrusion detections and forensics, information system security incident handling; and certification of systems and networks. They need to keep abreast of trends and intelligence to better understand how a potential adversary may think or act. They use using problem-solving skills to counteract the attempts of hackers. This level of work complexity requires the Cyber Security workforce to possess both a wide array of technical IT skills as well as advanced analysis capabilities.

What Can You Do With a Degree in Cyber Security Technology?

Cyber Security Technology encompasses a wide spectrum of material and offers a variety of positions. Some of the most common positions in this field include: Chief Information Security Officer (CISO), Computer Security Incident Responder, Cryptanalyst, Cryptographer, Disaster Recovery Analyst, Incident Responder, Information Assurance Analyst, Intrusion Detection Specialist, Network

Security Engineer, Security Analyst, Security Operations Center Analyst, Security Systems Administrator, Security Software Developer, Virus Technician, Vulnerability Assessor and Web Penetration Tester. Salaries range from \$37,009-\$125,706 depending on location and level of certificate and degree.

What is Computer Science?

Many of you will be looking for a major in a college technology program. Most schools offer Information technology and Computer Science programs. What is the difference between information technology and computer science degrees? The main difference is that computer science is the study of computers, their design, and their use for computation, data processing, and systems control. Computer Science involves the design and development of all types of usable hardware and software, operating systems, and interactive games and apps. Computer Science also employs the use of mathematical algorithms, the understanding of computer theory, and the writing of code to utilize the latest in computer technology.

What Can You Do With a Degree in Computer Science?

With a degree in Computer Science, graduates have a number of career paths. Some of these careers include: hardware or software engineers, software developers, systems engineers and system monitoring and control engineers. Salaries range from \$37,009-\$125,706 depending on location and level of certificate and degree.

What Can You Do With a Degree In Cyber Security Technology?

Cyber Security Technology encompasses a wide spectrum of material and offers a variety of positions.

Job Titles

- Information System Security Officer (ISSO)
- Computer Crime Investigator
- Cyber Security Technician
- Disaster Recovery Analyst
- Incident Responder
- Information Assurance Analyst
- Intrusion Detection Specialist
- Network Security Engineer
- Security Analyst
- Security Operations Center Analyst
- Security Systems Administrator
- Security Software Developer
- Virus Technician
- Web Penetration Tester

While some professionals work in an informal atmosphere, with unconventional working hours, and shifting work responsibilities there are opportunities in nearly every industry including the military, the Department of Defense, banks, technology firms, manufacturing, law enforcement, and health care.

For more information

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Dean of Career Technical Education
maura.murabito@cerrocoso.edu
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**The Cyber Security
profession needs you.
Nobody can afford an attack.**

Advisory Committee Members

Alutiiq	General Dynamics	NDTI
Bellevue University	Jacobs Engineering	Saalex
DCS	Lockheed Martin	T-Mobile
Exodus	NAVAIR	Trowbridge & Trowbridge



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EXCITING NEW OPPORTUNITIES IN



CYBER SECURITY

AS Degree
&
Certificate

Cyber Security

Protecting Critical Data

Today, cyber security professionals are in high demand. In fact, the demand for cyber security professionals is estimated to reach 6 million globally by 2019. Yet, while the job outlook looks fantastic for those in the field, there aren't nearly enough highly educated and qualified workers to fill the demand, which is one of the many reasons a degree or certificate in cyber security from Cerro Coso Community College can be very beneficial.

Associate of Science in Cyber Security

Cerro Coso Community College offers an Associate of Science degree in Cyber Security Technology designed for students pursuing professional employment in information security for business. Intended for both full-time and part-time students, this program is appropriate to both those currently employed and those seeking to enter the field. The program and courses are transferable to the California State University system. The program has also been articulated and is fully transferable to Bellevue University. Students exiting this program are prepared to enter the fields of information security, network security, information assurance or cyber security. Cyber Security prepares professionals to inspect, evaluate, and protect computer networks and data from intrusion and to counteract potential threats.

There are a broad range of knowledge, skills, and abilities required for Cyber Security.

Baseline knowledge of information technology is required with additional skills to detect threats that may try to infiltrate networks. Cyber Security professionals need the ability to rapidly respond to threats as soon as they are detected and keep their skills current with ongoing education and training. Cyber Security professionals must also possess a range of technical abilities to perform a variety of activities, and be able to work in different locations and environments including domestic and international assignments.



Knowledge & Skills

- Users of technology
- Use existing operating systems, software, and applications to solve a business need
- Interacts with clients, coworkers
- Study network and database design and evaluates potential
- Understands how hackers infiltrate a network

- Ability to use intrusion tools

Duties of a Cyber Security Professional may include:

- Development and execution of security policies/plans/procedures
- Design and implementation of data network security measures
- Network intrusion detections and forensics
- Information system security incident handling
- Certification of systems and networks

Cyber Security Professionals need to keep abreast of trends and intelligence to better understand how a potential adversary may think or act. They use problem-solving skills to counteract the attempts of hackers. This level of work complexity requires the Cyber Security workforce to possess both a wide array of technical IT skills as well as advanced analysis capabilities.

Required for Entry to Field

Certificate/A.S. Degree
B.S. in IT or Cyber Security helpful

Industry Certifications

A+, Net+, Security+, Server+

Advancement Education

B.S. in IT/Cyber Security

Salary Range

\$37,009 - \$125,706

Depending on location and level of certificate and degree.

For More Information

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The Information Technology Plus Certificate of Achievement (13 units) at Cerro Coso Community College is designed for students pursuing professional employment in computer information systems for business.

This certificate program provides students with skills to enter the job market.



Employment of computer and information technology occupations is projected to grow 13 percent from 2016 to 2026, faster than the average for all occupations. These occupations are projected to add about 557,100 new jobs. Demand for these workers will stem from greater emphasis on cloud computing, the collection and storage of big data, and information security.

—US Bureau of Labor Statistics

Knowledge & Skills

- Users of technology
- Use existing operating systems, software, and applications to solve a business need
- May interact with clients, co-workers
- Study network and database design

What Can You Do with a Certificate in Information Technology?

Information Technology (IT) encompasses a wide spectrum of material and offers a variety of positions. Some of the most common positions in this field include: systems administrators, network administrator, security professional, business analyst/systems analysts and technical support specialists.

Salaries range from \$37,009 - \$125,706 depending on location and level of certificate and degree.

This program prepares students for careers in Computer Information Systems:

- Business Analysts
- Computer Repair
- Computer Technician
- Help Desk Technician
- Network Administrators
- Systems Analysts
- Technical Support Specialists

Required for Entry to Field

- Certificate/A.S. Degree
- Industry Certifications
- A+, Net+, Security+
- Advancement Education - B.S. in IT



Designed for both full and part-time students, this program is appropriate to both those currently employed and those seeking to enter this field. Complete each course to be applied toward the certificate with a “C” or better. Complete a minimum of 12 units in residence at Cerro Coso Community College.

“Internship programs align academic classes, with the teamwork, problem solving, and adaptability of on-the-job-training. Interns develop a thorough understanding of workplace dynamics in addition to training in current technology.”

—Valerie Karnes,
Professor of Computer Information
Systems and Business

CIS Advisory Committee Members

Information Technology/Cybersecurity Advisory Committee 2021

Last Name	First Name	Company Name	Program/Title
Slinkard	Melissa	Alutiiq	Program Manager
Buchanan	Stacey	Bellevue University	Relationship Manager
Kuczora	Jillian	Burroughs High School	Teacher
Timpone	Frank	CCCC	Business
Mashall	Jennifer	CCCC	Job Placement coordinator
Navarro	Lacey	CCCC	Administrative Secretary, Career Technical Education
Hightower	Matt	CCCC	CIS & Business
Griffen	Nicole	CCCC	CTE Dean
Ama	Suzanne	CCCC	Web Design
Hack	Terry	CCCC	CTE Counselor-Devin Mosely will attend
Harper	Christopher	CCCC Adjunct	IT
Austin	Dave	DCS	Program Manager
Johnson	Phil	DCS	Program Manager
Rosenburg	Merrick	Epsilon Systems	Program Manager
Gerral	David	General Dynamics Information Technology	NAWC Contact
Jaeger	Jennifer	General Dynamics Information Technology	Program Manager, NAVAIR Services
Cooper	Jaelyn	Grand Canyon University	University Admissions Counselor
Henry	Penny	Jacobs Engineering	Program Manager on our Jacobs IT contract
Thomas	Rodney	Jacobs Engineering	Development and System Administration services
Lily	Peter	Leidos	Program Manager
Davies	Jennifer	Lockheed Martin	Program Manager
Zamarron	Angel	NAVAIR	Pathways Program Coordinator
Smosna	Wendy	NAVAIR	
Miller	Bruce	NAWC	493000A/D/E Division Head Warfare Systems Integration Lab Engineering
Balcer	Edward	NAWC	AIR 4.7 IT/CS Lead Head, Weapons & Energetics Technology Assurance Branch NAVAIR Weapons Division - 479900D
Ashley	Erica	NAWCWD	NAWCWD
Pedraza	Karla	NAWCWD	NAWCWD
Vineault	Kyla	NAWCWD	NAWCWD
Henden	Ole	NAWCWD	NAWCWD
Marcellino	Susan	NAWCWD	Data Science, Data Engineering, and DEVSECOPS
Cota	Joe	NDTI	Sr System Administrator
Paul	John	NDTI	Director, High Desert Operations
Perrusquia	Alma	Saalex	Manager
Shurtz	Emily	Saalex	Manger
Ortiz	Frank	SAALEX	5.2 Cyber Security Team - System Administrator
Kaleah	Kaleah	Saalex	Manager
Johnson	Stacey	T-Mobile	Manager
Giang	Quyen	Trowbridge & Trowbridge	Systems Analyst IT Specialist SA Team Lead RDT&E Customer Services Branch
Blake	Rick	Trowbridge & Trowbridge	Sr. Director, Defense Operations
Montoya	Stephanie	Trowbridge & Trowbridge	Program Manager

Computer Information Systems/Cyber Security Advisory Committee Meeting
Agenda
November 16, 2017

1. Introductions
2. Minutes of previous meeting
3. Committee Purpose and Overview
4. Computer Information Systems/Cyber Security Programs
 - Program Review Outcomes
 - Renumbering and sequencing of Cyber Courses
 - Operating System Certificate
 - Linux
 - Red Hat
 - Ubuntu
 - Windows
 - Apple
 - Brochures/Informational Flyers
 - New flyers – CIS/Cyber pathway and CIS/Cyber/CS Differences
 - Options for Transfer
5. Transfer Options for Local Students
 - Bellevue University presentation (10 minutes)
 - Embry-Riddle University presentation (10 minutes)
 - National University presentation (10 minutes)
6. Spring 2018 Class Schedule/Long Term Schedule
7. Customized Training – Kara Tolbert
8. Discussion:
 - Employment
 - Internships/Apprenticeship Programs
 - Industry needs
9. Next meeting date – Spring 2018
10. Adjournment



CIS Advisory Committee Meeting

Date: April 19, 2018

Location: Casey's Restaurant

Time: 11:30 am – 1:00 pm

Attendee's:

Valerie Karnes – Cerro Coso College	David Schmear – Jacobs
Kara Tolbert– Cerro Coso College	Stephanie Montoya T & T
Laura Vitale – Cerro Coso College	Angel Zammaron - NAWCWD
Ashlin Mattos – Cerro Coso College	Frank Tipone – Cerro Coso College
Michael Kane – Cerro Coso College	Jennifer Jager GDIT
Terri Hack – Cerro Coso College	Chandler Stanford – SSI
Ed Balcen - NAWCWD	Veronica – Bellevue
Karen O'Connor – Cerro Coso College	Keith Bennitt – CCCC/NAWC

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
1. Call to order	Valerie Karnes			
2. Introductions		Each attendee provided their name and a place of business.		
3. Committee Purpose and Overview		The focus of the meeting was to explain the degree and certificates and update the community on current events with CCCC.		
4. Discussion		Valerie touched on the revision of the programs. There is a total of 48 graduates this year completing a degree in this field. There was also mention of the summer/fall schedules being done. She also brought up the fact that these graduates have a wide range of salaries depending on the degree or certificates they have.		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
5.		There was an announcement of the Meet and Greet Laura and Valerie are setting up for the students/community/ and employers.		
6.	Angel NAWCWD	The Pathway Programs on base are hiring for CIS. The job closes April 30 th and they will provide on the job training if hired. The job is being offered on USA jobs you must be enrolled half time at the college to qualify.		
7.	Valerie CCCC	Went over the handouts that were given.		
8.	Kara CCCC	There are ways that she can provide classes for the contractors and the base. They just need to contact her with what type of class and she can build that for them. We can also merge multiple people from different companies at once. She stated she can work on state to make sure the classes are on that level.		
9.	Veronica Bellevue	Went over that they provide classes for the students to finish their Bachelor and Master's degrees. She asked what types of classes the employers were looking for to make people employable. All the classes taken at CCCC are transferable to Bellevue 100%.		
10.		There was a great deal of talk about soft skills. Such as resume, interview, presentation, etc. Multiple people have stated this seems to be an issue in the community. The college is aware, and the professors are working into their classes.		
12.	Chandler SSI	Would like to see a balance between IT people and a data base skill set. Maybe a business certificate focused on data base analysis.		
13.		There was talk about fast tracking the A+ and C+ certificates. Maybe having a boot camp for students just before they take these tests. Thoughts are having it at the end of each semester. We would need a minimum of 10 students for this to be cost effective.		
	Terri CCCC	There is a way to challenge a class to see if you have the knowledge prior to taking it. You can get the form at the counseling office.		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
	Ashlin CCCC	There is a digital jobs board the students can use. He will help them with their resumes, job search and preparation for interviews. Valerie has also worked with contractors to place students in various positions.		
	Michael CCCC	There is funding from Strong to get instruction and to get the message out to the community that we can provide special classes.		
	Ed NAWCWD	Would like to see a strong background in Linux systems. Red Hat is a company to do that. The would rather than see that the student has a course and not just a certification. The could take the course while working, if they have the basics down. Bellevue may be an option for this. The point id they need the working knowledge not just a paper certificate.		
	Valerie CCCC	Asked if there was any further discussion. Went over some of the concerns.		
14. Adjourned		The meeting adjourned at 1:00 pm		

Meeting Chair: Valerie Karnes



CIS Advisory Committee Meeting

Date: November 8, 2018

Location: Casey's Restaurant

Time: 11:30 am – 1:00 pm

Attendee's:

Valerie Karnes – CCCC	Penny Hersey – Jacobs
Maura Murabito CCCC	Stephanie Montoya T & T
Laura Vitale – CCCC	Angel Zammaron - NAWCWD
Emily Seals – CCCC Student	Stacy Buchanan – Bellevue
Frank Timpone - CCCC	Kory Troutman – Bellevue
Henry Palacios – CCCC Student	
Tammy Kinnan – JTF	
Karen O'Connor – CCCC	

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
1. Call to order	Valerie Karnes			
2. Introductions		Each attendee introduced themselves by name and their place of business.		
3. Committee Purpose and Overview		The Advisory Committee purpose and overview was presented. The intent of these meetings is to review the degree, certificates and activities to the group. This is mandated by law. The focus of the meeting was to explain the degree and certificates and update the community on current events with CCCC.		
4. Discussion Spring 2018 Minutes		The previous meeting minutes were reviewed. There were no additions or corrections.		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
<p>CIS Program Name Change to IT Curriculum changes</p> <p>IT/Cyber Pathways</p> <p>IT/Cyber Marketing Materials</p> <p>Business Classes</p>		<p>Valerie reviewed the modified CIS program as it become the Information Technology program by name in the summer term. Classes will now be designated with IT instead of the current CSCI designation.</p> <p>The course numbers will not change for the first four classes (101, 142, 143 and 146), but the upper level cyber security courses have been renumbered to reflect the order the classes should be taken. IT C101 (currently CSCI C101) will be a prerequisite for all other courses due to students struggling when entering the class without the baseline skills/knowledge that are covered in C101.</p> <p>Students can select one of two pathways once they have completed the IT Plus Certificate The two different pathways (IT or Cyber Security) were reviewed. Students can double major with the addition of one class (CSCI/IT C270). They would then earn three certificates (IT Plus Certificate of Achievement, IT Certificate of Achievement and Cyber Security Certificate of Achievement) and two AS Degrees (Information Technology and Cyber Security). Pathway documents are included in the meeting materials</p> <p>It was noted that the national salary is much higher than the local salary and the local salaries are on the marketing materials.</p> <p>There is work being done with the state for a zero-cost program for books.</p> <p>The business classes were changed as well. They must be taken in a order. This was brought up because some of the classes overlap.</p>		
<p>5. Meet & Greet – Spring 2019</p>		<p>There was an announcement of the new date of the Meet and Greet April 3. Katie Bachman is the new Outreach Coordinator and will be working with Valerie setting up and managing the event. The event last spring was successful, and employers and no changes were suggested. Multiple students were offered employment at the event or after. NAWC hired five students as a result of the event.</p>		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
10. NAWC Internships	Angel NAWCWD	Angel announced that in three week, NAWC will be announcing IT and Cyber slots for interns on the base. Students must be in their first or second semester of school. They will work with students on their hours around their college classes.		
12. Bellevue to Offer Linux I and Linux II	Stacey	Stacey from Bellevue University announced that Linux this is going to be offered via a two-part class. Both classes utilize the same book so it will save money for students. Linux 1 starts November 26 th and Linux II starts March 4. Both will be offered in a 12-week session. They pan on making it so this whole program is given twice a year. If students want to attend and receive financial aid, they can as long as Bellevue is the primary school and CCCC secondary on their application. There can be a max of 25 students per class.		
13. CCCC Spring 2018 Graduates	Valerie	Cerro Coso Community College awarded 48 certificates and degrees in the Spring 2018 term.		
14. Employer/Faculty Updates	Stephanie T&T	Stephanie shared that Trowbridge and Trowbridge are looking for at least 10 employees and are willing to train. They are having a job fair today from 4 to 6:00 pm at the Hampton Inn. She requested that we announce it to students to attend. .		
	Tammy JTF	JTF is looking for employees and is hiring as well. They are looking for need ISSO, CSSA, ASAS and SA employees. JTF will train new employees but have to pass the preliminary background check before they can start.		
	Karen CCCC	Karen shared her work with the state and the Business Office Technology (BOT) and the new state Business Information Work (BIW) model that has been developed. CCCC BOT program is in good position as we have all of the components for the BIW program. Her program goes over basic computer skills, Microsoft Office and soft skills. These are not taught in the high school level. The BOT program is being offered as a dual enrollment program with California City High. They have six students graduating with certificate. Valerie shared that she recommends that IT/Cyber students complete the 12 unit BOT certificate as the skills developed are expected by employers as baseline skills. All these classes transfer to Bellevue University.		
	Frank CCCC	Frank provided an update for the Business program.		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
	Valerie CCCC	The Spring Advisory Meeting will be held on March 28 th , 2019.		
14. Adjourned		The meeting adjourned at 12:35 pm		

Meeting Chair: Valerie Karnes

DRAFT



Information Technology / Cyber Security Advisory Committee

Date: March 28, 2019

Location: Casey's Restaurant

Time: 11:30 am – 1:00 pm

Attendee's:

Valerie Karnes – CCCC	Scott Miller – Saalex
Maura Murabito CCCC	Christian Patin – AWL
Amanda Atencio – CCCC	Angel Zamarron – Navair
Jennifer Marshall – CCCC	Laura Shattuck – General Dynamics
Devin Mosley – CCCC	Stacy Bachman – Bellevue University
Henry Palacios – CCCC Student / Saalex	Jennifer Davies – Lockheed Martin
John Bradly – CCCC	
Katie Bachman – CCCC	

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
1. Call to order	Valerie Karnes	11:37am		
2. Introductions		Each attendee introduced themselves by name and their place of business.		
3. Committee Purpose and Overview		The Advisory Committee purpose and overview was presented. The intent of these meetings is to review the degree, certificates and activities to the group. This is mandated by law. The focus of the meeting was to explain the degree and certificates and update the community on current events with CCCC.		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
<p>4. Discussion</p> <p>Fall 2018 Minutes</p> <p>Meeting Hand Outs</p> <p>CIS Program Name Change to IT Curriculum changes</p> <p>IT/Cyber Pathways</p> <p>IT/Cyber/CS Differences</p>		<p>The previous meeting minutes were reviewed. There were no additions or corrections.</p> <p>The handouts were reviewed and included the IT/Cyber Pathways, IT/Cyber Security/Computer Science Differences.</p> <p>Valerie reviewed the program name change from CSCI to IT, with the intention that the name change will make the program more recognizable to students. Classes will now be designated with IT instead of the current CSCI designation.</p> <p>Students can select one of two pathways once they have completed the IT Plus Certificate The two different pathways (IT or Cyber Security) were reviewed. Students can double major with the addition of one class (CSCI/IT C270). They would then earn three certificates (IT Plus Certificate of Achievement, IT Certificate of Achievement and Cyber Security Certificate of Achievement) and two AS Degrees (Information Technology and Cyber Security). Pathway documents are included in the meeting materials</p> <p>The Information Technology, Cyber Security, and Computer Science programs were outlined into 3 categories: knowledge & skills, job duties, and job titles. It was noted that the national salary is much higher than the local salary and this handout is located in the attached materials.</p> <p>There is work being done with the state for a zero-cost program for books.</p>		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
5. Meet & Greet – Spring 2019	Valerie / Katie Bachman CCCC	<p>The Meet & Greet will be held April 3. Katie Bachman, Director of Outreach, has been working with Valerie setting up and managing the event. Katie went over and confirmed the employers that will be attending the event. The event last spring was successful for students and employers. Multiple students were offered employment at the event or after.</p>		
6. CTEC Hands – Resume / Interviews event CTEC Update	Henry Palacios CTEC President	<p>CTEC Hands – Resumes / Interviews event held March 30 to help students with job preparation. Services include resume review, resume preparation, and mock panel interviews. Mock interview panel volunteers are welcome. Employers can participate or attend to view the pool of students currently in the program.</p> <p>Henry Palacios, Computer Technology Exploration Club (CTEC) provided additional information about the upcoming CTEC Hands – Resumes / Interviews event for March 30. He discussed the benefits of the mock interview panel. He would like the students to become less intimidated by the panel interview process with practice.</p>		
7. Testing Academy Grant		<p>Valerie and Rebecca Pang, Director of Distance Education, have been working on writing a grant. The intention of this funding is to help remove the financial barrier for students in the program. There will be 25 students in the cohort during the 1 year grant duration. The students in the cohort will receive wrap around support. Discussion about the new grant received positive feedback. Employers may end up competing to hold on to students, by working to make their business more appealing for students to stay on board.</p> <p>Valerie will be sending out an email requested Letters of Support from employers to work with the college and provide internships/apprenticeships for graduates of the grant in the Spring 2020 term.</p> <p><u>Valerie will be sending out an email requested Letters of Support from</u></p>		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
		<p><u>employers to work with the college and provide internships/apprenticeships for graduates of the grant in the Spring 2020 term.</u></p>		
<p>8. Internships/Job Placement</p>	<p>Valerie</p> <p>Jennifer Marshall CCCC</p>	<p>Valerie discussed a past internship with Jacobs where employers used students directly from her 101 class. Students completed the program and employers received good candidates.</p> <p>Jennifer Marshall, the new Job Developer, went over some of the services that she plans to offer. Some of the services include writing: resumes, cover letters, and federal resumes. She passed around the Job Hunting Handbook for employers to view. The Career Center is in the works and once completed it will have a station of computers for job hunters to use. Employers can also post jobs on the Cerro Coso website. There is an online submission form that employers can complete and then Jennifer works with the webmaster to get them posted to the website.</p> <p>Employers discussed the importance of an applicant listing active security clearances and certifications near the top of their resume.</p>		
<p>9. Bellevue University Update</p>	<p>Stacey Bachman Bellevue Univ.</p>	<p>Stacey discussed the 18 month online pathways for students seeking a Bachelors or Masters in Cyber Security. Students can take 1-2 classes at a time, making it an ideal program for students who are working full time. There is an articulation in place between Cerro Coso and Bellevue University, giving Cerro Coso students the ability to transfer 18 units to Bellevue.</p>		

TOPIC	FACILITATOR	SUMMARY/ FOLLOW-UP	O	C
<p>10. Certificates</p> <p>Cyber Security Brochure</p>		<p>Discussion among the group about creating certificates to meet employer demand. A certificate must be at least 12 units to be recognized by the State of California. Typically it takes 18 months to get a certificate through the approval process. Employers expressed that Windows and Linux (Redhat), and (especially) Linux are becoming crucial in the field.</p> <p>A Cyber Security brochure was given to employers to view. It was suggested to create two versions of the brochure: one for the local community and one for Cerro Coso students. The brochure can be used to advertise businesses where students can work with a Cyber Security certificate or degree. Employers who voiced interest in advertising on the brochure were: Saalex, Lockheed Martin, General Dynamics, and NDTI.</p>		
<p>11. Coding Camp</p>	<p>Angel Zamarron Navair</p>	<p>Angel Zamarron discussed the Coding Camp which will consist of this Fall's 5th, 6th, 7th graders. There will be 100 spots available. During the camp there will be 5-7 activities. Military and DOD kids get to sign up before it is made public.</p> <p>Discussion about a possible Cyber Camp at Burroughs High School in the future, since the Coding Camp is being done at the middle school level.</p>		
<p>12. Next Meeting Date</p>	<p>Valerie CCCC</p>	<p>The Fall Advisory Meeting will be in November 2019.</p>		
<p>13. Adjourned</p>		<p>The meeting adjourned at 12:45 pm</p>		

Meeting Chair: Valerie Karnes



Minutes DRAFT 1

Committee Name: Information Technology/Cyber Security Advisory Board

Date: November 14, 2019

Time: 11:30am

Location: Casey's BBQ, Ridgecrest

Attendees: Valerie Karnes, Lacey Navarro, Jennifer Marshall, Angel Zamarron, Scott Miller, Susan Marcellano, Stacy Buchanan, Erica Ashley, Terri Hack, Jillian Kuczora, John Bradly, Stephanie Montoya, John Paul, Krystal Park

1. Introductions

Meeting called to order at 11:43 am by Valerie Karnes.

All attendees briefly introduced themselves.

Valerie explained the purpose of advisories is to receive feedback from members regarding programs and student performance when entering the workforce.

2. Minutes of previous meeting

Minutes have error according to Bellevue Stacy Buchanan, error in Bellevue University Update section (Page 4, number 9) shows "the ability to transfer 18 units to Bellevue". Per Stacy Buchanan, this should show "at least at 78 units".

3. Information Technology/Cyber Security Programs

*Valerie explained the program roadmap and the process of transferring to Cal State. CSEI has been changed to IT is because CSEI is computer science, IT is Info Tech. This change came about because **faculty** are having a hard time separating the two when assessing students.*

4. IT/Cyber programmatic information materials

Packets included marketing documents and information for the IT/Cyber Programs. If any corrections need to be made, please contact Valerie Karnes.

5. Job Placements & Internships

Item duplicated on agenda. See item 10 below.

6. Operating System Certificate

- **Linux classes being offered through Bellevue University for students/employees**
Bellevue offered the Linux class at a reduced price in fall and spring and no students enrolled. Valerie asked the Board Members for feedback to determine if the course is still a need. Erica Ashley oversees the cyber security workforce on command and states it was probably a miscommunication. Saalex, NDTI, Trowbridge & Trowbridge representatives expressed interest due to the need on base.

Valerie will send out reminder email regarding Linux classes at Bellevue.

7. Cloud Computing Certificate of Achievement (AWS)

- *Dean approached faculty about the need for Cloud Computing, instead of developing an entire degree, faculty would like first create a certificate that is adequate enough to get them into the cloud computing environment, then decide if there is a need to create a degree program. Chris Harper went to AWS*



Minutes DRAFT 1

Certification School this summer to bring back information and ideas in order to move forward. Current students already taking 142 or 143 can step right in.

- *The timeline for the state of California to approve a new program is typically 18 months.*
- *John Paul explained lots of military folks are moving to cloud computing, but there is still a need for both technologies, not just AWS.*
- *Microsoft just won JEDI (Joint Enterprise Defense Infrastructure) cloud contract. This doesn't affect the current contract, but it may down the road.*
- *Several Board Members recommended to use a generic name for the program/certificate instead of "AWS". Members suggested training specifically about AWS and Microsoft in the course. The need will be general with both platforms so students are prepared and trained in both concepts.*
- *Other suggestions are to include hybrid cloud, micro-services, designme, and cloud architecture as a part of the curriculum. Valerie/Chris are still in the planning stages of the course outline. Valerie will send to employers for feedback before finalizing.*
- *Board Members would encourage their current IT personnel to sign up. Those with A+ certificate may be able to have that waived. They would have to take 2 other courses in order to complete the program.*
- *Valerie asked Board Members if they agree this is a good move. All agreed unanimously.*
- *Certificate in Data Analytics will be offered at Bellevue fall 2020.*

8. Spring Employers Meet & Greet dates

- *Valerie is currently planning the 3rd Annual Employer Meet and Greet. She would like to schedule the event right ahead of apprentice release and Jennifer Marshall helps students find work. Professor Karnes requested feedback from Board Members. All in attendance felt it was a valuable event. Suggestions included to shorten the time frame for a more condensed and more effective event. They felt it would be a great opportunity for students to have exposure to the employers/recruiters and to marketing different companies*
- *Event scheduled for April 15th from 4:00 pm -6:00 pm. Bellevue will provide funding for food.*
- *Angel Zamarron stated specific marketing targeting the high schoolers would serve as valuable. She suggested we provide posters/handouts to the high school to disseminate. She would like to help bridge the gap with CTE Students between the High School and the College. She suggested a call to actions.*
- *Jillian Kuzcora shared that CTE teachers at Burroughs are not offered times for the kids to attend. Valerie mentioned the vans available to the college, students are more likely to attend if they had the means to get there. CTE teachers at the high school will probably be willing to go if the admin helps coordinate the trip.*
- *Lacey Navarro will ask Dean Murabito about the possible use of the vans at the next event.*



Minutes DRAFT 1

- *Jillian will bring up the interest at the next PLC meeting.*
- *Per Jillian, she would like to coordinate with the college to host an event to have mock interviews including training session. The invite would not be CTE specific, but the entire high school. She suggested target History classes to capture all 11th graders etc,*

9. CTEC Updates

- **Hands-on workshop** – *Cancelled until Spring 2020. Valerie explained that the high school students would like to interact with the college students. Not enough RSVPs were received.*

10. Internships/Job Placement

- *Jennifer Marshall passed out brochure and explained the purpose of the Career Center. The Career Center works with community and contractors on base. Recently assisted Saalex with internships, IT electrical/technical writing, cyber. Jennifer Marshall is working with Pamela Torres to place students in the field and get them started. It is a standard paid internship program covering a 3-month duration. This internship provides hands on experience to get a job on base. Eligibility to the program requires the student submit a letter of recommendation from instructor and a statement from the applicant. We are hoping to do this year round. 1 placement per semester. Per Jennifer, it is her job to work together with all contractors to get more connections/communication.*
- *Deadline for the Fall: Process starts in March.*
- *Deadline for Spring: August/September.*
- *Interviews: October/November*
- *High school students may apply, but cannot be selected until they turn 18 to be on base. They can, however, work in the corporate offices. This can provide a meaningful internship without intellectual access. OPM stopped ability to grant clearance to minors. In 2017 the rules changed and now all employees on base must be 18 and over.*
- *We are in the beginning stages of using JobSpeaker at Cerro Coso. Bakersfield College has been having great success with it. Jennifer described how the platform builds relationships between colleges, students and employers. There will be several trainings in the next few months for employers, zoom or one on one. Jennifer Marshall would love feedback. John Paul expressed interest in JobSpeaker. Student must upload their information or resume into JobSpeaker. We do not have adequate documentation of where the students go after college. CTE students are emailed a survey, however, we only receive 30% response rate. We are attempting to fill in the gaps to provide better data. This app is open to the general public.*

11. Bellevue University Update

Students can finish a Bachelor's in Cyber online at Bellevue. Bellevue is also beginning a new partnership with Travis Airforce Base. Stacy is not well-versed with the details, but will send information out to the group as it becomes available.

12. Other Items



Minutes DRAFT 1

- *High School Dual Enrollment- Cerro Coso is actively working on this with the High School. Dean Murabito is very supportive, as is Jill Board, in order to get more kids in the pathway. We are hearing lots of support from BHS admin.*
- *Question: Is Dual Enrollment open to private high schools, such as Immanuel? Valerie: Yes, but we would need to have a teacher on staff qualified to teach. The class would be offered on their campus during their day, on their time. Can Immanuel students go to Burroughs? Concurrent enrollment, enrolled in both? There are lots of options, Valerie is very interested in getting students into the pipeline.*
- *Security Plus- is there still a need? Yes. Buildings on base are not fully restored. NDTI recently outsourced to get certifications externally. Jennifer can set up a class outside of normal hours. If you are willing to pay fee, it can be a part of contract/community ed. A week-long or 4 day boot camp would be ideal. Since the earthquake, the base has used a local agency in town as a testing center until their building comes back up.*

13. Next meeting date – Spring 2020

Next meeting will be April 2nd, 2020.

14. Adjournment

Meeting adjourned at 1:08 pm by Valerie Karnes.

Meeting Chair: Valerie Karnes

Recorder: Lacey Navarro



Minutes

Committee Name: ESCC Business & Information Technology Advisory Board

Date: April 22, 2020

Time: 1:00pm – 2:00pm

Location: Zoom

Attendees	
Ama, Suzie	Professor, Digital Media Arts, Cerro Coso
Armstrong, Scott	Information Services Director, County of Inyo
Campbell, Deanna	Eastern Sierra Director, Cerro Coso
Coussan, Annette	Eastern Sierra CTE Liasion, Cerro Coso
Faber, Julie	Web Designer and Developer
Hightower, Matt	Professor, Business & IT, Cerro Coso
Jones, Gina	Director, Owens Valley Career Development Center
Karnes, Valerie	Professor/Department Chair, Business & IT, Cerro Coso
Mixson, Vonetta	Instructor, Business, Cerro Coso
Murabito, Maura	Dean, Career Technical Education, Cerro Coso
Navarro, Lacey	Administrative Secretary CTE, Cerro Coso
Payne, Michael	Systems Administrator, Alterra Mountain Company
Timpone, Frank	Professor, Business, Cerro Coso

1. Introductions

Meeting called to order at 1:03 pm by Matt Hightower.

All attendees briefly introduced themselves.

Professor Hightower explained the purpose of advisories and provided a brief overview of the provided attachments. Valerie Karnes reviewed the preliminary list of graduates and explained how the document was created.

2. College Update – Deanna Campbell

Deanna Campbell provided an in-depth update on the following topics:

- a. COVID-19 Response – Director Campbell provided a summary of the actions taken by the college in order to comply with Governor Newsom’s Stay-at-Home Order. Cerro Coso was well-positioned to weather this move to online education with minimal gaps.*
- b. President Search – Even though there was a robust pool of applicants, interviews for President were postponed. The interview team decided that it would be more appropriate for interviews to take place in-person. President Board agreed to stay on past her expected retirement date.*
- c. Budget – The College is already operating on a deficit. The district is looking for ways to examine operations and reduce expenses. The State announced that educational funding will decrease for the upcoming year.*
- d. Student Enrollment – COVID-19 has had a negative impact on summer enrollment. Staff have done an excellent job with outreach, engaging with students and offering free/reduced internet.*
- e. Commencement – the term was extended until June 30 to ensure students can complete their classes despite the obstacles presented this term. The virtual ceremony will take place sometime in June. The ceremony will feature pre-recorded speeches by the Chancellor and other trustees. Virtual commencement*

Minutes



will provide students and parents a specific time block to expect to see their student. The College is finding creative ways to create a meaningful experience for all students and stakeholders.

3. Digital Media and Marketing – Suzie Ama

Required and capstone course:

- DMA C201 eCommerce and Social Media Marketing – *offered every spring*

Students choose 3 of the following:

- DMA C102 Digital Imaging
- DMA C107 Computer Illustration – *includes logo design*
- DMA C111 Fundamentals of Web Development – *emphasis on HTML*
- DMA C131 Digital Video Production – *audio and production quality*

Suzie Ama discussed the foundations skills needed in order to complete the certificate. The program is existing, but is being updated. Students will be able to earn the certificate in 1 year. Gina Jones, OVDC, showed an interest in this program for her members. The Native American CTE Grant provides funding to help with tuition and books. Julie Faber applauded Professor Ama's efforts dedicated to the growth and development of the program.

- ***Julie Faber Motioned to approve continued support of the Digital Media & Marketing COA***
- ***Motion seconded by Scott Armstrong***
- ***Motion approved unanimously***

4. Cloud Computing Certificate of Achievement – Valerie Karnes

- IT C142 – Information & Communication Technology Essentials (A+)
- IT C143 Computer Network Essentials (Net+)
- IT C251 -Introduction to Programming Concepts & Methodology (Python)
- IT C280 – Introduction to Cloud Computing (NEW)
- IT C282 – Cloud Architecture (NEW)

Valerie Karnes discussed how existing programs take a stair-step approach to connect with other programs. All Cerro Coso IT/Cyber certificates are designed around and aligned with industry certification. Students should have an idea whether they want to go through the IT program or Cyber Security program. In the last IT/Cyber Advisory meeting in November, we received lots of feedback and interest from the base and many stakeholders throughout the county. They feel the Cloud Computing Certificate will be beneficial for our students. The Advisory Board suggested the COA title be generic and not specific to AWS so other platforms may be covered throughout the course. The IT/Cyber program has been successful with employers hiring right out of the 101 class and putting students directly into internship programs. The Dean of Career Technical Education approached Valerie Karnes about moving forward with the new Cloud Computing Certificate. The State is in the process of developing model curriculum for AWS in California. The Model Curriculum suggests students need to know Python.

- ***Michael Payne motioned to approve continued support of the Cloud Computing COA***
- ***Motion seconded by Scott Armstrong***



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- *Motion approved unanimously*

5. Operating System Certificate of Achievement – Valerie Karnes

- IT C142 – Information & Communication Technology Essentials (A+)
- IT C143 Computer Network Essentials (Net+)
- IT C251 -Introduction to Programming Concepts & Methodology (Python)
- IT C290 – Linux System Administration I (NEW) – *in the Fall 2020 Schedule*
- IT C292 – Linux System Administration II (NEW)

In addition to the interest in Cloud Computing, the IT/Cyber Advisory Board also showed interest in the Linux Operating Systems Certificate. Linux is run on 90% - 95% of servers all over the world. The College tried to offer the Operating Systems Certificate through Bellevue, however, it was not successful. Cerro Coso would like to offer it here at our campus. The program is intended to provide in-depth training. We are partnering with Red Hat, using their platform to train students in Linux. This 16-unit course is beneficial because students can qualify for financial aid. There will be another virtual IWV IT/Cyber Advisory Board meeting in the upcoming weeks. The title of the certificate is general to have the flexibility to cover Microsoft and Apple in the course content. If any changes occur, Valerie will not have to change the name, just the description and courses. New courses for windows based administration may be added in the future.

Professor Karnes asked for feedback inquiring about interest of ESCC student interest. Scott Armstrong advised the group that the county is moving more and more systems elsewhere and these classes would be beneficial for current employees to grow, learn and advance in their companies. Scott also supports the idea of the course titles being generic to include more platforms. His company is considering moving to Microsoft Cloud in effort to rid physical servers. Azure is also making huge strides. Per Michael Payne, Microsoft is pushing everything to Azure. There have been big hacks because companies have not properly secured their AWS or Azure environment. Many companies are moving to off-premises for office infrastructure. Data centers are being built and dedicated for government use. Julie Faber emphasized that a firm foundation and understanding of AWS would be a really good plan as most websites are utilizing AWS.

- *Scott Armstrong motioned to approve continued support of the Operating System COA*
- *Motion seconded by Julie Faber*
- *Motion approved unanimously*

6. Entrepreneurship Certificate of Achievement – Matt Hightower & Frank Timpone

- BSAD C100 Introduction to Business
- BSAD C098 Fundamentals of Entrepreneurship Accounting (NEW)
- IT C101 Introduction to Computer Information Systems
- BSAD C171 Introduction to Marketing

This COA has been in the works for over 2 years. In November, the IWV Advisory Board showed huge support of the Entrepreneurship Certificate. It was a better use of time and effort to utilize existing courses to be ladderred to additional certificates and degrees. There are 13 units on this certificate and it can be completed in 1 year. Professor Timpone described the courses and pathways. The new certificate is going through the Curriculum Instruction Council (CIC) now and is expected to be approved by the end of the semester. In designing this



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certificate, Professors Hightower and Timpone did not want to bog down the course with unnecessary curriculum. To accommodate the students with an accelerated program, only the chapters that would be most appropriate to help them run their business were selected. Chapters and concepts include: Financial and Managerial Accounting, Finance and Procedures, Bookkeeping, Internal Controls, Financial Statement Analysis, Cost Accounting Procedures and Concepts, Intro to QuickBooks. Suzie Ama felt the Entrepreneurship Certificate would complement the new DMA Certificate as well. Professor Hightower emphasized that this certificate would provide a solid foundation for anyone to start their own business. The Entrepreneurship Certificate would also complement many other certificates and degrees, especially CTE.

- **Scott Armstrong motioned to approve continued support of the Cloud Computing COA**
- **Motion seconded by Frank Timpone**
- **Motion approved unanimously**

7. Additional Items

- *Comments from Annette Coussan – her job is to educate people on CTE classes. Currently, Lone Pine is interested in business classes. There are plenty of opportunities for outreach, if you have any extra copies of handouts or pamphlets that she can use to promote your program, please let her know. Annette created a short power point presentation that she has been sharing and will also share at the upcoming Bishop Chamber COVID-19 Workshop.*
- *Question from Gina Jones: When will these new changes come into effect?*
 - i. *Digital Media & Marketing – Fall 2020*
 - ii. *Cloud Computing – This program is going back to CIC for a second read. We plan to offer some of these classes in Fall 2020.*
 - iii. *Operating Systems – This program is going back to CIC for a second read. We plan to offer some of these classes in Fall 2020.*
 - iv. *Entrepreneurship – The final read is coming up for accounting classes. Professor Timpone is hopeful that it will pass through CIC in the fall and may offer the program beginning Spring 2021.*

8. Adjournment

Meeting adjourned at 2:04 pm by Matt Hightower.

Meeting Chair: Matt Hightower

Recorder: Lacey Navarro



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Committee Name: IWV Information Technology/Cyber Security Advisory Board

Date: May 7, 2020

Time: 1:00pm – 2:00pm

Location: Zoom

Attendees	
Ama, Suzie	Professor, Digital Media Arts, Cerro Coso
Bradley, John	Instructor, IT/Cyber, Cerro Coso, China Lake IT/Cyber Lead
Buchanan, Stacy	Relationship Manager, Bellevue
Hightower, Matt	Professor, Business & IT, Cerro Coso
Karnes, Valerie	Professor/Department Chair, Business & IT, Cerro Coso
Kuzcora, Jillian	Teacher, Burroughs High School, Sierra Sands USD
Marcellino, Suzan	Workforce Development, NAWCWD
Miller, Scott	Recruiter, Saalex Information Technology
Murabito, Maura	Dean, Career Technical Education, Cerro Coso
Navarro, Lacey	Administrative Secretary CTE, Cerro Coso
Smosna, Wendy	IT Acquisition & Compliance Branch Head, NAWCWD
Zamarron, Angel	Outreach Coordinator, NAWCWD

1. Introductions

Meeting called to order at 1:00 pm by Valerie Karnes.

All attendees briefly introduced themselves.

No additions/changes to the agenda

2. College Update – Maura Murabito

Dr. Murabito provided an in-depth update on the following topics:

- a. *Dr. Murabito expressed her gratitude and appreciation to all Board Members for their continuing support of the college, the students and the programs. All the time and effort put into the Advisory Meetings is valued.*
- b. *COVID-19 Response – Dr. Murabito provided a summary of the actions taken by the college in order to comply with Governor Newsom’s Stay-at-Home Order. All courses moved to online delivery, with the exception of Allied Health, Welding and Police Academy. For summer classes, the college plans to continue to deliver online with the same exceptions. We would like to resume with on-ground classes for Fall 2020. In light of recent events, we have asked faculty to have a back-up plan prepared in the event social distancing is still a requirement. Governor Newsom will provide funding for additional costs incurred due to the COVID-19 pandemic.*
- c. *President Search – Even though there was a robust pool of applicants, interviews for President were postponed. The interview team decided that it would be more appropriate for interviews to take place in-person. President Board agreed to stay on past her expected retirement date. Interviews are anticipated to resume in July.*

3. Cloud Computing Certificate of Achievement – Valerie Karnes

- IT C101 - Introduction to Computer Information Systems



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- IT C142 - Information & Communication Technology Essentials (A+)
- IT C143 - Computer Network Essentials (Net+)
- IT C251 - Introduction to Programming Concepts & Methodology (Python)
- IT C280 – Introduction to Cloud Computing (NEW) – Fall 2020
- IT C282 – Cloud Architecture (NEW) – Spring 2020

Valerie Karnes discussed how existing programs take a stair-step approach to connect and build upon other courses/programs. All Cerro Coso IT/Cyber certificates are designed around and aligned with industry certification and CSUs. Students should have an idea whether they want to go through the IT program or Cyber Security program. In the last IWW IT/Cyber Advisory meeting in November, we received lots of feedback and interest from the base and many stakeholders throughout the county. They feel the Cloud Computing Certificate will be beneficial for our students. The Advisory Board suggested the COA title be generic and not specific to AWS so other platforms may be covered throughout the course. The IT/Cyber program has been successful with employers hiring right out of the 101 class and putting students directly into internship programs. The Dean of Career Technical Education approached Valerie Karnes about moving forward with the new Cloud Computing Certificate. The State is in the process of developing model curriculum for AWS in California. The Model Curriculum suggests students need to know Python. Python was really a necessity to this program. Courses have already gone through CIC and are due to launch this fall. First class intro to Cloud is in the new schedule.

Professor Karnes request feedback from the group:

Wendy Smosna – we currently have Cloud On-The-Job training at the Base. This seems to be a difficult area for interns to fulfill. John Bradley is the technical expert in these areas and is knowledgeable about what’s coming down the pike. We are on the cusp, but it is hard for the base to continue to provide this type of training.

John Bradley – Department of Defense DITAC requires remote access capabilities. It is key that we have people out there that understand and can navigate this environment.

Susan Marcellino– there is an emerging need to have people that already have foundational knowledge in these programs. It is a great supplement to our team.

- ***Susan Marcellino motioned to approve continued support of the Cloud Computing COA***
- ***Motion seconded by John Bradley***
- ***Motion approved unanimously***

4. Operating System Certificate of Achievement – Valerie Karnes

- IT C101 - Introduction to Computer Information Systems
- IT C142 - Information & Communication Technology Essentials (A+)
- IT C143 - Computer Network Essentials (Net+)
- IT C290 - Linux System Administration I (NEW) – Fall 2020
- IT C292 - Linux System Administration II (NEW) – Spring 2021

In addition to the interest in Cloud Computing, the IT/Cyber Advisory Board also showed interest in the Linux Operating Systems Certificate. Linux is run on 90% - 95% of servers all over the world. The College tried to offer the Operating Systems Certificate through Bellevue, however, it was not successful. Cerro Coso would like to offer it here at our campus due to the requirement for an operating system certificate on base. The program is intended to provide in-depth training. We are partnering with Red Hat, using their platform to train students in



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Linux. This 16-unit course is beneficial because students can qualify for financial aid. The title of the certificate is general to have the flexibility to cover Microsoft and Apple in the course content. If any changes occur, Valerie will not have to change the name, just the description and courses. New courses for windows based administration may be added in the future. The first class is scheduled to be delivered in the fall.

Professor Karnes asked the group for feedback:

John Bradley is excited for the new program. We need to promote at board meetings at China Lake. He has been spreading the word. A solid background and skill-set is critical in getting a job on base. Understanding the linkage between Cloud and Linux is important. Wendy can help spread the word that courses are available. Jillian can provide information to BHS admin and counselors to disseminate to students.

Angel Zamarron– question regarding the two main certificates. IT/Cyber are these two additional tracks? Professor Karnes referred to the flowchart handout to better answer the questions. The Cloud and Operating System Certificates will build off of the existing Cyber/IT programs. It does not build to an associate's degree. Package a couple of extra courses to get students prepared to serve in the Cloud environment and Linux Operating System. The future might include a windows track and an apple track depending on the labor market and needs of the regions.

Can students pursue more than one certificate/degree at a time? Yes, they can even graduate, come back and pick up the other two. The existing workforce can enroll and take a couple of classes (Cloud/Azure/AWS). OJT can still align with objectives in the new program on the base to provide exposure to the type of work they would need to advance.

Susan Marcellino states she is reluctant to approve because the program is Linux-based.

Angel Zamarron agrees, and does not want to approve. Windows is not mentioned in the Operating System description. She would like to see additional courses specific to the platform.

- *All members were in agreement to change title to Linux Operating System.*

5. Digital Media and Marketing – Suzie Ama

Required and capstone course:

- DMA C201 eCommerce and Social Media Marketing – *offered every spring*

Students choose 3 of the following:

- DMA C102 Digital Imaging – *includes photo shop*
- DMA C107 Computer Illustration – *includes logo design*
- DMA C111 Fundamentals of Web Development – *entry level HTML*
- DMA C131 Digital Video Production – *audio and production quality*

Suzie Ama discussed the foundational skills needed in order to complete the certificate.

The program already exists, but is being updated to meet the needs of our demographic.

Students will be able to earn the certificate in 1 year. Across the gamut, we now need to communicate via video more than ever due to COVID-19 pandemic and moving everything to online delivery. According to Burning Glass Technologies, 80% of mid-level skills jobs require some form of digital skills. Professor Ama received broad support from the ESCC Chamber for a mini certificate providing entry level core-competency in these areas. Social Media Marketing that can be completed in 2 years. This certificate is not intended for artsy people and designers. It's for everyone else. The description specifically targets the students that might need this course.

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The updated program went through CIC in the fall and is now on the catalog. Presentations scheduled in effort to market the updated program fell through due to COVID-19. Professor Ama is excited to promote in our area. Wendy Smosna inquired about the capstone course. Due to social media restrictions in the naval environment, the fundamentals of Web Development course would be the most beneficial course to NAWCWD. Wendy Smosna would like to see data visualization, dashboards, data analyzation, wikis, and infographics to relay information. Professor Ama explained those classes already exist and students can take individual courses if the packages don't suit an employers need. She also advised that NAWCWD include a footnote on their application that applicants are strongly advised to take the Fundamentals of Web Development course. Professor Hightower went into detail about other business classes that would meet those particular needs. Business classes provide training in: cleaning, analyzing and digitizing data (data analysis). There is also a programming course in IT that utilizes Python to do those things. Project Management pulls all those things together to manage large scale projects.

6. Summer/Fall 2020 Schedules

Summer course offerings: All four IT+ Cert courses are being offered this summer (IT C142 (A+), C143 (Net+) and C146 (Security+) and still have openings. They are being offered as a pilot to provide students with the ability to pick up an extra class and complete earlier.

Fall course offerings: Professor Karnes shared the Fall 2020 schedule. In addition to our regular scheduled classes, we will be offering IT C280 - Introduction to Cloud Computing and IT C290 - Linux Administration I. She requested that the Advisory Committee members let their employees know that these new classes are available.

7. Additional Items

- i. Professor Karnes reviewed the Projected Graduation Numbers with the Advisory Board. We are seeing a substantial numbers of completers with 58 degrees and 65 certificates in the BIT department. This is the reason why we built on a stair-step model so students can easily get additional BIT program certificates and degrees.*
- ii. Professor Karnes has received lots of student feedback and they are enjoying the BIT department. They enjoy working in groups and teams like they would at a job. Valerie hopes that our students will become valued employees of yours. Professor Karnes invited Advisory Members to provide feedback from their current employees that are Cerro Coso graduates. We would like to know what is going well and what skills employers could use support on. Our goal is to provide the region with proficient students that can easily transition into your organization.*
- iii. NAWCWD is working on a marketing plan for their Apprenticeship Program. They are working on reminding students to submit the appropriate documentation when they would like to take a course at Cerro Coso. The burden is on them to start the process.*
- iv. Stacy Buchanan – Bellevue is launching Data Analytics for Bachelor's Degree this fall. Stacy will provide a link to these programs for Valerie to share with the group.*



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v. Wendy Smosna has had several interns express their frustration with some courses being offered only one semester per year, thus delaying their graduation. Matt Hightower explained the sequencing and stacking of courses. We encourage students to work with counselors to prevent this type of confusion. Unfortunately, we do not have the enrollment numbers to support running these classes each semester.

- *ACTION ITEM: Professor Karnes to provide Advisory Board Members with the sequence of courses*
- *ACTION ITEM: Professor Karnes to provide Advisory Board Members with the link to Data Analytics course at Bellevue*
- *ACTION ITEM: Operating Systems COA title changed to Linux Operating System COA*

8. Adjournment

Meeting adjourned at 1:57 pm by Valerie Karnes.

Meeting Chair: Valerie Karnes

Recorder: Lacey Navarro



Minutes

Committee Name: IWV Information Technology/Cyber Security Advisory Board

Date: November 12, 2020

Time: 11:30am – 12:30pm

Location: Zoom

Attendees	
Ama, Suzie	Professor, Digital Media Arts, Cerro Coso
Alexander, Steven	Director of IT Security, Adjunct Professor , Cerro Coso
Bradley, John	Instructor, IT/Cyber, Cerro Coso, China Lake IT/Cyber Lead
Buchanan, Stacy	Relationship Manager, Bellevue
Hack, Terri	Counselor, CTE, Cerro Coso
Hightower, Matt	Professor, Business & IT, Cerro Coso
Karnes, Valerie	Professor/Department Chair, Business & IT, Cerro Coso
Kuzcora, Jillian	Teacher, Burroughs High School, Sierra Sands USD
Marshall, Jennifer	Job Development Specialist, Cerro Coso
Smosna, Wendy	IT Acquisition & Compliance Branch Head, NAWCWD
Zamarron, Angel	Outreach Coordinator, NAWCWD

1. Introductions (Valerie Karnes)
Meeting called to order at 11:34 am by Valerie Karnes
All attendees briefly introduced themselves
No additions/changes to the agenda
2. Spring 2020 Minutes Review (Valerie Karnes)
Minutes approved unanimously
3. College Update – (Valerie Karnes)
 - o *The schedule is available for Spring 2021. Valerie reviewed which courses are available for students to enroll. Two Python classes were cancelled and are postponed until fall 2021. Most classes are scheduled zoom to simulate a live class. We also have a large group of online classes. Linux and Cloud classes will start in fall 2021 pending approval from the state.*
4. Curriculum Update (Valerie Karnes)
 - o Cloud Computing Certificate of Achievement – 16 units (Valerie)
 - o Linux Admin
 - *Valerie shared the Info Tech Road Map flyer and explained the pathways available in the IT/Cyber department.*
 - *Awards and Degree data from 2017-18 to 2019-20 was shared. Cerro Coso is expanding sections and offerings as needed based on data.*
5. IT/Cyber Security Student Learning Outcomes (Valerie Karnes)
 - o Targets – 70% on all course outcomes
 - o Review Report (Handout)
 - *Valerie explained SLOs and shared SLO report data from 2019-2020. If the outcomes were not met, we are reassessing the program and making adjustments. Steven Alexander is a new instructor charged with assessing and redesigning the class. We will update the advisory group with results next year.*

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- *Program Review is a comprehensive look at our program. It reviews student demographics, individual classes, and feedback. We will look at how it is tied to our institutional outcomes. Valerie opened the floor for questions. No questions asked. Valerie invited Advisory Members to send any feedback they may have via email.*

6. Spring 2021 Schedules (Handout) (Valerie Karnes)

7. Job Developer Update (Jennifer Marshall)

- *The Job Development Specialist has created a canvas page to house Career Center Workshops on the website. Several workshops are taking place on a weekly basis. She is promoting JobSpeaker to the community and our students. JobSpeaker is an online database that helps students and employers connect. Student can view job postings; employers can search by need and see our students. The Career Center also hosts resume and interview workshops via zoom, as well as drop-in hours to meet one-on-one with Jennifer throughout the week.*

8. Employer Updates/Needs

- *Valerie asked the group for feedback on how the college can help staff local organizations. How can we help students be prepared to enter your place of employment?*
- *Angel Zamarron – General hiring requirements- maximum telemax status. Interns are currently on leave without pay. At this time, we are discussing what the return to work will look like. The Navy Outreach utilizes internal processes and procedures, the Naval Research Enterprise Internship Program (NREIP) and scholarships. Set up information sessions with Jennifer. Naval SMART (Science, Math and Research Transformation) Research Enterprise Scholarship for service. Jennifer sent flyers out to students. Despite LWAP status, we were able to successfully graduate 3 or 4 Cerro Coso students from our program. These students were promoted to career positions at NAWCWD.*
- *Wendy Smosna – Working with one intern that is able to maintain rotations. Technical requirements, no new updates. Chris Harper may be able to help with technical requirements as we start to see the interns come back. We have been in a mode of change with our departments going through an alignment change. Hopefully positions will settle a bit and we can have more information to share in the spring. Two students successfully graduated - Carleo Simpson and Victor Jennings.*
- *Valerie Karnes - Linux and Cloud will be offered in the fall pending final approval by the state. Linux will be done in Red Hat. We will be focusing on Azure and other cloud systems as well to ensure exposure to all platforms.*

9. Additional Items

10. Action Items

11. Adjournment

Meeting adjourned at 12:06 pm by Valerie Karnes

Meeting Chair: Valerie Karnes

Recorder: Lacey Navarro



Minutes

Committee Name: I WV Information Technology/Cyber Security Advisory Meeting

Date: April 22, 2021

Time: 11:30am – 12:30pm

Location: Zoom

Attendees	
Ama, Suzie	Professor, Digital Media Arts, Cerro Coso
Alexander, Steven	Director of IT Security, Adjunct Professor , Cerro Coso
Atencio, Amanda	Executive Secretary CTE, Cerro Coso
Bradley, John	Instructor, IT/Cyber, Cerro Coso, China Lake IT/Cyber Lead
Buchanan, Stacy	Relationship Manager, Bellevue
Davies, Jennifer	Lockheed Martin, Program Manager
Griffin, Nicole	Interim Dean, CTE, Cerro Coso
Hack, Terri	Counselor, CTE, Cerro Coso
Monique	NAWS
Karnes, Valerie	Professor/Department Chair, Business & IT, Cerro Coso
Margie	NAWS
Kuzcora, Jillian	Teacher, Burroughs High School, Sierra Sands USD
Marcellino, Susan	Data Science/Data Engineering/DEVSECOPS, NAWCWD
Marshall, Jennifer	Job Development Specialist, Cerro Coso
Zamarron, Angel	Outreach Coordinator, NAWCWD

1. Introductions (Valerie Karnes)

Meeting called to order at 11:33 am by Valerie Karnes

All attendees briefly introduced themselves

changes to the agenda: Upcoming Program Review (2021-22) - completed and online

2. Fall 2020 Minutes Review (Valerie Karnes)

Minutes approved unanimously.

3. College Update (Nicole Griffin, Interim CTE Dean)

- o Plan to return to campus and offer campus classes for Fall 2021. New certificates: Welding Process Certificate, Entrepreneurship Certificate, Medical Billing & Coding Certificate, Linux Operating Certificate, Cloud Computing Certificate, and Digital Media & Marketing Certificate. New IT/Cyber Security classroom will offer students hands-on practice. California Chancellor recognized Cerro Coso’s IT program for high success rates, being a leader in the region, and getting students placed into jobs that earn a livable wage.
- o Valerie added that the Computer Club is working to be reinstated. She would like to work with BHS and Jillian Kuzcora for getting high school students involved.

4. IT/Cyber curriculum (Valerie Karnes)

- o Cloud/Linux classes starting in the Fall 2021 term.
- o Valerie reviewed and discussed the attached packet IT-Cyber-Cloud-Linux Information Pathway Schedule. This includes additional information from the 2021-22 Cerro Coso



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Catalog, the recommended sequence of coursework., program flyers, and long-term schedules. Valerie discussed the potential need to offer a longer summer course for Net+ and Security+. John Bradley reported that the summer courses are fast-paced and are in high demand. Student feedback echoes the fast-paced nature of the course and students must absorb a large amount of information in a short period of time. Students from across the state are participating and, due to our alignment with Bellevue, students can continue their coursework.

5. IT/Cyber Security Student Learning Outcomes (Valerie Karnes)
 - Targets – 70% on all course outcomes
 - Valerie shared SLO document analyzing drop rates, completion, and student success. In 2019-20, all of the courses were evaluated. The goal is to have students pass the A+ exam at 80%.
 - IT C248 System and Network Administration – awaiting data to analyze.
 - IT C255 Introduction to Cybersecurity: Ethical Hacking – course has been redesigned and revamped.
 - IT C143 Computer Network Fundamentals – SLO had been met and supplemental resources added.
6. Upcoming Program Review (2021-22) - UPDATE
 - Completed and online.
 - Program Review is a comprehensive look at our program. It reviews student demographics, individual classes, and feedback.
7. New IT/Cyber Security Classroom
 - New IT/Cyber Security classroom will offer students hands-on practice. Funded by Perkins and SWF.
8. Job Placement updates (Jennifer Marshall)
 - JobSpeaker is an online database that helps students and employers connect. Students can view job postings; employers can search by need and see our students. There is a committee reviewing the website to improve its functionality and flow for students navigating through it.
 - JobSpeaker will be updated with additional jobs. The Job Development Specialist is currently working with JT4. Additionally, she is working with High County Hardware and Ace Hardware in the Bishop/ Mammoth area. They have expressed an interest in internships.
 - The Job Development Specialist is gearing up for Career Center workshops. In addition, she is creating recorded videos to assist students who are unable to attend the workshops.
9. Employer Needs - Open Forum
 - Valerie Karnes - Shared that JP from NDTI is sending prospective students to the Cerro Coso website for prerequisites for employment.
 - Jillian Kuzcora – Shared that quite a few AP high school students have expressed interest in a Summer program for Cyber Security over a Fall/Spring program. The time frame works better with student’s schedules/availability.
 - Group discussion - Students need to have a Cyber background, as it is very important to have a foundation in hacking to be cyber aware. Employers agree that engineers/programmers need to be cyber aware so that they can design with a threat perspective.



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- Stacy Buchanan – no updates
- Terry Hack – She just received the Cerro Coso graduation list.
- Monique – No updates.
- Margie – No updates.
- Angel Zamarron – She has a current student due to graduate in May and will be converting him to a position. She has been impressed by former students willing to engage and give back. A former graduate will be speaking about cyber career opportunities.
- Susan Marcellino - Suggested implementing DEVSECOPS into IT/Cyber courses. When hiring employees, they look for those collaborative skills and it can make the applicant stand out as a strong candidate. By encouraging a team integrated approach, students will transition well as they move into the workplace. She suggested incorporating: coordination that is cross functional, task/project tracking that includes a wiki page to teach students the DEVSECOPS agile framework, and include access to collaborative tools. The tool suite that they use is called Atlassian.
- Valerie will look into embedding the collaborative perspective and experience of DEVSECOPS into IT/Cyber courses. She added that there could be potential to integrate that collaborative approach in C259 Intro to System Analysis and Design cap stone course.

10. Summer 2021/Fall 2021 Schedules (Handout) (Valerie Karnes)

11. Additional Items

- Completed Business Program Review

12. Action Items

13. Adjournment

Meeting adjourned at 12:30 pm by Valerie Karnes

Meeting Chair: Valerie Karnes

Recorder: Amanda Atencio



Minutes

Committee Name: IWV IT/Cyber Security Advisory Committee

Date: November 9, 2021

Time: 11:30 – 1:00

Location: Zoom : <https://cccconfer.zoom.us/j/96790805525>

Attendees	
Karnes, Valeries	Professor, Cerro Coso
Ama, Suzie	Professor/Departament Chair Cerro Coso
Cooper, Jaelyn	Grand Canyon University
Carvajal, Kacey	Grand Canyon University
Buchanan, Stacy	Relationship Manager, Bellevue
Hack, Terri	Counselor, CTE, Cerro Coso
Hightower, Matt	Professor, Cerro Coso
Corbin, Steve	Professor, Cerro Coso
Griffin, Nicole	Dean, CTE, Cerro Coso
Kuzcora, Jillian	Teacher, Burroughs High School, Sierra Sands USD
Cota, Joe	NDTI
Marcellino, Susan	NAWCWD
Zamarron, Angel	NAWCWD
Kendell, Catherine	California Community Colleges Chancellor’s Office

Call to Order – *the meeting was called to order by Professor Valerie Karnes at 11:31 a.m.*

1. Introductions - *all those in attendance introduced themselves.*
2. Steve Corbin New Faculty Member – *Professor Corbin introduced himself to the committee and provided a thorough background of his education and work experience.*
3. Approval of Minutes - *minutes were motioned and seconded for approval with corrections of missing last names from April 22, 2021 meeting.*
4. College Update – *Nicole Griffin, Dean CTE, gave a brief update of the current on goings at the college. The current major focus is employer engagement.*
5. IT/Cyber Curriculum – *Professor Karnes reported that the first Cloud class is being run this fall semester and the Linux class is getting ready to run for the spring semester.*
6. IT/Cyber Security Program Review – *Professor Karnes gave an overview of the current Program Review. Overall programs are doing well. 240 degree and certificates have been earned since 2016. For a full report see meeting packet. Professor Karnes asked for feedback from the employers on requiring math for the certificates. Would it create a*

gap in being prepared for the job? Angel Zamarron (NAWCWD) stated that in the other apprenticeship program, they require math, English and speech for their employees. She also stated that she would reach out to the technical workforce for their opinion and feedback on the matter. Susan Marcellino (NAWCWD) spoke to her own personal preference of individuals needing critical thinking skills and she feels math is good source for obtaining these skills. Jaelyn Cooper (GSU) stated that there is no specific course requirements for transfer, but math is still needed for graduation. Kacey Carvajal (GSU) stated that for IT/Cyber college algebra or higher is required, but again is not required to transfer. Stacy Buchanan (Bellevue) stated that math is not required for certifications but is for Bachelor's. Her opinion, it is better to take math courses at the community college level.

7. *New IT/Cyber Security Classroom - the new cyber lab has been approved. The original opening date of fall has been delayed to spring due to supply chain lag issues.*
8. *AWS Pilot Cloud Skills Program – Catherine Kendall from the California Community Colleges Chancellor's Office presented the AWS Pilot Cloud Skills Program that Cerro Coso has been selected to take part in. Cloud skills has been identified as a need throughout California. This is a 2 year program resulting in an AA or a certificate. There are 5 areas of focus: Leadership Support, Curriculum Alignment, Faculty Development, Career Support, and Employer Engagement. The first cohort is scheduled to start November 16, 2021. This is a new program in which Cerro Coso was one of four colleges selected to be a part of. Full presentation will be emailed to Valerie Karnes.*
9. *Job Placement Updates - No discussions Jennifer Marshall not in attendance*
10. *Spring 2022 Schedules - Priority registration for spring 2022 has started. Open registration begins November 17, 2021. Professor Karnes provided a screen shot of the IT/Cyber Security course being offered in the spring. Noted that four core classes are offered every semester.*
11. *Employer Updates/Needs – Angel Zamarron reported that the two students in the apprenticeship program are doing very well. Joe Cota reported that his student intern is doing very well, even through the difficulties of his availability during the busy season. Stacey Buchanan reported that Cerro Coso students are always well prepared. Jaelyn Cooper reported she is working with one student looking to transfer next fall. Kacey Carvajal sees a lot of similarities in Cerro Coso and GSU's programs. He shared some links for information on GSU's program as well as some resource links that instructors can use in their classrooms including live sessions. The links are listed below. Bellevue University also provided some resource links that are listed below. Jillian Kuczora reported that BHS is 100% back on campus. She has about 20-21 students interested in cyber security and cloud resource pathways. She requested some resource information to disseminate to students.*

GSU Resources

[GCU Live Lessons | Grand Canyon University](#)

[GCU LIVE Lessons | Engage in Live Online Lessons - YouTube](#)

[Cyber Center of Excellence on Vimeo](#)

[CYBER CENTER OF EXCELLENCE WORKSHOPS - Events Calendar \(gcu.edu\)](#)

<https://calendly.com/gcucollegeoftechnology/30-minute-administrators-organizations-teacher-appointment?month=2021-11>

[Bellevue University Resources](#)

[Activities and Resources for Cybersecurity Students | Bellevue University](#)

12. Additional Info – *Professor Karnes will send out the full program review in February/March to discuss at spring meeting. The spring meeting will be held in April 2022.*
13. *Meeting adjourned at 12:52 by Valerie Karnes*

Meeting Chair: Valerie Karnes

Recorder: Denise Allen