

2023-24

Instructional Program Review

Cybersecurity

Troy Lanning

CONTENTS	
1. Program/discipline mission/goals and link to strategic plan	,
1A. Describe progress toward goals set in previous review, annual budget presentations, and/or strategic budget planning	;
1B. Have you met your previously set goals? If not, how do you plan to meet them?6)
2. Program/discipline description and overview7	,
2A. Provide the catalog description of the program7	,
Cybersecurity and Networking AAS7	,
Two-Year Associate of Applied Science Degree7	,
Credit for Prior Learning	,
Special Accreditation Information8	,
Program Learning Outcomes	,
Program Requirements	,
Secure Network Technician	,
One-Year Certificate of Completion9)
Program Learning Outcomes9)
Program Requirements9)
Computer Support Technician I Career Pathway Certificate9)
Less-Than-One-Year Certificate of Completion9)
Program Learning Outcomes)
Program Requirements)
2b. Describe how and to what degree the program description reflects the program's overall goals. If it does not, revise program description10)
2C. Community labor market need analysis and projection10)
2C.i. Has the demand for graduates changed in the past five years? If so how and to what degree?14	ŀ
2C.ii. What is the expected market demand for the future? How might the labor market need projection affect the program? how might the program adjust to these projections?	ļ
2D. Describe the specific curricular, instructional, or other changes made in the previous five years15)
3. Resources)
3A. Describe faculty composition, qualifications, and professional development.)
3A.i. What percent of faculty are full-time? Part-time?15)

3A.ii. Describe faculty degree attainment. What are the minimum degree qualifications? What percent of faculty exceed minimum degree qualifications?	.16
3A.iii. List the specific professional development program faculty attended including both on-site and off-site trainings; how did the professional development impact instruction, design, and delivery?	. 17
3A.iv. Are faculty composition, qualifications, and professional development meeting instructiona needs? If not, describe any plans that will address this.	∦ . 17
3B. Describe the specific facilities, equipment, and materials used by the program.	. 18
3B.i. Are facilities meeting instructional needs? If not, describe any plans that will address this	. 18
3B.ii. Is equipment meeting instructional needs? If not, describe any plans that will address this	. 18
3B.iii. Are instructional materials meeting program needs? If not, describe any plans that will address this	. 19
3C. Describe the instructional support services the program uses	. 19
3C.i. Review LRC holdings for relevancy and currency to program	. 19
3C.ii. Review program student use of tutoring and e-tutoring.	. 21
3C.iii. Review program student use of testing services	. 22
3C.iv. Review other instructional support services (student clubs, advising, TRiO, Veterans Service etc.) if applicable	es, . 22
3D. Describe to what degree the program uses the College's learning management system (Canvas) for all methods of delivery (face-to-face, online, synchronous, hybrid)	. 22
4. Effectiveness	. 23
4A. Student learning outcomes assessment	. 23
https://ssrs-	
s19.klamathcc.edu/reports/report/Assessment/Pending%20Reports/Number%20Of%20Assessme s%20By%20CMA%20And%20Course	ent . 23
4A.i. Course learning outcomes (CLO)	.24
4A.ii Program learning outcomes (PLO)	. 26
4B. Student success	. 28
4B.i. Describe enrollment trends and plans to address them.	. 28
4B.ii. Describe degree awarded trends and plans to address them	. 29
4B.iii. Review transferability of program	. 30
4C. Student engagement and satisfaction	.31
4C.i. Course evaluations data and analysis	.31
4C.ii Job placement data and analysis (if available)	. 32

5. Budget	2
5A. Provide five-year cost margin data and analysis3	2
5B. Summarize previous annual program viability study results and explain how changes impacted student learning outcome proficiency. If this has not occurred, describe plans to address this	3
5C. Explain any budgetary challenges and any plans to address them	3
6. Conclusion	3
6A. Describe program strengths	3
6B. Describe program weaknesses	3
6C. Describe support needed3	3
6D. Create new goals and link them to the strategic plan	4
8. Appendices	6
8.A Strategic Plan 2.0	6
8.B Strategic Plan 3.04	8
Instructional Program Review Rubric	0

1. PROGRAM/DISCIPLINE MISSION/GOALS AND LINK TO STRATEGIC PLAN

The Cybersecurity and Networking (CSN) program is the result of the separation of the previous Computer Engineering Technology (CET) program into two distinct programs. The goal of the CSN program is to create a pathway for students who would like to immediately go to work upon graduation. The goal of the CET program is for students to continue into OIT's CSET program. The previous CET degree did the best it could to manage this dichotomy, however it was never able to focus on either the students looking to go straight into industry or students looking to transfer to OIT.

There has been a transition of students coming out of the COVID-19 pandemic into online courses. The CSN and CET degrees are in the process of transitioning courses into a HyFlex model. The HyFlex model allows students to choose how they attend the course – face to face or distance education – each day. This conversion was reliant on getting the NetLab+ solution installed (was used for its first class in January 2024) and is a time-consuming process.

The CET and CSN programs remain linked due to sharing faculty and a budget.

1A. DESCRIBE PROGRESS TOWARD GOALS SET IN PREVIOUS REVIEW, ANNUAL BUDGET PRESENTATIONS, AND/OR STRATEGIC BUDGET PLANNING.

- Goal 1 (Prosperity): Improve student success in workforce employability through certifications and resume/portfolio development opportunities
 - Measurable Target: Set a goal of five students earning a CompTIA A+ and/or a CCENT prior to Fall 18
 - Third-party certification and work experience are the two most important artifacts on an IT/IS Technician's resume. In order to improve a student's probability of employment in the IT/IS field, the CET program will look for relevant third-party certifications and additional internship opportunities
- Goal 2 (Access): Improve student access to education opportunities in a variety of locations
 - \circ $\$ Measurable Target: Student enrollment is about 15 students per class
 - The Computer Engineering Technology and Computer Support Technician programs will seek to improve both the quantity and range of student populations enrolling at KCC. There will be a strong emphasis on developing partnerships with the local high school districts to promote College Now or undertake Dual enrollment classes.
- Goal 3 (Excellence): Increase accessible pathways towards 4-year degrees
 - Measurable Target: Increase in the number of students that are enrolling in four-year schools and are successful in obtaining a four-year degree
 - The Computer Engineering Technology and Computer Support Technician programs will enhance its reputation both locally and statewide through unique programs, in addition to enhanced customer service and campus quality.
- Goal 4 (Community): Increase internship opportunities
 - Measurable Target: Add an additional three internship opportunities per year over the next three years
 - Increase the pool of job-ready student interns by 30% over the next 3 years
 - Increase the number of CCENT and CompTIA A+ certification holders to five per year by year three

- Internships lead to successful degree completion and employment. In order to improve student success, the Computer Engineering Technology and Computer Support Technician programs will identifying additional community partners to provide internships as well as developing courses, trainings, or instructional modules that will give students necessary skills for a successful internship experience.
- Goal A (Prosperity): Improve income attainment
 - Measurable Target: Increase the number of third-party certification options
 - Increase the number of students that earn more than two certifications
 - Develop multiple pathway options with the AAS that will lead an increase in the number of third-party certifications that a student can earn which will lead to better employment opportunities without a bachelor's degree.
- Goal B (Access): Recruit more students coming out of high school
 - Measurable Target: The goal is to attract fifteen or more traditional students per year
 - Currently most of the students in the CET program are non-traditional students. The program is only adding five or fewer traditional students (students that have recently graduated from high school) per year

1B. HAVE YOU MET YOUR PREVIOUSLY SET GOALS? IF NOT, HOW DO YOU PLAN TO MEET THEM?

□Yes

⊠No

Partially. The previous goals were mostly written from the frame of the existing degree at the time (Computer Engineering Technology – CET).

Goal 1: Improve student success in workforce employability through certifications and

resume/portfolio development opportunities – met, but not within the projected timeframe. This is part of the culture and it has been integrated into the Cybersecurity and Networking (CSN) degree – CIS 281.

Goal 2: Improve student access to education opportunities in a variety of locations – in progress; in 2021 Pete and Troy brought forward a technology solution that makes our lab hardware accessible across the internet (NetLab+). This solution took approximately 3 years to get implemented. Now that we have the hardware, we have started converting our technical core classes to a HyFlex model to better reach our students.

Goal 3: Increase accessible pathways towards 4-year degrees – met; this goal is targeted towards the CET, but the CSN does have an articulation with OIT's Cybersecurity degree. Troy is pursuing an articulation with Mt. Hood Community College for the CSN graduates.

Goal 4: Increase internship opportunities – in progress; with the start of the degree came the pandemic which closed our entire internship opportunities with local businesses. We have started rebuilding this, but it is time consuming as Troy or Pete must meet with the individuals to evaluate the opportunities. **Goal A: Improve income attainment** – met; the addition of the CSN met the requirement of this goal. We have multiple industry certifications that students can acquire while completing their degree. Incorporated into the degree is also an independent study course focused on the students getting an industry certification. The CSN also now has a distinct 1-yr cert and pathway cert. The CSN students also complete the CET pathway cert as part of their degree.

Goal B: Recruit more students coming out of high school – in progress; this goal has been very difficult for the CSN degree to accomplish with the start of the degree being the start of the pandemic. The plan is to use the NetLab+ project to address this.

2. PROGRAM/DISCIPLINE DESCRIPTION AND OVERVIEW

2A. PROVIDE THE CATALOG DESCRIPTION OF THE PROGRAM.

There are three integrated parts to the program:

- Cybersecurity and Networking AAS Two-Year Associate of Applied Science degree
- Secure Network Technician One-Year Certificate of Completion
- Computer Support Technician Career Pathway Certificate

CYBERSECURITY AND NETWORKING AAS

TWO-YEAR ASSOCIATE OF APPLIED SCIENCE DEGREE

The Cybersecurity and Networking AAS degree is designed for new students and existing professionals who would like to acquire technical training in information system support and administration with an emphasis on cybersecurity techniques. This program is designed to help students earn industry-recognized, third-party certifications in hardware, software, networking, and cybersecurity. The program includes an internship with a local company's information system (IS) department to add real job experience to the degree holder's resume.

Students who pursue this degree will have a strong foundation in hardware, software, networks, computer languages, embedded systems (robotics) as well as a solid background in cybersecurity skills such as perimeter defense design, business continuity and disaster recovery, penetration testing, and ethical hacking. The curriculum will familiarize students with the theory and application of computer technology while offering an intensive, hands-on experience working with networks, hardware, software, embedded systems, and cybersecurity in a state-of-the-art computer lab facility.

A degree holder will have the additional benefit of being amply prepared for entry-level jobs in information systems support including technician positions involving a network environment in need of on-the-site cybersecurity monitoring. Work in the field of cybersecurity and network support includes the following: wired and wireless network design and administration, server management, robotic systems design, security design and administration.

Career opportunities for students who wish to enter the workforce immediately upon graduation include network systems support technician, computer user support technician, and network and systems administrator with cybersecurity skills.

For more information about the program, please see our program page:

www.klamathcc.edu/cybersecurity

CREDIT FOR PRIOR LEARNING

This program may provide prior learning credit and extended learning opportunities for persons previously or currently employed in related professions.

For more information: <u>https://www.klamathcc.edu/cpl</u>

SPECIAL ACCREDITATION INFORMATION

This program has special accreditation, certification, or approval from professional organizations.

For more information: https://www.klamathcc.edu/accreditation

PROGRAM LEARNING OUTCOMES

Upon successful completion of the program, students will be able to:

- Identify, test, and install PC hardware and PC software
- Connect network hardware and configure network software in a server system
- Talk to nontechnical end-users and provide high customer service to all end users
- Analyze security issues and apply them to network design problems
- Perform necessary 'white hat' attacks on a network to assess vulnerabilities
- Acquire the necessary fundamentals of the C++ programming language for solving complex program problems
- Understand the fundamentals of design and implementation of embedded system

PROGRAM REQUIREMENTS

Complete a one-term cooperative internship with a local employer that utilizes an information system during the normal course of conducting business. Arrangements for this learning experience will be made on an individual basis, and the student is under no obligation to accept permanent employment.

Number of credit hours necessary for completion: 96

SECURE NETWORK TECHNICIAN

ONE-YEAR CERTIFICATE OF COMPLETION

This certificate is intended for students who seek technical training in information system support that involves a network environment and hardware repair.

Students will have a strong foundation in hardware, networks, and software, as well as a solid background in mathematics and writing. The curriculum provides students an intensive, hands-on experience working with networks, hardware, and software.

Those who complete this program will have the advantage of being amply prepared for entry-level positions in information systems support involving a network environment and computer repair. The program includes the opportunity to earn industry-recognized, third-party certifications in hardware, software, and networking.

Employment opportunities for those wishing to enter the work force immediately upon program completion include information systems support technician and computer repair technician.

PROGRAM LEARNING OUTCOMES

- Apply the common network protocols, standards, and the fundamentals of IP addressing.
- Demonstrate how to configure a wireless network.
- Demonstrate workplace safety and hardware handling procedures.
- Identify, test, and install PC hardware and PC software.
- Demonstrate the procedures for installing, configuring, and backing up software.
- Talk to nontechnical end-users and provide high customer service to all end users.
- Analyze security issues and apply them to network design problems

PROGRAM REQUIREMENTS

Number of credit hours necessary for completion: 47

COMPUTER SUPPORT TECHNICIAN I CAREER PATHWAY CERTIFICATE

LESS-THAN-ONE-YEAR CERTIFICATE OF COMPLETION

The Computer Support Technician Career Pathway Certificate provides students the basic knowledge and skills needed to work with an information system. Students who complete this program will have a strong foundation in computer hardware, software, and networks. The curriculum allows students to acquire hands-on experience working with information system components in a lab setting as well as study information system concepts in a classroom setting. This certificate is beneficial for students who are new to information system technology and are looking for an entry point for acquiring computer support technology training. Those who are currently in a non-technology career may find this credential optimal for cross training into information system technology and, thereby, gain a competitive advantage when applying for positions in a wide variety of careers, including those with small businesses.

PROGRAM LEARNING OUTCOMES

Upon successful completion of the certificate, students will be able to:

- Apply the common network protocols, standards, and the fundamentals of IP addressing.
- Demonstrate how to connect network hardware and configure network software in a server system.
- Demonstrate how to configure a wireless network.
- Demonstrate workplace safety and hardware handling procedures.
- Identify, test, and install PC hardware components.
- Demonstrate the procedures for installing, configuring, and backing up software.
- Demonstrate the ability to communicate with nontechnical end users and provide a high level of customer service.

PROGRAM REQUIREMENTS

Number of credit hours necessary for completion: 16

2B. DESCRIBE HOW AND TO WHAT DEGREE THE PROGRAM DESCRIPTION REFLECTS THE PROGRAM'S OVERALL GOALS. IF IT DOES NOT, REVISE PROGRAM DESCRIPTION.

The Cybersecurity and Networking (CSN) program is designed for students who intend to get into industry upon completing the degree. The program allows students that do not have extensive computer background to bridge that gap in knowledge before getting into industry. The program has extensive hands-on training with real hardware to prepare graduates for their new career. Included within the degree is an independent study course where students study for and take an industry recognized certificate (CompTIA A+ recommended).

2C. COMMUNITY LABOR MARKET NEED ANALYSIS AND PROJECTION

Computer User Support Specialists (151232)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

Description

Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, via telephone, or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems. Excludes Network and Computer Systems Administrators (15-1244).

Projections

Area	2022 Employment	2032 Employment	Annual Growth	Annual Replacement	Total Annual
			Openings	Openings	Openings
Oregon	9,384	10,341	96	647	743
East Cascades	501	552	5	36	41

Data Sources and Limitations

Wages

No wage data available for this occupation.

Current Job Openings

There are 7 current job listings for this occupation.

Job Title	Location	Order Number	Date Posted
Monitoring Success			
Specialist Northwest	Dond	2069700	02/00/2024
(Washington, Oregon,	benu	5906709	05/09/2024
<u>Idaho)</u>			
IT HELP DESK ANALYST	Bend	3968023	03/08/2024
Treasury Support	Pand	2067096	02/07/2024
Specialist II	benu	5907080	05/07/2024
Information Technology	Chiloquin	2067092	02/07/2024
Support Specialist	Chiloquin	5907065	05/07/2024
Field Support Specialist	Antelope	3943042	02/07/2024
IT Support Specialist I	Redmond	3938767	02/01/2024
Printer Repair	Pand	2026951	01/20/2024
<u>Technician</u>	Dellu	3930831	01/30/2024

Industries of Employment

Industry	Employment
Wholesale Trade	13
Information	62
Finance and Insurance	14
Professional, Scientific, and Technical Services	88
Management of Companies and Enterprises	71
Administrative and Support and Waste Management	13
and Remediation Services	15
Educational Services	58
Health Care and Social Assistance	39

Occupations with Similar Skills

Software Developers

Computer Network Support Specialists

Network and Computer Systems Administrators

Computer Systems Analysts

Computer Occupations, All Other

Statewide Employment Analysis

Employment in this occupation in 2022 was much larger than most occupations across the state. The total number of job openings is projected to be much larger than most occupations in Oregon through 2032. This occupation is expected to grow at about the statewide average growth rate for all occupations through 2032.

Reasonable employment opportunities exist.

Area Employment Analysis

Employment in this occupation in 2022 was somewhat larger than most occupations in the region. The total number of job openings is projected to be somewhat larger than most occupations in the region through 2032. This occupation is expected to grow at a somewhat slower rate than the regional average growth rate for all occupations through 2032.

https://www.klamathcc.edu/en-US/academics/academic-programs/business-tech-management/cybersecuritynetworking.html

Careers in C	yberSecur	ity and Net	worki	ng	
Helpdesk Support Technician Desktop Specialist Technical Help Desk I					
<u>IT Sı</u>	<u>ipport Specialist</u>		1	<u>r Technician</u>	IT Service Desk Technician
ll data was gathered ata provided for a <u>C</u>	from the omputer User Su ment.	<u>pport Specialist</u> p	osition. Fe	or a different employment	forecast please visit the <u>State of Oregon</u>
nployment Depart Local, State,	and Nation	al Employn	nent P	ojected Change	2020-30
nployment Depart	and Nation	al Employn State of Oregon	U.S.	cojected Change	2020-30 nual Salary
Decal, State, Job Title User Support	and Nation East Cascade +24.7%	al Employn State of Oregon +15.7%	U.S. +7%	East Cascade Average Ann \$59,759	2020-30 nual Salary

2C.I. HAS THE DEMAND FOR GRADUATES CHANGED IN THE PAST FIVE YEARS? IF SO HOW AND TO WHAT DEGREE?

 \boxtimes Yes

□No

As mentioned in the area and statewide employment analysis, this area of employment has continued to grow at a rate higher than other industries.

2C.II. WHAT IS THE EXPECTED MARKET DEMAND FOR THE FUTURE? HOW MIGHT THE LABOR MARKET NEED PROJECTION AFFECT THE PROGRAM? HOW MIGHT THE PROGRAM ADJUST TO THESE PROJECTIONS?

The demand for technicians and cybersecurity continues to rise nationwide as we continue to hear news articles of data breaches and cybersecurity issues.

2D. DESCRIBE THE SPECIFIC CURRICULAR, INSTRUCTIONAL, OR OTHER CHANGES MADE IN THE PREVIOUS FIVE YEARS.

This program was approved by HECC 5 years ago and this is the first 5-yr review. During these first five years there have been multiple classes created (some for the launch of the degree, some based upon feedback from our CET/CSN advisory committee). In the last 5 years the CSN program has added a career pathway and 1-yr certificate differentiating the CSN students from the CET students.

The initial launch of the program had the following new classes: CIS 153/L – Scaling Networks, CIS 154/L – Connecting Networks, CIS 140 – Linux Fundamentals, CIS 279/L – Network Operating Systems (replaced CIS 225 – End User Support), CIS 142/L – Introduction to Programming C#, CIS 284/L – Network Security Fundamentals, CIS 285/L – Cyber Ops, CIS 286 – Ethical Hacking.

After the initial offering and gathering input from the CET/CSN advisory committee CIS 154/L was removed from the degree and a lab was added to CIS 140 – Linux Fundamentals and CIS 286 – Ethical Hacking. The remaining 2 credits were used to create a new class CIS 281. CIS 281 is an independent study course for students to prepare for and take industry recognized certification exams (recommended CompTIA A+).

Certificates:

Computer Support Technician I – career pathway certificate containing the courses recommended prior to a student taking the CompTIA A+ certificate. 4 lectures, 4 labs; 16 credit hours

Secure Network Technician – 1-yr certificate. 47 credit hours

3. RESOURCES

3A. DESCRIBE FACULTY COMPOSITION, QUALIFICATIONS, AND PROFESSIONAL DEVELOPMENT.

The Cybersecurity and Networking (CSN) program shares faculty with the Computer Engineering Technology (CET) program. This works well for the CSN since it was originally one combined program with the CET. Currently shared between both programs are two full-time faculty (each a program lead for their respective program) as well as one Computer Science Lab Coordinator/adjunct (Trevor Workman) and one adjunct (Doug Chamberlain).

3A.I. WHAT PERCENT OF FACULTY ARE FULL-TIME? PART-TIME?

https://ssrs-

<u>s19.klamathcc.edu/Reports/report/Academic%20Affairs/Instructor%20email%20List%20by%20CMA%20</u> <u>code</u>

FIRST NAME LAST NAME		EMAIL ADDRESS	STATUS
William	Brandsness	brandsness@klamathcc.edu	Full-Time

Troy	Lanning	lanning@klamathcc.edu	Full-Time
Douglas	Chamberlin	Douglas.Chamberlin@klamathcc.edu	Adjunct
Trevor	Workman	Trevor.Workman@klamathcc.edu	Staff/Adjunct
Amy	Fox	fox@klamathcc.edu	Staff

3A.II. DESCRIBE FACULTY DEGREE ATTAINMENT. WHAT ARE THE MINIMUM DEGREE QUALIFICATIONS? WHAT PERCENT OF FACULTY EXCEED MINIMUM DEGREE QUALIFICATIONS?

https://ssrs-s19.klamathcc.edu/Reports/report/Academic%20Affairs/Instructor%20Degrees

Instructor Name	Sub Group	School	Degree	Major
		University Of		
Brandsness, William	F9MO	Oregon	Bachelor of Science	Sociology
		OREGON		
		INSTITUTE OF		Applied
Brandsness, William	F9MO	TECHNOLOGY	Bachelor of Science	Mathematics
				Computer
				Information
Brandsness, William	F9MO	Boston University	Master of Science	System
				Software
		Oregon Institute		Engineering
Lanning, Troy	F9MO	of Technology	Bachelor of Science	Technology
		Arizona State	Master of Science in	Engineering
Lanning, Troy	F9MO	University	Engineering	Science
				Engineering in
				Computer
		OREGON		Systems
		INSTITUTE OF		Engineering
Chamberlin, Douglas	ADJCR	TECHNOLOGY	Associates Degree	Technology
		OREGON		
		INSTITUTE OF		Accounting
Chamberlin, Douglas	ADJCR	TECHNOLOGY	Associates Degree	Technology
		Portland		
		Community		
Workman, Trevor	FT	College	Associate of Arts	AAOT
		Klamath		
		Community		Cybersecurity
Workman, Trevor	FT	College	Associate of Science	and Networking
Fox, Amy	ADMFT			

3A.III. LIST THE SPECIFIC PROFESSIONAL DEVELOPMENT PROGRAM FACULTY ATTENDED INCLUDING BOTH ON-SITE AND OFF-SITE TRAININGS; HOW DID THE PROFESSIONAL DEVELOPMENT IMPACT INSTRUCTION, DESIGN, AND DELIVERY?

Cisco Instructor Trainings:

Pete Brandsness – CIS 153, CIS 154, CIS 284, CIS 285

Troy Lanning – CIS 285, Dev Ops Associate

Trevor Workman – CIS 145, CIS 146, CIS 153, CIS 152, CIS 285

The Cisco Instructor Trainings that we attended are required to be able to offer those technical core courses within the degree.

Conferences:

Cisco Partner and Instructor Training 2023 – Troy Lanning

WATSC '24 – Troy Lanning & Trevor Workman

Microsoft .NET Conf 2023 – Troy Lanning

The conferences we attended were a great opportunity to network with other schools across the nation to find out tips, tricks and issues others are seeing. Helps prevent reinventing the wheel.

Webinars:

AWS – Troy Lanning – 2022

MongoDB – Troy Lanning – 2022

CAE – Troy Lanning, Pete Brandsness, Trevor Workman – 2023

CAE – Troy Lanning, Trevor Workman – 2024

NSF S-STEM Grant – Pete Brandsness – 2023, 2024

Like the conferences, many of the webinars have been a great place to connect with a larger network of schools as well.

December 2019 – Finished Master of Science in Engineering from Arizona State University – Troy Lanning

3A.IV. ARE FACULTY COMPOSITION, QUALIFICATIONS, AND PROFESSIONAL DEVELOPMENT MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

⊠Yes

□No

□Somewhat

We are in the process of training Trevor Workman (he will start on his bachelor's Fall 2024) to be sure that we have someone ready to replace Pete when he retires.

3B. DESCRIBE THE SPECIFIC FACILITIES, EQUIPMENT, AND MATERIALS USED BY THE PROGRAM.

3B.I. ARE FACILITIES MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

⊠Yes

□No

□Somewhat

The Cybersecurity and Networking (CSN) has a unique lab on campus that it shares with the Computer Engineering Technology (CET) degree. This lab has allowed the students a space in which they can work hands-on with the technology.

Included in this room is the IDF (Network Closet) that houses our NetLab+ solution, 20 student stations with 2 computers at each, 18 side stations where students can assemble/disassemble computers and printers.





3B.II. IS EQUIPMENT MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

□Yes □No ⊠Somewhat There are a couple of pieces of equipment we need to buy to better support our NetLab+ solution. These include a NAS (so that we can backup our data) and another switch (we needed one more for the solution and IS has been loaning us one).

Dale Severns and IS has done a great job of setting up several classrooms on campus to facilitate HyFlex. This includes multiple screens around the room, multiple cameras, multiple microphones, and a whiteboard camera. This setup is crucial for the CSN conversion to HyFlex.

3B.III. ARE INSTRUCTIONAL MATERIALS MEETING PROGRAM NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

□Yes

□No

⊠Somewhat

In the technology field, our content changes very frequently. We meet with OIT each term to make sure we have the latest content which they are teaching. We also include new technology standards and new topics from our advisory committee, so this requires adjusting our instructional materials.

3C. DESCRIBE THE INSTRUCTIONAL SUPPORT SERVICES THE PROGRAM USES.

3C.I. REVIEW LRC HOLDINGS FOR RELEVANCY AND CURRENCY TO PROGRAM.

Consortium

The library belongs to the Sage Library System, which consists of over 70 libraries including public and academic libraries. Students can interlibrary loan materials from all of these libraries.

Electronic Database Resources:

Main

- 1. Gale General OneFile
- 2. eBook Open Access (OA) Collection (EBSCOhost)
- 3. Credo Reference
- 4. Gale eBooks
- 5. Gale In Context: Opposing Viewpoints
- 6. Fuente Academica
- 7. Gale OneFile: News
- 8. Gale OneFile: Popular Magazines
- 9. Gale OneFile: Computer Science
- 10. eBook Collection (EBSCOhost)
- 11. Points of View
- 12. DOAJ Directory of Open Access Journals

13. Readers' Guide Full Text Mega (H.W. Wilson)

Shelf

Main Collection

- 1. Nine algorithms that changed the future : the ingenious ideas that drive today's computers
- 2. The Universal history computing : from the Abacus to the Quantum Computer
- 3. The career programmer : guerilla tactics for an imperfect world
- 4. Absolute beginner's guide to computer basics
- 5. Computer basics in easy steps
- 6. Pattern on the stone : the simple ideas that make computers work
- 7. Hackers
- 8. Code : the hidden language of computer hardware and software
- 9. The productive programmer
- 10. The pragmatic programmer : from journeyman to master
- 11. Masterminds of programming
- 12. Cracking the coding interview : 150 programming questions and solutions
- 13. Programming logic and design,7e (comprehensive version)
- 14. Object-oriented analysis and design with applications
- 15. Growing object-oriented software, guided by tests
- 16. C++ : Learn by doing
- 17. Murach's C# 2015
- 18. Programming Logic and Design Comprehensive
- 19. C# 8.0 in a nutshell : the definitive reference
- 20. The mythical man-month : essays on software engineering
- 21. Compilers : principles, techniques, & tools
- 22. Domain-driven design : tackling complexity in the heart of software
- 23. Practices of an agile developer : working in the real world
- 24. Advanced programming in the UNIX environment
- 25. Software estimation : demystifying the black art
- 26. Mastering Kali Linux for advanced Penetration Testing : secure your network with Kali

Linux 2019.1 - the ultimate white hat hacker's tool kit

- 27. Mastering Kali Linux for advanced Penetration Testing : secure your network with Kali Linux 2019.1 the ultimate white hat hacker's tool kit
- 28. The hacker and the state : cyber attacks and the new normal of geopolitics
- 29. Hacking : the art of exploitation
- 30. The hacker playbook : practical guide to penetration testing
- 31. Algorithms
- 32. The essentials of computer organization and architecture

- 33. Database systems design, implementation, and managements
- 34. Careers in computer support
- 35. Delivering world-class technical support
- 36. Introduction to help desk concepts and skills
- 37. The art of deception : controlling the human element of security

Reserves

- 1. Introduction to logic circuits & logic design with Verilog
- 2. C++ Learn by doing
- 3. The essentials of computer organization and architecture
- 4. C# 10 in a nutshell : the definitive reference
- 5. Responsive web design with HTML5 and CSS : build future-proof responsive websites using the latest HTML5 and CSS techniques
- 6. Don't make me think, revisited : a common sense approach to Web usability
- 7. Database systems : design, implementation, and management
- 8. Hands-on Microsoft Windows Server 2019
- 9. Hands-on Microsoft Windows Server 2016
- 10. Mike Meyers' CompTIA A+ Core 1 certification passport (exam 220-1101)
- 11. Mike Meyers' CompTIA A+ Core 1 certification passport (exam 220-1101)
- 12. Mike Meyers' CompTIA A+ Core 2 certification passport (Exam 220-1102)
- 13. Mastering Kali Linux for advanced penetration testing : apply a proactive approach to secure your cyber infrastructure and enhance your pentesting skills

3C.II. REVIEW PROGRAM STUDENT USE OF TUTORING AND E-TUTORING.

Specific tutoring stats were unavailable however the overall stats were provided. One potential reason the specific stats would be unavailable is that our students who need tutoring have to get this assistance in the 811 lab where the equipment and expertise is. Trevor Workman (the Computer Science Lab Coordinator/NetLab+) is our students primary contact for tutoring.

Fall 2022 to Fall 2023					
Tutoring Center Users					
Accounting/Business/Computers	257				
Math/Nursing/Science	2,089				
Literature/Speech/Writing	631				
Other	435				
Total	3,412				

3C.III. REVIEW PROGRAM STUDENT USE OF TESTING SERVICES.

Troy was not able to gather the specific numbers of students using the testing services, however we have multiple tests within the degree (at least 20; midterms and finals) which leverage the testing center. This is crucial as it prepares students for the industry recognized certification testing experience.

3C.IV. REVIEW OTHER INSTRUCTIONAL SUPPORT SERVICES (STUDENT CLUBS, ADVISING, TRIO, VETERANS SERVICES, ETC.) IF APPLICABLE.

The Counselling Services, TRIO, and Veterans Services have also provided support to our degree. Occasionally we have students who need to speak with a professional counselor and having these resources available and free for our students has been a great help. TRIO has helped provide a few of our students with additional tutoring resources and assistance with registration. Veterans Services has helped recruit students to the degree. Usually once the student has been introduced Pete or Troy will advise the student, but Veterans Services helps them get registered.

Additionally, IS has been crucial in helping get technology for our students. Being able to get a student a hotspot or give them a donation computer can make all the difference for students.

3D. DESCRIBE TO WHAT DEGREE THE PROGRAM USES THE COLLEGE'S LEARNING MANAGEMENT SYSTEM (CANVAS) FOR ALL METHODS OF DELIVERY (FACE-TO-FACE, ONLINE, SYNCHRONOUS, HYBRID).

The Cybersecurity and Networking (CSN) program uses Canvas as a tool for all of our methods of delivery (face to face, distance education, and HyFlex). We use Canvas as a tool to facilitate our rigorous coursework. This provides students reminders of upcoming assignments and allows us to organize each course.

4. EFFECTIVENESS

4A. STUDENT LEARNING OUTCOMES ASSESSMENT

HTTPS://SSRS-

<u>S19.KLAMATHCC.EDU/REPORTS/REPORT/ASSESSMENT/PENDING%20REPORTS/NUMBER%2</u> 00F%20ASSESSMENTS%20BY%20CMA%20AND%20COURSE

ADV REQ CDE	Course	Learning Outcome	Number of
		Туре	assessments
CIS116	C++ Programming I	CLO	1
CIS1203	Embedded C	CLO	2
l	I	PLO	1
CIS126	C++ Programming II	CLO	1
1		PLO	1
CIS131	Computer Architecture	CLO	1
CIS1401	Linux Fundamentals	CLO	2
CIS142	Introduction to Programming C#	CLO	1
CIS145	Hardware Installation Support	PLO	1
CIS146	Software Installation Support	CLO	1
	' '	PLO	2
CIS151	Network I	CLO	1
CIS151L	Network I Lab	PLO	1
CIS152	Network II	CLO	1
CIS153L	Scaling Networks Lab	PLO	1
CIS162	Digital Logic Design	CLO	1
CIS280	Coop Wk Exp: Computer Technology	PLO	3
	En		
CIS284	Network Security Fundamentals	CLO	1
CIS285	Cybersecurity Operations	CLO	2

4A.I. COURSE LEARNING OUTCOMES (CLO)

Course Code Key				
	Has Plan Submitted			
	Has Result Submitted			
	Has Plan And Result Submitted			

HTTPS://SSRS-

S19.KLAMATHCC.EDU/REPORTS/REPORT/ASSESSMENT/ALL%20CLO%20ILO%20PLO

Course Code	Term Year	Instructor
<u>CIS 116 01</u>	FA2021	Lanning, Troy 560464
<u>CIS 116 01</u>	FA2021	Lanning, Troy 560464
<u>CIS 120 01</u>	SP2018	Brandsness, William 552103
<u>CIS 120 01</u>	SP2019	Lanning, Troy 560464
<u>CIS 126 01</u>	WI2021	Lanning, Troy 560464
<u>CIS 131 01</u>	SP2022	Brandsness, William 552103
<u>CIS 140 01</u>	WI2020	Lanning, Troy 560464
<u>CIS 140 01</u>	WI2022	Lanning, Troy 560464
<u>CIS 140 01</u>	WI2022	Lanning, Troy 560464
<u>CIS 142 01</u>	SP2021	Lanning, Troy 560464

<u>CIS 146 01</u>	SP2019	Fuquay, Michelle 512259
<u>CIS 151 01</u>	FA2020	Brandsness, William 552103
<u>CIS 152 01</u>	WI2022	Brandsness, William 552103
<u>CIS 162 01</u>	FA2020	Lanning, Troy 560464
<u>CIS 284 01</u>	SP2023	Brandsness, William 552103
<u>CIS 285 01</u>	SP2020	Brandsness, William 552103
<u>CIS 285 01</u>	SP2021	Brandsness, William 552103
<u>CIS 286 01</u>	SP2020	Lanning, Troy 560464

4A.I.1 DESCRIBE EVIDENCE OF STUDENT PROFICIENCY IN CLOS. IF THERE IS NO EVIDENCE, DESCRIBE PLANS TO ADDRESS THIS.

For the Cybersecurity and Networking AAS we typically use either a lab specific to the CLO or a specific section of a test to judge student proficiency. We look for the students to demonstrate their proficiency and most of the time we can hit our projected numbers. Sometimes however, we have a group of students which was not ready for rigors of the coursework, and we will miss our projected numbers.

4A.I.2 DESCRIBE THE SPECIFIC PROCESS FOR ADVISORY COMMITTEES FOR REVIEWING COURSE CONTENT AND OUTCOMES GUIDES (CCOGS). IF THERE IS NO PROCESS, DESCRIBE PLANS TO ADDRESS THIS. We meet every term with the advisory committee. At this meeting, we discuss high level changes to the courses and the degree. These topics are discussed at length with the committee with Pete and Troy providing their logic and reasoning for the changes. We then answer any questions the committee members have and once everyone is satisfied that they understand the changes and need for them we vote. Pete and Troy also receive feedback from our committee on topics which the committee members would like to be included in courses. When we can incorporate this feedback into a course we do so.

4A.I.3 WHICH COURSES HAD LEARNING OUTCOMES REVISED/UPDATED AND WHY?

Most of the CIS technical core have had their outcomes revised and updated. Some changes were to reflect a change in procedure on CLO's when David started his position. Other changes were to maintain consistency with OIT's learning outcomes to ensure transferability. Lastly, changes were made to standardize with outcomes for the Center of Academic Excellence – Cyber Defense designation that was awarded in November of 2023.

4A.I.4 IDENTIFY AND GIVE EXAMPLES OF CHANGES MADE IN INSTRUCTION THAT OCCURRED AS THE RESULT OF CLO ASSESSMENT. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

One example of a change which happened as a result of CLO assessment is the addition of the term project to CIS 126: C++ Programming 2. This project ties in all of the student's skills from both terms of C++ and requires extensive work on the students' part. Furthermore, this project helps prepare the students for the rigors of industry.

Largely the CSN degree cannot wait for a CLO assessment to tell us we need to change part of the course. The technology field changes too fast for us to wait to find out this information.

4A.II PROGRAM LEARNING OUTCOMES (PLO)

HTTPS://SSRS-

<u>S19.KLAMATHCC.EDU/REPORTS/REPORT/ASSESSMENT/PENDING%20REPORTS/PLOS%20BY%20</u> <u>DEGREE</u>

Course Code Key				
	Has Plan Submitted			
	Has Result Submitted			
	Has Plan And Result Submitted			

HTTPS://SSRS-

S19.KLAMATHCC.EDU/REPORTS/REPORT/ASSESSMENT/ALL%20CLO%20ILO%20PLO

Course Code	Term Year	Instructor
<u>CIS 120 01</u>	SP2023	Lanning, Troy
<u>CIS 120 01</u>	SP2023	Lanning, Troy

		560464
<u>CIS 126 01</u>	WI2022	Lanning, Troy
<u>CIS 145 01</u>	FA2020	Chamberlin, Douglas
<u>CIS 145 01</u>	FA2020	Chamberlin, Douglas
<u>CIS 146 01</u>	WI2020	Chamberlin, Douglas
<u>CIS 146 01</u>	WI2022	Chamberlin, Douglas
<u>CIS 151L 01</u>	FA2021	Brandsness, William
<u>CIS 153L 01</u>	FA2021	Brandsness, William
<u>CIS 280 01</u>	SP2021	Horne, Michelle
<u>CIS 280 01</u>	SP2022	Horne, Michelle
<u>CIS 280 01</u>	SP2022	Horne, Michelle
<u>CIS 280 01</u>	SP2023	Fox, Amy
<u>CIS 285 01</u>	SP2023	Brandsness, William

<u>CIS 286 01</u>	SP2020	Lanning, Troy
<u>CIS 286 01</u>	SP2022	Lanning, Troy

4A.II.1 DESCRIBE EVIDENCE OF STUDENT PROFICIENCY IN PLOS. IF THERE IS NO EVIDENCE, DESCRIBE PLANS TO ADDRESS THIS.

Within the Cybersecurity and Networking (CSN) program we have assessed several PLOs for student proficiency. During the pandemic the assessments of the PLOs had to be more flexible due to the issues with assessing outcomes for a class that was forced to be online instead of face to face. Since returning from the pandemic, we have continued to assess the PLOs. The PLOs were also updated to provide better separation between the CSN and CET PLOs.

When assessing the PLO we have an assignment (usually a lab, homework, or section of a test) which maps to the PLO. This assignment is the one we use to assess student proficiency with the PLO.

4A.II.2 IDENTIFY AND GIVE EXAMPLES OF CHANGES MADE IN INSTRUCTION THAT OCCURRED AS THE RESULT OF PLO ASSESSMENT. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

There are a couple of examples of changes made to the program as a result of PLO assessment, student feedback and our CET/CSN advisory committee. One such example was the removal of CIS 154/L – Connecting Networks so that we could add labs to CIS 140 – Linux Fundamentals and CIS 286 – Ethical Hacking. This also facilitated the addition of the CIS 281 course in which students' study for and attempt an industry recognized certification.

Another example of a change because of PLO assessments is the addition of CIS 142 as a prerequisite to CIS 116. This has allowed Troy to speed up the delivery of the content that overlaps in the courses and spend more time of the topics which are new in CIS 116 (functions, arrays, and file I/O) and more challenging in CIS 126 (pointers, classes, and linked lists).

4B. STUDENT SUCCESS

4B.I. DESCRIBE ENROLLMENT TRENDS AND PLANS TO ADDRESS THEM.

https://ssrs-

s19.klamathcc.edu/Reports/report/Dashboards/5%20Year%20Comparison%2020%20bar%20graph%20c hronological



At the start of the program our numbers were heavy influenced by the separation of the Computer Engineering Technology students into the CSN degree. We also had an influx of previous IQOR employees enrolling through Trade Act. Enrollment was down coming out of COVID-19 because we were unable to get into the high schools to recruit students. Our enrollment seemed to be recovering in the '22-23 year, however we continue to struggle to compete with students being able to make \$19+/hr. working unskilled.

Post pandemic we have been able to return to recruiting from the high schools. We have offered summer camps focusing on an introduction to robotics (VEX) and Troy has been at Henley High School each Wednesday (2023-2024 school year) for an hour working with Dr. Lebkowsky's competition VEX teams.

Our biggest change for enrollment trends is contingent on our conversion to HyFlex. We were unable to convert classes to HyFlex prior to the 2023-2024 school year because we did not have a technological solution (NetLab+) in place for students to be able to interact with the hardware off campus. This conversion and NetLab+ solution will allow the CSN degree to offer courses in the high schools as well as to the industry professionals who are adding skills to their title.

4B.II. DESCRIBE DEGREE AWARDED TRENDS AND PLANS TO ADDRESS THEM.

https://ssrs-

s19.klamathcc.edu/reports/report/Enrollment/Program%20Enrollment%20By%20Term%20v2



Our first three years of graduates were looking pretty good for our program size. Part of this is because the Computer Engineering Technology (CET) students who changed over to the Cybersecurity and Networking (CSN) degree were able to graduate in the first year of the degree's existence. This success continued into the next couple of years as we started to graduate part of the IQOR cohort. The last big group of IQOR trade act students graduated at the end of '22.

After the IQOR cohort we have a slump in our graduation rates, this is partially related to retention and recruiting. Trevor Workman is now running the summer camps – providing an opportunity for students to come to campus and get excited about robotics and technology. Troy has been working closely with Dr. Lebkowsky and her competition VEX students in the effort to recruit students into the program. Troy, Pete and Trevor are meeting regularly discussing how to improve our retention numbers without reducing the quality of the education. Our current focus in this effort is the conversion to HyFlex, however this required having the NetLab+ solution up and running. We have also found that converting a face-to-face, high-touch, STEM focused curriculum to HyFlex is very difficult and time consuming.

4B.III. REVIEW TRANSFERABILITY OF PROGRAM.

The Cybersecurity and Networking AAS currently has an articulation with OIT to transfer into their Cybersecurity degree. Unfortunately, this articulation is not very good and there has been no consistency in the leadership of the program at OIT. Thankfully, Mt. Hood Community College is starting their BAS in Cybersecurity in Fall '24 and we should be able to get a good articulation there. Troy is pursuing an articulation agreement (as mentioned in the Strategic Plan 3.0).

4B.III.1 DESCRIBE TRANSFERABILITY FROM HIGH SCHOOL TO KCC TO OUS.

In the past we have offered College Now courses which would transfer into the Cybersecurity and Networking AAS (the courses became an elective in CET but are part of the technical core of the CSN). In 2018-2019 Pete and Michelle Fuquay taught a course at Klamath Union high school. This course was the same one offered for the College Now course and counted towards the degree. Unfortunately, COVID-19 eliminated our College Now courses. With our recent addition of the NetLab+ solution, we are hoping to incorporate industry professionals and high school students into our technical core classes.

4B.III.2 HAS THIS CHANGED OVER THE LAST FIVE YEARS? IF SO, WHY? WHAT ARE THE IMPACTS ON STUDENTS AND THE PROGRAM?

This has changed in the last five years. At the creation of the Cybersecurity and Networking (CSN) program we did get an articulation with OIT's Cybersecurity program. This articulation however never truly benefitted our graduates because OIT was very restrictive on the credits they would accept towards their degree. This resulted in our students having to retake courses simply because they were not a 300+ level course. Troy made several attempts to meet with the program lead for the Cybersecurity program at OIT, but having consistent leadership in the position at OIT has been tricky.

Senate Bill 523 has led to the possibility of a much better articulation with Mt. Hood Community College (MHCC) who in the Fall of 2024 will be starting their BAS in Cybersecurity. Troy is working with the lead for MHCC to have an articulation in place for Fall 2024. This program also has the distinct advantage of being purely online allowing our graduates to work while pursuing their BAS.

4C. STUDENT ENGAGEMENT AND SATISFACTION

4C.I. COURSE EVALUATIONS DATA AND ANALYSIS

https://survey.klamathcc.edu/etw/etalus.htm



4C.I.1 DESCRIBE CHANGES MADE IN INSTRUCTIONAL METHODS BASED ON STUDENT COURSE EVALUATION DATA. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

We do make changes to our program based upon feedback from the students. One such example was a rather large change; however, we compiled data from multiple sources (student feedback, advisory committee feedback, PLO assessment) before making this change. The change was to remove CIS 154/L – Connecting Networks so that we could add labs to CIS 140 – Linux Fundamentals and CIS 286 – Ethical Hacking. This also facilitated the addition of the CIS 281 course in which students' study for and attempt an industry recognized certification. Our students had expressed interest in having more opportunity to work with the technology being used in those classes.

4C.I.2 DESCRIBE CHANGES MADE TO THE COURSE BASED ON STUDENT COURSE EVALUATION DATA.

Due to the nature of the Cybersecurity and Networking (CSN) AAS we must revise and update our courses regularly. We constantly have new industry standards, new topics from OIT, and new topics from our advisory committee which we must work into the coursework. In the case of the topics from OIT, we are provided with the resources which they are using to cover the topics (we meet with OIT every term to make sure we have the updated content and books).

Furthermore, each time we offer a course we do some self-reflection on how the course went. We often find that we need to make small changes such as when certain topics are introduced, reword certain technical pieces or update content with new standards. Many of the same conclusions are echoed in the student's responses on course evaluations.



4C.II JOB PLACEMENT DATA AND ANALYSIS (IF AVAILABLE)

The above pie chart shows what the graduates of Cybersecurity and Networking (CSN) and Computer Engineering Technology (CET) degrees do after completing. Most years we are around 85% of our graduates entering into the job force using their degree, continuing to their bachelor's, or working and pursuing their bachelor's at the same time. The remaining ~15% of our graduates usually choose not to work or pursue a bachelor's due to family situations. This year our numbers were a little higher (90% continuing education or working in the field).

5. BUDGET

A. FROVIDE TWE-TEAR COST MARCIN DATA AND ANALISIS.										
Academic Year	AY	2018-19	A١	(2019-20	AY	2020-21	AY	2021-22	AY	2022-23
Tuition	\$	116,888	\$	157,327	\$	128,741	\$	136,545	\$	141,234
Registrations		462		599		481		519		513
Cost In Progress	\$	147,631	\$	179,805	\$	166,712	\$	197,768	\$	185,830
Margin In Progress	\$	(30,744)	\$	(22,478)	\$	(37,971)	\$	(61,223)	\$	(44,596)

5A. PROVIDE FIVE-YEAR COST MARGIN DATA AND ANALYSIS.

	FTE	29.83	39.15	31.25	35.13	34.16
--	-----	-------	-------	-------	-------	-------

The CMA shown is for two programs. Cybersecurity and Networking and Computer Engineering Technology share a single budget since there is significant overlap between the degrees.

5B. SUMMARIZE PREVIOUS ANNUAL PROGRAM VIABILITY STUDY RESULTS AND EXPLAIN HOW CHANGES IMPACTED STUDENT LEARNING OUTCOME PROFICIENCY. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Have not had a program viability study.

5C. EXPLAIN ANY BUDGETARY CHALLENGES AND ANY PLANS TO ADDRESS THEM.

Have not had any budgetary challenges.

6. CONCLUSION

6A. DESCRIBE PROGRAM STRENGTHS.

The Cybersecurity and Networking (CSN) program is a rigorous program with a track record of success for our graduates. This rigor has helped our graduates succeed in industry and in their pursuits of their bachelors. CSN also has a large technical core which has contributed to our graduate's success.

The CSN has dedicated faculty (2 full-time, 2 adjunct) with a strong, diverse background in the technology field. This faculty dedicates significant time to continuing education and keeping up with the ever-changing technology field.

Continued institutional support has helped this program work towards its new goals as discussed in this document.

6B. DESCRIBE PROGRAM WEAKNESSES.

Enrollment and retention have been concerns for Troy and Pete. We often discuss tactics and try things to improve our retention. As we transition our courses into a HyFlex environment we are changing how we interact with our students. This has been a challenge as we are finding that students do not want to interact with their instructors (even in face- to-face courses) making it very difficult to help with their deficiencies (technology, content, etc.).

6C. DESCRIBE SUPPORT NEEDED.

The support needed for the Cybersecurity and Networking (CSN) program include:

- full-time funding for the Computer Science Lab Coordinator position this was funded by the DoL grant, but that runs out in December of 2024; Trevor is being trained to replace Pete when Pete retires
- continued support for NetLab+ now that we have the solution in place, we are converting
 classes to use it so it will take some time to reach its full potential. We also need a couple of

pieces of hardware which we did not account for as part of the original quote. We have the funds to do this from our course fees

- continued support as we convert courses to HyFlex converting STEM classes to HyFlex is time consuming. Pete has started converting his courses, Troy will start 2024-2025. The current estimate is that it will take 3+ years to complete.
- continued travel funds we have started traveling for conferences again after the hiatus for the pandemic, these funds come from the Faculty Senate, but it is more expensive to travel now than before
- continued continuing education funds once again comes from Faculty Senate and has paid to train Trevor; future instructors will also need the Cisco Instructor Training
- summer bridge program we are going to setup a gathering for new CET/CSN students. It will
 last for 2 weeks (4 hours/day 40 hours total). During this time we will introduce students to
 resources on campus and ensure the students have the technology they need (on campus and at
 home) as well as bring in guest speakers from industry to talk to the students

6D. CREATE NEW GOALS AND LINK THEM TO THE STRATEGIC PLAN.

lan Years 023-2026	cience and Cybersecurity	The Computer El partnering exten opportunities, th highly trained co The Department	ngineering Department seeks to promote sively with local business and higher educ e Department reaches deeply into the cor mputer support and engineering professi offers career tracks at multiple levels lead	the success of students ational institutions for t mmunity to foster a netv onals. ding to a variety of care	, local companies, and the econ anings, instructors, and potent vork of job opportunities and an ers in the computer industries.	omy of the region. ial employment a available pool of
OALS						
oal 🗸	Goal Statement ${}^{\checkmark}$	Initiative $ $	Potential Actions ~	Modified \vee	Add Progress Notes	Add Success
	Articulation Agreements	Future-focused educ	 Agreement for Cyber Security & Networking with Mt Hood by Fall 2024 	2/6/2024 10:59 AM	Click for details	Click for detail
	Increase Enrollment	Student Success	 Implement NetLab solution allowing classes to be offered online. Convert classes to a HyFlex model. This is an in depth course restructuring which will take about 3 years to complete Start supporting dual-credit through the HyFlex offerings. 	2/6/2024 10:56 AM	Click for details	Click for detai
	Maintain DOD/Homeland certification (CAE designation)	Advanced planning a	1. Yearly reporting 2. Yearly symposium 3. Engage in the CAE community 4. 5 yr resubmission	2/6/2024 10:54 AM	Click for details	Click for detail
	Stay current with industry.	Future-focused educ	 Attend conferences and webinars to remain current with industry. 	11/21/2023 5:04 PM	Click for details	Click for detail
	Engage in the local community and larger technical communities across the nation	Community engage	 Engage in the CAE's nationwide community Host Summer camps for high school and middle school Oregon Council of Computer Chairs - twice yearly meeting of schools across Oregon Engage in the local VEX community 	2/6/2024 11:28 AM	Click for details	Click for detail

8.A STRATEGIC PLAN 2.0

Department Plan With Notes

Computer Engineering

Mission Statement

The Computer Engineering Department seeks to promote the success of students, local companies, and the economy of the region. By collaborating extensively with local business and higher educational institutions for trainings, instructors, and potential employment opportunities, the Department reaches deeply into the community to foster a network of job opportunities and an available pool of highly trained computer support and engineering professionals. The Department offers career tracks at multiple levels leading to a variety of careers in the computer industries.

Goal	Goal Title	Initiative	Explanation
1	Improve student success in workforce employability through certifications and resume/portfolio development opportunities	Prosperity	Third party certification and work experience are the two most important artifacts on an IT/IS Technician's resume. In order to improve a student's probability of employment in the IT/IS field, the CET program will look for relevant third

		party certifications and additional internship				
Measurable Target						
Set a goal of five students earning a	CompTIA A+	and/or a CCENT prior to Fall 18				
Action Items						
More students will earn third party certification	S					
Create additional courses and trainings to prep	are students for t	hird party certification				
Work with local industry partners to determine most relelvant third party certifications						
Increase partners and affiliation agreements						
Progress Notes						
Have created a Community Education class i	in the summer fo	or certification prep (12/21/2018)				
In progress. Currently working on Cybersecu	urity and Netwo	rking degree that will emphasize certification				
(12/21/2018)						
CyberSecurity and Networking AAS degree	has been approv	red by the state and will be offered Fall of				
2019 (5/17/2019)						
Will add additional curriculum to the summers studends that take certification exams. (1/14	er Community E 4/2020)	ducation class to increase the number of				
Have worked with Business Adminstration p Adminstration Certificate to CET AAS degree degree. (1/14/2020)	program to enco e for better emp	urage students to add a Business loyability and transfering to OIT's IT BS				

	(Cyber: Troy Lanning - 01-15-2020 17:26: the Department of Defense (DOD) & Dep	50) - Pursuing ce artment of Home	rtification for graduates to be employable by eland Security (DHS) (1/15/2020)					
	The the goal of DoD and DHS certification is still in progress. We were not able to make the progress we were aiming for this year on this topic due to COVID. Removed a Networking course from the Networking series and built time into the degree for students to pursue an industry relevant professional certificate. The first offering of this course is Winter 2022. (5/3/2021)							
	Successes							
	Currently working on Cybersecurity and Networking degree that will emphasize certification (12/21/2018) CyberSecurity and Networking degree has been completed (5/17/2019)							
	Status							
	In Progress							
Goal	Goal Title	Initiative	Explanation					
2	Improve student access to education opportunities in a variety of locations	Access	The Computer Engineering Technology and Computer Support Technician programs will seek to improve both the quantity and range of student populations enrolling at KCC. There will					

<u> </u>		
		be a strong emphasis on developing partnerships with the local high school districts to promote College Now or undertake Dual enrollment classes.
Measurable Target		
Student enrollment is about 15 stude	ents per class	5
Action Items		
Grow dual enrollment and dual credit from Hig Grow fulfillment of state requirements for Prog Grow facilities and hardware in a variety of loca Grow through special outreach to female stude	jh Schools jram-of-Study ations ents and underre	presented minority students in technology fields
Progress Notes		
Have increased the student numbers from 4	to 7 through d	ual credit program at KUHS (12/21/2018)
Have created a IT Essentials lab at KUHS (12,	/21/2018)	
Have located some additional equipment th	at may be used	to expand lab at KUHS (5/17/2019)
(edited: Troy Lanning; 1-15-2020; fixed spel adding dual enrollment class offerings on th	ling) Are in disc ne KCC campus	cussions with local high school districts about next school year. (1/14/2020)
(edited: Troy Lanning; 1-15-2020; fixed spel course offerings using cloud technology. (1/	ling) Will add a (14/2020)	n online class this coming spring term in our

	 (Cyber: Troy Lanning - 01-15-2020 17:18:57) - Exploring additional distance ed offerings in the coming years; starting with CIS 275 - Database (Spring 2020) and looking for additional coursework which can be completed via cloud technology. (1/15/2020) Due to COVID we had an unique opportunity to expand our online course offerings. We are pursuing an online cloud solution (NetLab+) to take many of our Cisco courses online. Aiming to roll this out Winter 2022 with Pete & I working on getting everything setup this summer. (5/3/2021) 							
	Successes							
	Have started a dual credit program at KUHS (12/21/2018)							
	Status							
	In Progress	In Progress						
Goal	Goal Title Initiative Explanation							
3	Increase accessible pathways towards 4- year degrees	Excellence	The Computer Engineering Technology and Computer Support Technician programs will enhance its reputation both locally and statewide through unique programs, in addition to enhanced customer service and campus quality.					

Measurable Target

Increase in the number of students that are enrolling in four year schools and are successful in obtaining a four-year degree

Action Items

Increase articulation agreements with OIT and negotiate articulation agreements with SOU, Oregon State University, and the University of Oregon to a variety of pathways Provide a pathway to an OIT IT BS degree

Progress Notes

We have been meeting with OIT CSET staff every academic term to ensure that our classes that transfer into the CSET program contain the same material and have the same academic rigor. If our students that transfer to the CSET program are academically successful at OIT, it will provide an opportunity to add additional CSET classes to the curriculum and allow the Computer Engineering program at KCC to offer a true two-plus-two degree that matches OIT's first two years. (1/14/2020)

(Cyber: Troy Lanning - 01-15-2020 17:18:57) - Working with OIT's Cybersecurity to establish an articulation agreement for the CyberSecurity & Networking AAS. Aiming for a two-plus-two degree path, but have to wait and see what OIT says. Should hear back early February 2020. (1/15/2020)

Progress on the articulation agreement was slowed due to the COVID-19 issues. (6/1/2020)

We signed an articulation agreement with OIT - Cyber in September 2020. We did not get as much as we were hoping for and as such I am investigating alternative schools for students wishing to pursue a bachellors. (Currently talking with Boise State University) (5/3/2021)

Redesigned the CET degree to improve transferability to OIT. We are offering CIS 136 Object Oriented

C C: m	++ for the next time Spring 2022. This will allow the students to finish their complete first year of the SET program here. We added options to the degree for students who are more advanced in hath/science who wish to maximise transferable credits from KCC to OIT. (5/3/2021)
S	uccesses
(N	No Successes)
S	tatus
N	lot Started

Goal	Goal Title	Initiative	Explanation
4	Increase internship opportunities	Community	Internships lead to successful degree completion and employment. In order to improve student success, the Computer Engineering Technology and Computer Support Technician programs will identifying additional community partners to provide internships as well as developing courses, trainings, or instructional modules that will give students necessary skills for a successful internship experience.

Measurable Target

Add an additional three internship opportunities per year over the next three years Increase the pool of job-ready student interns by 30% over the next 3 years Increase the number of CCENT and CompTIA A+ certification holders to five per year by year three

Action Items

Identify and negotiate internship agreements with regional employers Identify the requirements as needed by employers Develop modules, trainings, or courses to meet employer requirements

Progress Notes

Have started contacting employers about becoming part of the academic advising committee for the Cybersecurity and Networking degree (12/21/2018)

Klamath Falls City IS wants to talk about supporting the program this coming mid-July (5/17/2019)

(Cyber: Troy Lanning - 01-15-2020 17:23:25) - Meeting with a supervisor in BLM to see if there are internship opportunities available for the students. (1/15/2020)

Met with a BLM supervisor, there are no current internship opportunities locally, but there could be some in the future. (6/1/2020)

Have opened communication with the Klamath County School District to create internship opportunities for our students. Meeting with one of the KCSD IT professionals on 5-6-21 to introduce myself and see what the students would be doing if they interned with KCSD. (5/3/2021)

	Successes						
	Currently, working with new partners on Cybersecurity and Networking degree (12/21/2018)						
	Klamath County IS is willing to become involved in out internship program, guest speak in in our cla and participate on the academic adisory committee (5/17/2019)						
	Klamath Falls City School District is offering (5/17/2019)	two internship	os for our dual credit program at KUHS				
	Status						
	In Progress						
al	Goal Title	Initiative	Explanation				
	Improve income attainment	Prosperity	Develop multiple pathway options with the AAS that will lead an increase in the number of third- party certifications that a student can earn which will lead to better employment opportunities without a bachelors degree.				

Measurable Target

Increase the number of third-party certification options Increase the number of students that earn more than two certifications

Action Items

Identify and develop courses that lead to specific third-party certifications that are currently in demand by employers but not offered in the current AAS.

Modify the current AAS pathway to incorporate new classes

Progress Notes

Eight new courses will be created for the Cybersecurity and Networking degree (12/21/2018)

Add the Cybersecurity and Networking pathway (12/21/2018)

Have completed adding classes with state approval of the CyberSecurity and Networking AAS degre (5/17/2019)

Cybersecurity and Networking Program has over 20 students in the program. (1/14/2020)

Removed the 4th Networking course (CIS 154/L) from the degree and added a lab for Linux (CIS 140) and Ethical Hacking (CIS 286) to provide students hands-on experience with some of the tools and technologies they will experience in the field. Added a CIS 281 CompTia Prep course for students to prepare for an industry level professional certification. These changes were approved by the school committees and are waiting for the state to approve them. (5/3/2021)

Redesigned the CET degree to improve options for students. Students can now focus on courses which will transfer to OIT if they are going for their CSET degree. At the same time the expansion of options

allows students to without the technical expertise to build up their skillset from the ground up. These changes have been approved by the college committees and are waiting for the state to approve them. (5/3/2021)					
Successes					
Developing th	e Cybersecurity and Networking degree (12/21/2018)				
Completed th	e CyberSecurity AAS degree (5/17/2019)				
Status					
Completed					

Goal	Goal Title	Initiative	Explanation		
В	Recruit more students coming out of high school	Access	Currently most of the students in the CET program are non-traditional students. The program is only adding five or fewer traditional students (students that have recently graduated forn high school) per year		
	Measurable Target				

The goal is to attrach fifteen or more traditional students per year

Action Items

Contact high school guidance counselors and supply them with program information Create outreach opportunities with prospective technology students

Progress Notes

Have started planning second VEX tournament for 2020 with the KCSD Will attend and help at a VEX summer camp for high school students this summer (5/17/2019)

Preparing handout information for school counselors and prospective students. (5/17/2019)

(Cyber: Troy Lanning - 01-15-2020 17:24:43) - Working with local high schools increase recruitment opportunities outside of the Mazama Career Fair and events hosted on campus. (1/15/2020)

Working with the county high schools (Henley and Mazama) for an offering of CIS145/CIS146 during the college now hour. This will be capped at 18 students this year (2020-2021). (6/1/2020)

Met with various high school counselors about the new CyberSecurity & Networking AAS. Provided handouts for them to distribute to their students and answered questions relating to the degree. Event was setup by Jared Dill and provided opportunities to reach these students prior to the COVID-19 issues. (6/1/2020)

Met with Henley HS about offering a summer coding course for their VEX students. Expecting about 15 students and this will be offered on campus. Met with Bill from the extracuricular programs in Klamath City Schools. He asked Pete and I to offer a 1 week course on VEX for Ponderosa Middle School. There are opportunities to expand this in the future to work with the high school and create a natural pathway for those students. Meeting with Dean Stickles on 5-7-21 to discuss these two opportunities. (5/3/2021)

Still hoping to offer the High School offerings of CIS 145/CIS 146 in 2021-2022 as it was put on hold 2020-2021 do to COVID. This may have to be postponed again though because of COVID. (5/3/2021)					
Successes					
(No Successes)					

8.B STRATEGIC PLAN 3.0

Department Mission Statement Computer Engineering Science and Cybersecurity The Computer Engineering Department seeks to promote the success of students, local companies, and the economy of the region. B Plan Years The Computer Supportunities, the Department reaches deeply into the community to foster a network of job opportunities and an available pool of highly trained computer support and engineering professionals. The Department offers career tracks at multiple levels leading to a variety of careers in the computer industries.						
OALS						
ioal ~	Goal Statement $ imes $	Initiative $ $	Potential Actions ${}^{\scriptstyle\!$	Modified $ $	Add Progress Notes	Add Success
	Articulation Agreements	Future-focused educ	 Agreement for Cyber Security & Networking with Mt Hood by Fall 2024 	2/6/2024 10:59 AM	Click for details	Click for details
	Increase Enroliment	Student Success	 Implement NetLab solution allowing classes to be offered online. Convert classes to a HyFlex model. This is an in depth course restructuring which will take about 3 years to complete Start supporting dual-credit through the HyFlex offerings. 	2/6/2024 10:56 AM	Click for details	Click for details
	Maintain DOD/Homeland certification (CAE designation)	Advanced planning a	1. Yearly reporting 2. Yearly symposium 3. Engage in the CAE community 4. 5 yr resubmission	2/6/2024 10:54 AM	Click for details	Click for details
	Stay current with industry.	Future-focused educ	 Attend conferences and webinars to remain current with industry. 	11/21/2023 5:04 PM	Click for details	Click for details
	Engage in the local community and larger technical communities across the nation	Community engage	 Engage in the CAE's nationwide community Host Summer camps for high school and middle school Oregon Council of Computer Chairs - twice yearly meeting of schools across Oregon Engage in the local VEX community 	2/6/2024 11:28 AM	Click for details	Click for details

INSTRUCTIONAL PROGRAM REVIEW RUBRIC					
	Highly Developed	Developed	Emerging	Initial	
1—Accomplishments in Achieving Goals	Exhibits ongoing and systematic evidence of goal achievement.	Exhibits evidence of goal achievement.	Exhibits some evidence that some goals have been achieved.	Minimal evidence that progress has been made toward achieving goals	
2—Labor Market Projection	Thoroughly explains projected market demand and potential effects on program; presents highly developed plan to address projection.	Explains projected market demand and discusses several possible actions to address projection.	Minimally explains projected market demand and lists one or two actions to address projection.	Presents labor market demand without analysis/explanation and fails to list possible actions to address projection.	
3—Resources	-		-		
Professional Development	Exhibits ongoing and systematic support of professional development opportunities.	Exhibits support of regular professional development opportunities.	Evidence of intermittent professional development opportunities.	Minimal evidence of professional development opportunities.	
Faculty Meeting Instructional Needs	Employs a sufficient number of highly qualified faculty to meet instructional needs.	Employs an adequate number of qualified faculty to meet instructional needs.	Has a plan to employ an adequate number of qualified faculty to meet instructional needs.	Faculty numbers and/or qualifications are insufficient to meet instructional needs.	
Facilities and Equipment	Facilities and resources meet current and future needs.	Facilities and resources meet current needs.	Evidence of a plan to have facilities and resources meet current and future needs.	Minimal evidence that facilities and resources meet current and future needs.	

4—Effectiveness						
Student Learning Outcomes Assessment	Exhibits ongoing and systematic SLO assessment to adjust instruction.	Exhibits student learning outcomes assessment and uses results to change instruction.	Has a plan to engage in ongoing and systematic SLO assessment, including using results to change instruction.	Minimal evidence of SLO assessment.		
Student Success	Thoroughly analyzes trends in enrollment, degrees awarded, time-to- completion rates, and formulates comprehensive plans to address them.	Describes trends in enrollment, degrees awarded, time-to- completion rates, and formulates plans to address them.	Describes trends in enrollment, degrees awarded, time-to- completion rates, and makes an attempt to plan to address them.	Minimal description of trends and/or fails to formulate plan to address them.		
5—Budget	Financial resources meet current needs and are projected to meet future needs.	Financial resources meet current needs.	Evidence of a plan to acquire financial resources to meet current needs.	Minimal evidence that financial resources meet current needs.		
6—Strengths and Weaknesses	Strengths and weaknesses are described accurately and thoroughly.	Most strengths and weaknesses are described accurately and thoroughly.	Some strengths and weaknesses are described accurately and thoroughly.	Minimal evidence that strengths and weaknesses are described accurately and thoroughly.		
7—New Goals and Plan	Multiyear planning process with evidence of use of assessment data in planning.	Multiyear planning process with some assessment data.	Short-term planning process recently implemented.	Minimal evidence of planning process.		
8—Overall Evaluation	Evidence of ongoing systematic use of planning in selection of programs and services.	Exhibits evidence that planning guides program and services selection that supports the college.	There is evidence that planning intermittently informs some selection of services to support the college.	Minimal evidence that plans inform selection the of services to support the college.		
	Highly Developed	Developed	Emerging	Initial		