



Applied Baccalaureate Degree Program
Cybersecurity

Program Proposal

**COVER SHEET
NEW DEGREE PROGRAM PROPOSAL**

Program Information

Institution Name: Clover Park Technical College

Degree: Bachelor of Applied Science in Cybersecurity CIP Code: 11.1003

Name(s) of the existing technical associate degree(s) that will serve as the foundation for this program:

Degree: Comp Net and Info Sys Sec AAS-T CIP Code: 11.1003 Year Began: 2008

Degree: _____ CIP Code: _____ Year Began: _____

Planned Implementation Date (i.e. Fall 2014): Fall 2020

Proposal Criteria: *Please respond to all eight (8) areas listed in proposal criteria FORM D.
Page Limit: 30 pages*

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Introduction

Clover Park Technical College (CPTC) has designed a Bachelor of Applied Science in Cybersecurity (BAS-C) degree program. This program is for technical associate degree graduates that want to become cybersecurity practitioners.

As an applied science curriculum, we intend to approach learning cybersecurity using hands-on tools in a realistic, practical context. Students will graduate with a practical understanding of cybersecurity concepts as well as experience with a current set of tools.

CPTC Intends to offer this program in a hybrid format with evening and weekend meetings to accommodate working adults. The program's structure would also permit a student's completion with less than a full-time commitment. A typical full-time student would take 18 months to complete the program. A half-time student might take twice that.

Our ideal applicant would have a recent associate degree in Networking and Information System Security. The program is designed to accept associate degree holders who through education or experience, are familiar with information technology concepts at a junior system administrator's level.

Our ideal graduate would be a candidate for positions as an Information Systems Security Officer, Penetration Tester, or Security Analyst.

Criteria 1: Curriculum Demonstrates Baccalaureate Level Rigor

Curriculum demonstrates baccalaureate level rigor.	Describe curriculum including (1) program learning outcomes (2) program evaluation criteria and process (3) course preparation needed by students transferring with technical associate degree (4) general education component (5) course work needed at junior and senior levels in the BAS.
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Program Outcome Development

We developed the BAS-C degree curriculum with input from industry and academia.

In search of rigor, we considered both the content (breadth, depth, and focus) and the cognitive level of learning outcomes. Development was informed by new curriculum we created with a corporate customer using the National Institute of Science and Technology (NIST) National Initiative for Cybersecurity Education (NICE) work role of Cyber Defense Analyst (PR-CDA-001).¹

We derived course-level outcomes, in part using the Department of Homeland Security / National Security Agency Center of Academic Excellence in Cyber Defense (CAE-CD) Education knowledge unit outcomes.² Overall, the program will cover enough CAE-CD foundational, technical core, and optional knowledge units to earn the CAE-CD certification.

Program Learning Outcomes:

- 1. Assess the cyber risk of an information system and recommend mitigation.**
- 2. Analyze identified malicious activity in order to mitigate effects and recommend security improvements.**
- 3. Create a cybersecurity vulnerability assessment of a small to medium business.**
- 4. Evaluate the security practices of an application / IT project development team at any point in the system lifecycle.**
- 5. Implement security software or hardware.**
- 6. Research offensive and defensive cybersecurity trends and tools.**
- 7. Evaluate cloud security in public, private, and hybrid environments.**

¹ Newhouse, William et al, NIST Special Publication 800-181: National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework, <https://doi.org/10.6028/NIST.SP.800-181> (visited December 16, 2018).

² National Security Agency, 2019 Knowledge Units, https://www.iad.gov/NIETP/documents/Requirements/CAE-CD_2019_Knowledge_Units.pdf, (retrieved June 10, 2019)

Program Evaluation Criteria and Process

Initially, we will evaluate the BAS-C program on a quarterly, annual, and three-year cycle. We project quarterly evaluations for only the first three years. Its purpose is to ensure that the College is fully supporting the program during its formation. Further, it confirms the program's adherence to our core values as well as our stated intent. Annual evaluations are internal faculty assessments of students' ability to achieve program-level outcomes. These are at the core of our continuous quality improvement effort. Three-year evaluations are routine and known as Program Reviews.

Per CPTC's Policy and Procedures Manual, we will conduct the formal Program Review of the BAS-C program for effectiveness on a three-year basis. This review is supported by a variety of quarterly and annual assessments of various indicators of program success and student satisfaction. They are comprehensive. Their objectives are to: recommend assistance, recommend resources, evaluate curriculum, evaluate the assessment of student proficiency, evaluate recruiting and retention, and identify outside influences and trends. In addition to the formal program reviews, the Dean of Instruction may choose to employ other criteria and methods for assessing the entire program, drawing upon the input from a variety of stakeholders, including the following:

- Program Advisory Committee: CPTC has a healthy and diverse Advisory Committee comprised of industry experts who provide perspective, evaluation, and feedback on the program. With the addition of the BAS-C degree, we will add one or two members to better represent the cybersecurity sector requiring bachelor's degrees. This advisory committee currently holds meetings three times each year.
- Student Surveys: Upon graduating from or leaving the program, students are surveyed as to what they perceived to be the strengths and weaknesses of all aspects of their experience, including classroom activities, pedagogical techniques, the relevance of specific courses, and other criteria, as appropriate.
- Employers Survey: The CNISS faculty at CPTC are active in the industry and gain information about current industry standards/trends as well as the success of their students in the field. Faculty may decide to develop a formal survey for alumni employers to better track this type of information.
- Faculty Evaluations: Regularly, the program faculty will meet as a team to discuss the program and its curricula as well as how they might be improved.
- Course Evaluations: To provide specific feedback from the students' perspectives, surveys of student assessments on course and instructor effectiveness are distributed at the end of each quarter. CPTC Calls these course assessments Student Assessment of the Learning Environment or SALEs.

- Wage Progression and Employment Status: The CNISS faculty at CPTC already tracks the status of the associate degree alumni and will continue to develop reporting processes for graduates of the BAS-C program that are consistent with CPTC best-practice.

Annual Program Outcome Assessment

The faculty plans and executes an assessment of selected program outcomes annually. We document the plan and results of these assessments in a college-wide tracking system. For the BAS-C program, faculty will map the program outcomes back through course outcomes. To create the assessment plan, we will select appropriate student course-level assessments that measure competency in the selected program outcomes. The faculty is responsible for planning and carrying out the annual program outcome assessment. This assessment also feeds the Program Review.

Additional Program Assessment during Start-up (Quarterly for First Three Years)

Using the data gathered from the tools above, we plan to assess program success in terms of student satisfaction, Full-Time Equivalents (FTEs), employment, and retention/completion quarterly for the first three years. Quarterly monitoring most benefits students by allowing timely intervention. Misfires allowed to continue for a year before correction may affect recruitment and retention for several subsequent years. Early intervention should minimize the adverse impact of any aspect of the program in need of correction.

In terms of *student satisfaction*, we would assess program success as average quarterly Student Assessment of Learning Environment (SALE) scores of 3.5 with the goal being 4.5. The higher goal number would be more consistent with our mature associate degree program's average. The SALE is a measure of the student's happiness with course content, presentation, and learning environment. The College administers this assessment at the end of each course. Early in the program, we expect some growing pains and expect an adjustment period to get the material and methods "dialed in." By the end of the second year of a course's presentation, we would expect to be exceeding the standard (3.5) and be routinely hitting the goal number (4.5). If we fell short in any course, we would assist that instructor in addressing the shortcomings. SALE Assessments are the responsibility of the Dean but conducted by our IT Department (infrastructure, not teaching).

In terms of *FTEs*, we will assess quarterly FTE totals against our glide path for program growth. We will also assess FTEs/instructor as a measure of efficiency. Being above the glide path in total FTEs indicates unexpected success. While this sounds good, being above the glide path can cause significant student dissatisfaction if instructor hiring, resources, and quality do not keep pace with program growth. Being below the glide path indicates a problem with our growth assumptions, poor marketing/outreach, a poor program reputation, or some other problem. A program below the glide path with a reasonably efficient FTEs/instructor ratio may survive as a small program. It may benefit from some marketing help or improved outreach activities. A program with an inefficient FTEs/instructor ratio would be subject to being "taught out" and shut

down. In our startup period, the FTE analysis will be the responsibility of the Navigator and reviewed by the Dean. Our Institutional Research team will support this effort.

In terms of *post-program employment*, we will execute a “graduation plus six months” salary survey. We will sample again at three years post-graduation. In the salary survey, we want to collect: hiring company names, and initial and three-year salaries. Success here would be 80% of graduates hired in the IT industry within six months of graduation being paid above living wages. At the three-year mark, we expect current salaries to exceed \$80k per year for BAS graduates. This assessment will be the responsibility of the Navigator and reviewed by our Advisory Committee, instructors, and the Dean.

In terms of *retention and completion*, we are concerned with aggregate numbers as well as a demographic comparison. Completion rates at the associate degree-level for public institutions, typically come in around 24% nationally.³ That is, 76% of students that start do not achieve a degree within three years. Completion rates in applied baccalaureate programs vary but are typically much higher. Mature, conventional schedule information technology programs in our area can graduate 80% of the students who enter their junior year. Persistence in night and weekend programs can be much lower. Initially, for our flexible schedule program, our minimum standard will be 70%. Our goal will be 80%. Demographically, Clover Park attracts about 40% of students of color. The student body is usually about 64% women, but in the CNISS program, women make up less than 15% of students. Demographically, program success would be to attract at least 40% of students of color and 30% of women with the goal being 50% or more women in the program. We intend to look at quarter-to-quarter retention, completions, and demographics each quarter. This assessment will be the responsibility of the Navigator and reviewed by our Advisory Committee, instructors, and the Dean. Our Institutional Research team will support this effort.

Figure 1. Program Assessment Plan

Area Assessed	Minimum Standard	Goal	How Assessed
Student Satisfaction	3.5	4.5	SALE
FTE Generation	FTE/Instructor >12	On Glide Path	Total Enrollment Quarterly
Graduate Salary	80% of Graduates hired in IT within 6 months above living wage	80% hired in IT in 6 months; average salary at 3 years > \$80k / year	Salary Survey at 6 months and 3 years

³ National Center for Educational Statistics, Undergraduate Retention and Graduation Rates, https://nces.ed.gov/programs/coe/indicator_ctr.asp (visited March 14, 2019)

Completion	70% of those who start graduate within 3 years	80% of those who start graduate within 3 years	Compare intake to graduation. Track retention quarterly.
Demographics	Intake 40% or more students of color; 30% women. Retain and graduate at the same rate.	Intake more than 40% students of color and 50% women. Graduate at a higher rate.	Compare self-identified race and gender at intake, in quarterly retention, and at graduation.

Course Preparation Needed

Students transferring with an [associate degree](#) will need to demonstrate that they have completed course work in:

- Networking
- Windows Server administration
- Linux server administration
- Computer programming
- Fundamental cybersecurity

We intend to initially match applicants’ coursework course outcomes from their syllabi to our course pre-requisites. In this manner, we can judge if the course the applicant completed has prepared them to be successful in our program. This process should rapidly produce a matrix of acceptable courses from our sister colleges. This product would then become the basis for an articulation agreement.

We are counting on the applicant’s associate degree to contribute 90 transferable credit hours to the 180 total credit hours that make up a bachelor’s degree. Of those 90 credit hours, 20 must count towards the 60 hours of general education credit needed for the bachelor’s degree. Applicants who are missing any of the technology topics or are short of the 20 general education credits or 90 total credits will make-up those deficits in the program’s Preparation Tier.

General Education Component

The General Education design builds skills, knowledge, and abilities in a progressive manner. From a starting point of college-level numeric, communicative, social, and scientific competency, students will learn and apply business communications, information literacy, statistical analysis, professional ethics, and organizational leadership in a cybersecurity setting.

The student’s transferable general education experience from their associate degree, the 40 credit hours they earn in the BAS-C program, and any credits they make up in the Preparation Tier will total at least 60 credit hours. Of the 60 credit hours, at least 20 will be upper-division. While there should be some latitude in the student’s selection of general education courses, they will need to meet the credit distribution by subject shown below. This distribution represents the Washington State Board for Community and Technical College’s BAS

Committee's recommendation for Minimum General Education Requirements for Applied Baccalaureate Degrees.⁴ Course descriptions appear in Appendix A.

Overall, this general education distribution is:

Figure 2. General Education Credit Distribution

Distribution	AAS / AAS-T	Preparation Tier	Lower Div. Gen Ed	Upper Div. Gen Ed
10 Communications	College-level English (5 credits)			ENGL 310 Business Comms (5 credits)
5 Quantitative	College-level Math (5 credits)			
10 Humanities			ENGL&235 Tech Writing (5 credits)	PHIL 310 Professional Ethics (5 credits)
10 Social Science	Sociology or Psych (5 credits)			PSYC 311 Ind and Org Psych (5 credits)
10 Natural Science			Science w/ Lab (5 credits) Science (5 credits)	
15 Addt'l	Addt'l Science (5 credits)		MATH 146 Statistics (5 credits)	BUS 310 Project Man (5 credits)

Course work needed at the junior and senior levels

The BAS-C program is designed with four technical tiers showing progressive development (Career Ladder model). The four technical tiers include:

Tier 1: Preparation.

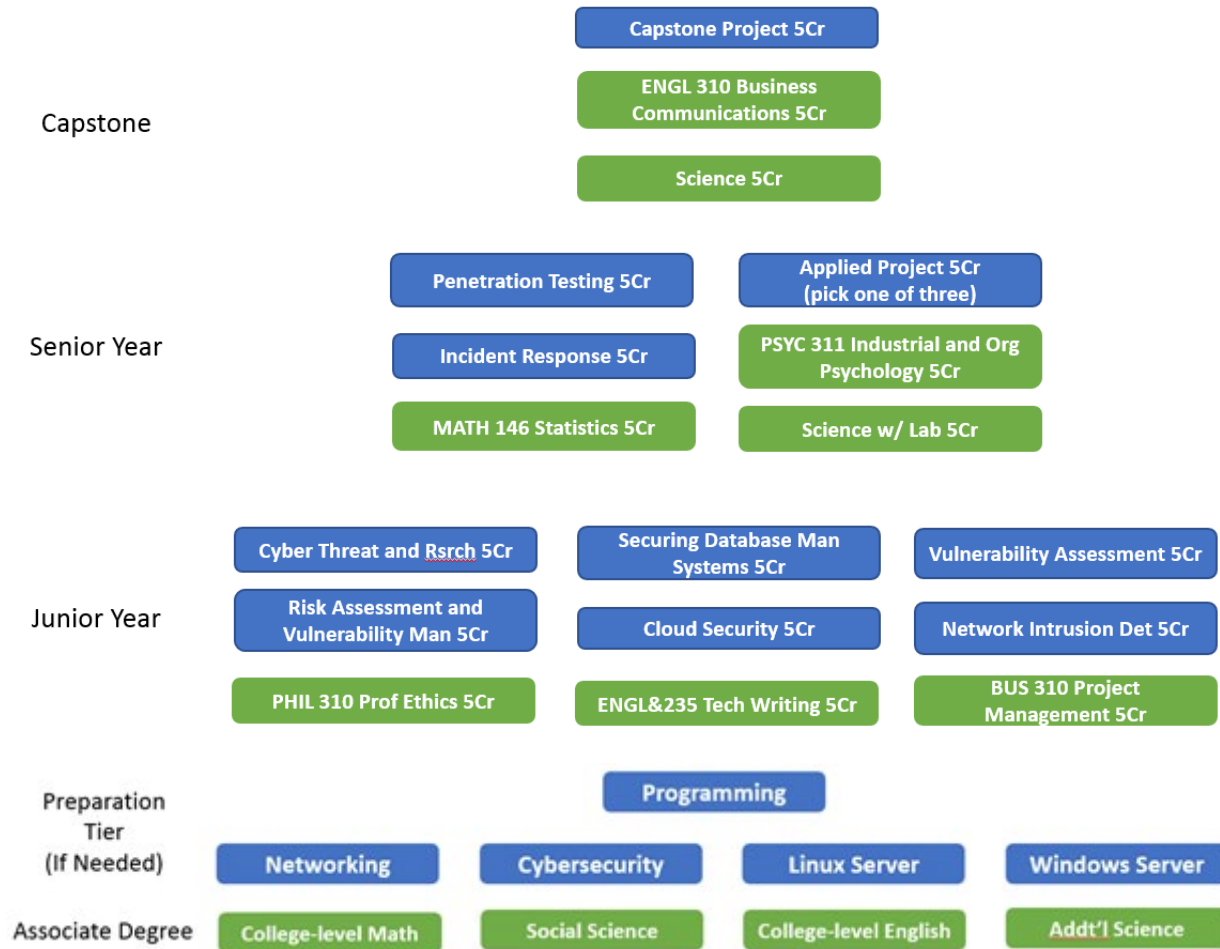
Tier 2: Acquiring the Tools (Junior Year).

Tier 3: The Practice of Cybersecurity (Senior Year).

Tier 4: Capstone Project.

⁴ BAS Committee, Washington State Board for Community and Technical Colleges, *RECOMMENDATION to INSTRUCTION COMMISSION FROM BAS COMMITTEE for MINIMUM GENERAL EDUCATION REQUIREMENTS FOR APPLIED BACCALAUREATE DEGREES*, July 2015 (retrieved June 10, 2019: <https://www.sbctc.edu/resources/documents/colleges-staff/programs-services/applied-baccalaureate/RecommendationforGenEdRequirementsforBASJuly2015.pdf>)

Figure 3. Curriculum Structure



The first tier (Preparation) is an in-program pre-junior year period of learning when students gain the skills, knowledge, and abilities required to be successful. CNISS graduates and other applicants with sufficient preparation may skip this tier entirely. Students without this preparation must complete the required coursework to make up their deficit prior to junior status.

The admission requirements for the Junior Year are:

- Associate degree (transferable) totaling 90 or more credit hours including 20 credit hours of transferable general education coursework includes math, English, and social science. Applicants need to have maintained a minimum cumulative 2.5 out of 4 GPA for admission.
- Five quarter credit hours of computer networking coursework.
- Five quarter credit hours of Windows Server coursework.

- Five quarter credit hours of Linux operating system coursework.
- Five quarter credit hours of cybersecurity coursework.
- Five quarter credit hours of computer programming.

Clover Park Technical College does not currently have a “bridge” for this proposed program. The required prerequisite/preparation courses currently exist as daytime conventional vocational/technical college courses. This format would not serve working adults’ needs. If there is sufficient interest, we will create an evening, two-quarter certificate with introductory courses in networking, Windows Server, Linux server, computer programming, and cybersecurity. As we teach these topics in a daytime conventional face-to-face format now, converting them to a hybrid, flipped format for evening classes would not be difficult. This would ensure the best access for working adults who lack some or all the technical pre-requisites.

In the second tier (Acquiring the Tools or Junior Year), students acquire the skills, knowledge, and abilities to effectively wield a current set of tools commonly used by cybersecurity professionals.

This tier consists of six technical courses and three general education courses. The technical topics include threat, risk management, database security, cloud security, vulnerability assessment, and network intrusion detection. The general education topics include professional ethics, project management, and English composition 2. Course descriptions appear in Appendix A.

These courses may be taken in any order as they do not build upon each other:

Figure 4. Second Tier (Junior Year)



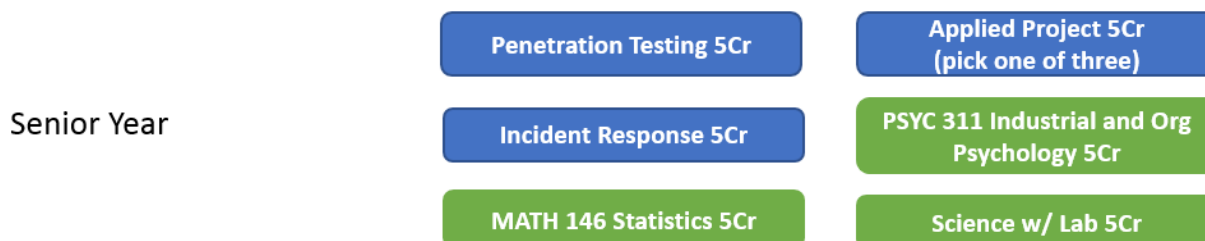
In the third tier (The Practice of Cybersecurity or Senior Year), we will guide the students through several complex simulated cybersecurity engagements. In this tier, students will employ the tools they learned in the second tier in a coordinated, thoughtful manner.

Students will complete an incident response course, a penetration testing course, and an applied project course. General education topics include statistics, a science elective, and industrial and organizational psychology.

Through a series of simulated cybersecurity engagements, students will build the skills, experience, and insights they need to reach the analysis and evaluation levels of learning. Each engagement is patterned after those required of a cybersecurity professional. Each engagement will require the student to analyze the problem, research solutions, select and

employ appropriate tools, create a project plan, execute the plan, and evaluate their results. Students will communicate their results as they would with customers in the field. These engagements build upon one another with evaluation and feedback at each stage. Efficient, clear report writing will become a honed skill.

Figure 5. Third Tier (Senior Year)



In the fourth tier (Capstone Project), each student will research and propose a project to demonstrate mastery of the program learning outcomes. This student proposed faculty approved project should tie together all the previous learning.

The project scope will likely include components of earlier learning activities but must also include a novel component of the student’s design. We designed this project to motivate the student to reach new heights in the development of his/her skills, knowledge, and abilities by allowing them to focus on an aspect of their choosing. We bound the project scope by the program outcomes to ensure that the learning is mostly within our program scope.

General education topics included in the final tier are business communications and a natural science elective course.

Figure 6. Fourth Tier (Capstone)



Credit Budget

Students entering the BAS-C program will have earned at least 90 credit hours while earning their associate degree. The total credit load for the BAS-C degree is 90 credits plus any work needed in Tier 1 (Preparation). Thus, the BAS-C degree pathway will have a minimum of 180 credits. The credit budget is indicated in Figure 7.

Figure 7. Credit Budget

	Credits
Associate Degree	90
Tier 2	45
Tier 3	30
Tier 4	15
Total	180

Criteria 2: Qualified Faculty

CRITERIA	STANDARD
Qualified faculty.	<p>Provide a profile, including education credentials, of anticipated faculty (full-time, part-time, regular, continuing) that will support the program for each year (junior and senior). Include faculty needed to cover the technical course work, general education courses, and electives. In addition, provide the total faculty FTE allocated to the program.</p> <p>Faculty and administrators responsible for technical courses must meet certification requirements for professional and technical administrators and instructors in the Washington Administrative Code.</p>

Instructor Qualification

Clover Park Technical College recruits and employs well-qualified instructors. Instructors are encouraged to embrace lifelong learning and to maintain currency in their fields. Upper-division technical program instructors are required to have a Master's degree in a related discipline and at least three years' industry experience to teach as an instructor, whether adjunct or tenured, in a bachelor program. They also maintain a current Professional-Technical Faculty Certification. BAS-C faculty profiles and credentials can be found in Appendix C.

We currently employ one fulltime faculty who would lead the BAS-C program and as enrollment grows, additional faculty hires will be necessary. We regularly bring in guest speakers who are current practitioners and experts in their field. We also enjoy robust red-team support from graduates who are professional penetration testers in our area. We expect these relationships to continue and expand instructional capacity in BAS-C program.

General education instructors are required to have a Ph.D. (or ABD) in their field.

Faculty librarians contribute information literacy content in the context of both general education and technical courses.

Student and Faculty Projections

We project a steady-state student load of at least 80 BAS-C students by the end of the third year. This represents a full class with the students split evenly between the Junior and Senior year cohorts. Clover Park holds class in each of the four quarters every year. We intend to admit students each quarter to maintain continuity with our associate program. Our program's total of 80-88 student projection is conservative based upon nearby Green River College's experience. It includes a 10% attrition between junior and senior years.

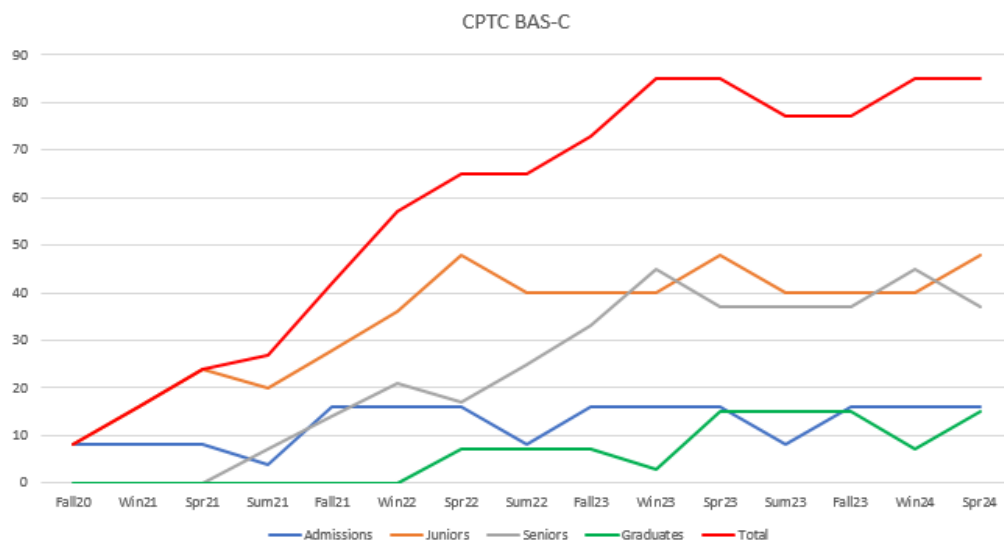
Figure 9. Enrollment Projection and Instructor Requirement

	AY 20/21	AY 21/22	AY 22/23	AY 23/24	AY 24/25
Unduplicated Headcount	28	82	113	117	117
Student/Faculty Ratio	15:1	24:1	26:1	26:1	26:1
BAS-C Teaching Faculty FTE	1.5	2	2	2	2
General Education Faculty FTE	.25	.75	1	1	1

The teaching faculty requirement for this new program is 3 fulltime faculty split 2:1 between technical and general education instructors. Clover Park defines a fulltime faculty as the workload needed to present 80 credit hours of instruction. That is, a fulltime faculty is expected to present at least 20 credit hours of instruction each of the four academic quarters.

In our projection, we assumed that 8 new students enrolled each quarter starting in Fall 2020, our first year. We assumed that new summer enrollment was half of the number of any other quarter. In the second and subsequent years, we assumed 16 new students enrolled per quarter except summer. Accounting for 10% attrition between junior and senior year, we will level off at about 85 students total. In the junior year, when any course enrollment exceeds 20 students, we will create a second section. This is what headcount might look like:

BAS-C Enrollment by Quarter



The junior year teaching load is two technical courses per quarter and one general education

course per quarter. The program has six technical courses in the junior year. These do not have a sequential requirement. Since these courses can be taught and taken in any order, they only must be presented one and one-third times per year and represent only one half of a fulltime faculty requirement initially. The general education teaching load follows a similar pattern requiring only one-quarter of a person-year initially. In the third year, the junior class size is large enough to split into two sections. At this point, there will be enough technical credits taught in the junior year for one instructor person-year. There will be enough general education credits for one half of a fulltime faculty.

The senior year and capstone teaching load is one and one-half technical instructors and one half of one general education instructor. The senior year and capstone technical courses must be offered every quarter if the program is to admit students every quarter. This is the result of the courses building upon each other. The fallout from this is a small class size but all classes running every quarter. The senior year and capstone general education classes do not have a sequencing requirement. They represent a requirement for slightly less than one half of one general education instructor.

Criteria 3: Admission Process

CRITERIA	STANDARD
Selective admissions process, if used for the program, consistent with an open door institution.	Describe the selection and admission process. Explain effort that will be used to assure the program serves as diverse a population as possible. Include specific detail for selecting students for admittance when there are more applicants than available seats in the program.

Admission Process

Clover Park is committed to a first-come, first-served admission process consistent with an open-door institution. We will serve a diverse population by operating our recruiting and open admission process in our diverse local community and by encouraging diversity in our student body, faculty, and staff. Admissions to BAS programs is led by the Associate Dean for Student Success. This office is committed to serving BAS admission applications by providing perspective students with an admissions packet that includes application instructions and guidance. Once a student has applied for the BAS degree, the Associate Dean for Student Success has regular correspondence with the applicant. The acceptance letter outlines the next steps for each student and refers them to the program advisor for further assistance in navigating college processes.

We envision a three-phase admission: application, admission, and registration. In the application phase, interested students will apply and demonstrate that they meet the admission criteria. Once the Admissions Office determines that the applicant earned at least a transferable, accredited associate degree with a cumulative 2.5 GPA on a 4.0 scale, the applicant will be admitted to the program. No letters of recommendation or essays will be required. The College does not currently charge a fee to apply or enroll. While interviews are not required, applicants are highly encouraged to attend an information session where they can ask questions. Graduates of the CPTC AAS-T program in Computer Networking Information Security Systems will be able to enroll on a first come, first served basis. In order to avoid lapses or interruptions for students who enrolled in the AAS-T program with the intention of continuing straight on to the BAS-C, a brief priority registration window will be given to students who will complete their AAS-T degree in the 2 quarters before entry of the most recently graduated cohort. After this priority registration period, the number of slots available to transfer students will be determined by the remaining seats in first quarter classes.

The College will work with students who apply and are judged not to meet the admission requirements as described above. Unsuccessful applicants will be directed to resources that they can access to make up their application deficits.

In the admission phase, the student will be placed in the next starting cohort with empty seats or a waitlist. The starting cohort could either be for the Preparation Tier or Junior Year status. We

plan to admit students each quarter. This frequency is needed to maintain continuity with our associate program. If they haven't already done so, students should apply for financial aid in this phase. A completed financial aid application unlocks financial aid resources should they be needed and is the starting point for our financial scholarship application process.

In the registration phase, students formally register for courses. Students admitted to the Preparation Tier and scheduled to move into the Junior Year status will have registration priority over newly admitted students for Junior Year courses. Essentially, Preparation Tier students are "in the pipeline."

Clover Park establishes maximum class sizes (or "caps) for its courses in order to ensure instructional excellence. Initially, the BAS-C program course caps will be 20 students. When that limit is reached, we intend to create a second section. Failing that, students will be registered or turned away on a first come, first served basis except that preparation tier students are considered "in the pipeline" and would have the opportunity to register one day ahead of "open enrollment" students.

Encouraging Diversity at Clover Park Technical College

Lakewood is a diverse community. The percentage of people in Lakewood who identify as white alone is significantly lower than those who do so in Washington State (58.0% vs. 79.5%).⁵ We will serve a diverse a population by operating our recruiting and open admission process in our diverse local community and by encouraging diversity in our student body, faculty, and staff. We strive for a diverse population of applicants by maintaining an equity-minded approach to program outreach and recruitment efforts. We maintain a presence in the high schools and at Joint Base Lewis McChord for a variety of events, from career fairs to classroom visits. Additional outreach efforts include translation of college materials into Spanish, Spanish speaking college information nights, attending LGBTQ targets events, and partner with the Tacoma Housing Authority to recruit underserved populations. For our bachelor's programs, the college outreach team will continue to work with our community partners and recruit specifically for a bachelor's degree. These actions provide greater educational access to our diverse population.

Three of CPTC's Core Values⁶ clearly identify the important place that diversity has in the college:

Equity

We recognize that the unique needs, goals, and circumstances of the individual have a direct impact on a person's ability to access and benefit from college activities and opportunities.

⁵ United States Census Bureau. (2017) Quick Facts Lakewood city, Washington; Washington. Retrieved from <https://www.census.gov/quickfacts/fact/table/lakewoodcitywashington,wa/RHI125217>

⁶ <http://www.cptc.edu/vision>

Diversity

We celebrate the many individuals that make up our community and embrace the opportunity to learn from both their differences and similarities.

Social Responsibility

We commit to decisions and actions that are socially aware and make us a strong community partner.

The efforts of the college in this area are coordinated by an active Diversity Committee⁷, which includes representatives from student, staff and faculty groups. The committee meets regularly to advance its work per a detailed Diversity Plan⁸. Strategies described in the plan include:

Encouraging Diversity in the BAS-C Program

In addition to ongoing work at the college level, the following measures will be adopted in the BAS-C program to encourage diversity.

- There are two upper-division courses in the BAS-C curriculum that will satisfy the college's diversity requirement in the degree program: PSYC 311 – Organizational Psychology and PHIL 310 Professional Ethics. In addition, the content of all other courses in the program will be monitored by faculty and the Dean of Instruction to ensure that they are consistent with CPTC's core values and diversity statement.
- Recruitment for the BAS-C program will be designed to appeal to all ages and genders, as well as to students of color.
- Faculty will carefully monitor diversity in student enrollment in the program to determine the extent to which it represents the local community and to determine if action needs to be taken to change the recruitment processes (see program assessment in Criteria 1).
- Efforts will be made to ensure representatives from industry partners represent a variety of backgrounds, and that speakers invited to campus will be carefully selected to encourage diversity.

⁷ <http://www.cptc.edu/diversity>

⁸ <http://www.cptc.edu/sites/default/files/about/diversity/2016-20DiversityPlan-forsite.pdf>

Criteria 4: Student Services

CRITERIA	STANDARD
Appropriate student services plan.	Describe services that will be needed by the students admitted to the degree program and college plan for providing those services for baccalaureate-level students. Include a description of financial aid services and academic advising for a student admitted into the program.

Student Services at CPTC include the following services:

- Welcome Center
- Advising-Counseling
- Assessment Center
- Child Care Center
- Enrollment Services
- International Programs
- New Student Orientations
- Tutoring Center
- Outreach & Entry Services
- Student Aid & Scholarships
- Student Disabilities
- Student Life Programs
- Student Rights & Responsibilities
- Veterans Services
- Workforce Funding

The Vice President of Student Success is responsible for overseeing the services listed above.

Generally Available Services

Students in the BAS-META program will have access to all support, advising, and counseling services generally available to students at CPTC. Twice per month, during program information days, the staff of Advising, Enrollment Services, and Financial Aid stay until 6pm to serve students. In addition, Advisors set up classroom visits twice per quarter. At these visits, Advisors remind students about upcoming deadlines for financial aid/enrollment, discuss education planning, troubleshoot individual questions, and connect students with internal and external resources as needed. Currently, general support/student services offices have the capacity to assist with program implementation. As enrollments grow, additional services or personnel will be considered. Some of these services include:

Welcome Center. The Entry Services team at CPTC meets with students one-on-one to help to help them navigate the steps to get started at the college. The team can provide information about:

- CPTC's entry steps
- Program costs and funding options
- Requirements for programs
- Registration preparation

The Welcome Center has extended hours on the second and fourth Wednesday of each month to align with our Program Information Sessions and be available to those who cannot make it in during regular business hours.

Access and Disabilities Accommodations. CPTC is committed to providing reasonable accommodations for students of all abilities. Appropriate adjustments and assistive services or technologies will be provided to qualified students with disabilities during recruitment, the application process, enrollment, registration, financial aid, course/module work, counseling, and program fulfillment. A Student Disability Specialist is on duty to be of assistance.

Enrollment Services. CPTC is dedicated to making the admissions experience as simple and intuitive as possible for new students. The registration process is available online (<http://www.cptc.edu/register/>). Credit evaluation, transfer review, and prior learning assessment are handled by the Credentials Evaluator and Student Completion Specialist in the Office of Enrollment Services.

Advising & Counseling Office (<http://www.cptc.edu/advising>) provides support and direction to help BAS students meet their academic and career goals. CPTC assigns specific counselors to each program degree pathway. Counselor/Advisors provides both appointments and walk-in times to assist students and offers the following services: information regarding campus and community resources; academic advising and educational planning; career exploration resources and information; workshops on resumes; interviewing skills; job searching; and brief personal counseling on issues affecting a student's success, e.g. stress management, time management, study skills and adjusting to college

Student Aid & Scholarships (<http://www.cptc.edu/financial-aid>) reviews applications for aid and considers students for grants, loans, work-study funding, and other awards as appropriate. Students can apply, get information, monitor their applications, and view their awards online through the Financial Aid Student Portal. Appointments to meet with professional financial aid counselors are also available Monday through Friday during business hours. The office has extended hours through 6 PM on the second and fourth Wednesday of each month to align with Program Information Sessions.

Childcare Services (<http://www.cptc.edu/childcare>) The Hayes Child Development Center provides services for children ages four weeks to five years with a discount rate for CPTC students and staff.

My Clover Connection (<http://www.cptc.edu/mycc>) is a one-stop utility for managing all functions of student accounts. These include: checking email, scheduling, paying fees, dropping class, changing PIN or contact information, and viewing/ order official transcripts.

Tutoring Services (<http://www.cptc.edu/tutoring>) are available to help in a variety of subjects such as basic math, writing, accounting, calculus and statistics. CPTC's students also have access to eTutoring's free 24/7 online tutoring services in a variety of subject areas.

Library and Learning Resources (<http://www.cptc.edu/library>) The CPTC Learning Resource Center provides a variety of print, audiovisual and online resources to students, faculty, and staff. The general collection of books, reference materials, magazines, and multi-media resources support CPTC's instructional programs. A quick search on "cybersecurity" yielded over 17,000 peer-reviewed journal articles, over 1,000 books, and almost 3,000 dissertations available to our students.

The Learning Center's computer lab has a collection of electronic resources including online reference databases, including ProQuest and Ebsco Host, electronic journals, computer applications, Internet access, and a variety of assistive technologies. CPTC's library is very hands-on; professional library staff are ready to help either in the building or online.

Our Program / Library faculty partnering starts with English 101 and 235. In these courses, students practice writing research papers. This exercise exposes them to information literacy and the process of finding and citing original sources. As the students' progress into their junior and senior year studies, they will have to compare, contrast, argue, and defend their findings in research papers. These assignments provide many opportunities within the program for program faculty to partner with library faculty to ensure information literacy instruction is incorporated into the curriculum. (NWCCU Standard 2.C.6)

Remote access to online databases is available to students who are not on campus. In addition, 'Ask a Librarian' is a free online reference and research help service available 24 hours a day, seven days a week. CPTC's own Reference Librarian is available to answer questions via email or phone.

The CPTC Learning Center and librarian support are in place to support any specialized research, data resource and/or subscription needs of BAS-C students and faculty. A budget already exists to support new resource requests in our library. We have budgeted an additional \$2,000 per year to acquire new library materials for this program. Faculty will work together with our qualified faculty librarian and library technicians to be sure our resources reflect the depth, breadth, and currency necessary to support a rigorous, upper-division program. (NWCCU Standard 2.E.1)

Data and feedback from library and program administration, faculty, and students will guide ongoing planning for library and information resources. (NWCCU Standard 2.E.2) CPTC will regularly and systematically evaluate the quality, adequacy, utilization, and security of library

and information resources and services to ensure the rigor of the upper-division program and general education course work. (NWCCU Standard 2.E.4)

CPTC Aims to provide appropriate instruction and support for both students and faculty to ensure efficiency and effectiveness in obtaining, evaluating, and using library and information resources. Already in place are Library Skills Classes & Orientations upon request. Program faculty and librarians are prepared to present this instruction in-person and online. The Faculty Librarian is directly integrated into the College's curriculum documentation and approval process. Library resources and information literacy are documented considerations in the development of every course. (NWCCU Standard 2.E.3)

Our library participates in an Interlibrary Loan System to make more resources available to our students. As part of the Library Leadership Council's Reciprocal Borrowing Statement, CPTC students, staff, and faculty may present valid identification to gain access to circulating materials from other participating Washington Association of Community and Technical Colleges (WACTC) libraries as an alternative to interlibrary loan. As of January 2017, thirty Washington State community and technical colleges, in addition to CPTC, participate in this agreement.

BAS Program-Specific Services

Program Advising

Program advising is the formal responsibility of Student Services division and faculty counselors. This support office has designated specific program faculty counselors to provide advising services for BAS students. Faculty counselors work closely with program faculty to advise students on course choice, discuss student progress, direct students to needed resources, and assist with other program-related retention issues or problems.

BAS Navigator

The College has one full-time BAS Navigator/Manager who will specialize in guiding BAS students from application to graduation for four BAS programs and works under the direction of the Dean of Instruction. The BAS Navigator will provide supports for the four BAS programs at CPTC by assisting incoming BAS students with the following guidance: career pathway exploration; guiding students through the application process to include applying for funding and enrolling to the college; providing triage for students who present barriers to success; connect prospective and current students to financial aid, additional funding and scholarship resources, veteran funding resources, counseling and advising resources. In addition, the navigator will assist with monitoring the progress of the students and communicating with faculty advisors as needed if student issues/academic progress issues.

Additional Navigator duties include targeted outreach, marketing, and recruitment publicize offerings, as well as any other supports needed for faculty. Collecting post-graduation data based off student surveys and contacting alumni for specific employment and setting up student spotlight interviews for marketing purposes.

The BAS Navigator works closely with the Outreach and Entry Services Director to strategize the implementation practices to recruit a diverse student population with a specific focus on equity and access for underserved populations.

Criteria 5: Commitment to a High-Quality Program

CRITERIA	STANDARD
Commitment to build and sustain a high-quality program.	Provide a financial plan for the first five years of program operation. This plan should include (1) types of funds to be used to support the program; (2) projected program expenses; (3) appropriate facilities to be (4) equipment, technology, and instructional resources needed for the program; and (4) anticipated revenue. Document the college's ability to sustain the program over time.

Financial Plan

The following financial plan assumes the following:

- Student enrollment will be 12 FTE during AY 20/21 and gradually rise each subsequent year. Teaching will occur in all four quarters.
- Starting in Spring 2020, a current CNISS faculty member will be contracted to start the development of instructional resources.
- By Fall 2020, one half of one full-time faculty will be tasked to teach in the BAS-C program. By Fall 2021, one full-time faculty (1.5 FTE total) will be hired and designated to teach in the BAS-C program. By the Fall of 2022, a total of two full-time faculty will be tasked to teach in the BAS-C program.

Figure 9 on the following pages shows the financial plan for the first five full years of the BAS-C program operations.

College Commitment

The college is committed to funding the costs associated with the launch of the program by utilizing existing college resources and college reserves.

Facilities, Equipment and Instructional Resources

The BAS-C program is a hybrid (online and classroom) program that requires no additional facilities beyond existing CPTC classrooms. Evening and weekend scheduling ensures that there will be no facilities scheduling conflicts.

The program will require an additional computing resource to increase our online teaching capability. This resource will take the form of a secure online gateway to a rich virtual environment in which students will complete complex labs and projects. The secure gateway provides students, and instructors access to flexible, complex projects from both on and off-campus.

There are three major resource costs with such an environment. Firstly, there is an initial hardware and software cost to set the system up. Secondly, there will be annual licensing and hardware refresh costs. Lastly, there is a system administrator, and the lab assistant workload requires that we estimate to be less than one half of one person year. These are all built into the budget model below. The system administrator/lab assistant costs will be included in faculty costs.

Program Costs and Funding

Figure 9. Program Costs and Funding

I. PLANNED STUDENT ENROLLMENT

	FY 0		FY 1		FY 2		FY 3		FY 4		FY 5	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments to	0	0	16	28	67	82	107	113	107	113	107	113
B. Enrollment from existing												
	0	0	16	24	67	67	107	113	107	67	107	113

II. REVENUE

	FY 0		FY 1		FY 2		FY 3		FY 4		FY 5	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2. Institution Funds	\$27,470	\$24,188	\$20,958	\$0	\$21,587	\$0	\$22,234	\$0	\$0	\$0	\$0	\$0
3. Federal (e.g. grant,	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4. New Tuition Revenues	\$0	\$0	\$103,860	\$0	\$434,914	\$0	\$694,564	\$0	\$694,564	\$0	\$694,564	\$0
5. Student Fees	\$0	\$0	\$3,744	\$0	\$10,452	\$0	\$17,628	\$0	\$10,452	\$0	\$17,628	\$0
6. Other (e.g., Gifts, Program Revenue)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$27,470	\$24,188	\$128,562	\$0	\$466,953	\$0	\$734,426	\$0	\$705,016	\$0	\$712,192	\$0

Budget Notes:

1.A.Enrollments are assumed to be full time; therefore FTE=headcount

11.4 Tuition assumes a 2.4% increase each year.

11.5 Program equipment/Computer Technology Fees

III. EXPENDITURES

	FY 0		FY 1		FY 2		FY 3		FY 4		FY 5	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs												
1. FTE (total for all personnel types)	0.33	0.25	1.33	0.00	2.33	0.00	3.33	0.00	2.33	0.00	3.33	0.00
2. Faculty	\$0	\$ 17,917	\$ 73,817	\$0	\$ 152,064	\$0	\$ 234,938	\$0	\$ 234,938	\$0	\$ 234,938	\$0
3. Adjunct Faculty	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4. Grad Assts	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5. Research Personnel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6. Directors Administrators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7. Administrative Support	\$20,348	\$0	\$20,958	\$0	\$21,587	\$0	\$22,234	\$0	\$22,234	\$0	\$22,234	\$0
8. Fringe Benefits	\$7,122	\$6,271	\$33,171	\$0	\$60,778	\$0	\$90,010	\$0	\$90,010	\$0	\$90,010	\$0
9. Other:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Costs	\$27,470	\$24,188	\$127,947	\$0	\$234,428	\$0	\$347,182	\$0	\$347,182	\$0	\$347,182	\$0

Budget Notes:
 III.A.2. Faculty/Admin. support salaries increased by 3% each year
 III.A.8. Fringe calculated as 35%

	FY 0		FY 1		FY 2		FY 3		FY 4		FY 5	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures												
1. Travel	\$0	\$0	\$4,000	\$0	\$4,000	\$0	\$4,000	\$0	\$4,000	\$0	\$4,000	\$0
2. Professional services	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3. Other services	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
4. Communications	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5. Materials & supplies	\$0	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0
6. Rentals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
7. Materials & goods used for	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8. Marketing materials and advertising	\$0	\$0	\$2,000	\$0	\$2,000	\$0	\$2,000	\$0	\$2,000	\$0	\$2,000	\$0
9. Miscellaneous:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Operating Expenses	\$0	\$0	\$11,000	\$0	\$11,000	\$0	\$11,000	\$0	\$11,000	\$0	\$11,000	\$0

Budget Note:
 III.B.8. \$0 of operating expense is provided for each new faculty line

	FY 0		FY 1		FY 2		FY 3		FY 4		FY 5	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay												
1. Library Resources	\$0	\$0	\$4,000	\$0	\$4,000	\$0	\$4,000	\$0	\$4,000	\$0	\$4,000	\$0
2. Equipment	\$0	\$0	\$75,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0	\$5,000	\$0
Total Capital Outlay	\$0	\$0	\$79,000	\$0	\$9,000	\$0	\$9,000	\$0	\$9,000	\$0	\$9,000	\$0
D. Capital Facilities Construction or Major Renovation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
E. Indirect Costs (overhead)												
1. Utilities	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2. Maintenance & repairs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3. Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Indirect Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL EXPENDITURES	\$27,470	\$24,188	\$217,947	\$0	\$254,428	\$0	\$367,182	\$0	\$367,182	\$0	\$367,182	\$0
Net Income (Deficit)	\$0	\$0	(\$89,385)	\$0	\$212,525	\$0	\$367,243	\$0	\$337,833	\$0	\$345,009	\$0

Criteria 6: Program Specific Accreditation

CRITERIA	STANDARD
Program-specific accreditation.	Indicate whether the institution will seek specialized program accreditation. If so, describe plans for accreditation and identify appropriate accreditation body. Include a statement of the college's plan to seek accreditation through NWCCU and/or the current status of college's standing to offer applied baccalaureate degrees.

The BAS Cybersecurity program requires no specialized program accreditation.

With SBCTC approval of the BAS-C Program, CPTC will immediately file a Major Substantive Change Proposal with the Northwest Commission on Colleges and Universities.

Criteria 7: Pathway Beyond Baccalaureate

CRITERIA	STANDARD
Pathway options beyond the baccalaureate degree.	Describe opportunities and articulation agreements for the place-bound BAS graduate to continue their education onto a graduate (Master's) degree program. Detail specific discussions with public and private baccalaureate institutions (when applicable) regarding post-baccalaureate pathways for graduates.

Place bound BAS graduates should have their choice of online programs as well as at least one hybrid master's degree.

Our graduates should qualify to enter Western Governors University Master of Science Cybersecurity and Information Assurance. This is a completely online program with very reasonable rates. It has been a favorite with our associate degree graduates who have gone on to complete their applied baccalaureate elsewhere.

Central Washington University Master of Science - Information Technology and Administrative Management (ITAM), Cybersecurity Management is a program that can be taken online. Though a management program, our graduates should qualify to enter. This program is of interest to our students because their BS and BAS programs are offered in a hybrid format locally at Pierce College. While the MS-ITAM program is not offered in a hybrid format locally, our students will likely have attended an information session or visited the Pierce College location while researching BAS options.

University of Washington Tacoma Master of Cybersecurity and Leadership (MCL). Our graduates might need to complete additional coursework in a compiled programming language such as Java or one of the "C" programming languages to qualify for this program. Our graduates will have experience writing an interpreted scripting language (Python) but not necessarily have experience with a compiled language (required for entry). If required, BAS Students considering UWT could complete the needed course in our Computer Programming Department. The MCL program meets locally on Saturdays to accommodate working adults. We have some current students as well as graduates who have participated in this program.

We have engaged each of these programs regarding their applicability to our future graduates at the Program Director/Manager/Navigator level with good results.

Criteria 8: External Evaluation

CRITERIA	STANDARD
External expert evaluation of the program	<p>The institution will select two external experts to review the program. External experts should come from a university-level institution, i.e., departmental professor, academic dean or department head. The expert should be a practitioner/instructor from within the content area of the proposal.</p> <p>In a separate document, provide copies of external evaluators' reports or letters. Summarize the institution's responses and subsequent modification to the proposal based on the evaluator's recommendations. Attach a short bio of the evaluators.</p>

Attached in Appendix B, please find copies of two reviewer's comments. In response to Mr. Carter's comments, we added a course on Cloud Security, replacing a proposed project course. In response to Mr. Grant's comments, we placed professional ethics earlier in the course sequence, better defined the program prerequisite process, and reconsidered our resource commitment in the period before the program starts. Mr. Grant also recommended including a budget to bring adjunct experts onboard to assist with some of the more specialized skills we will be helping the students to develop.

Appendix A – Course Descriptions

The BASC course numbers and titles are notional and not yet approved by the CPTC Curriculum Committee.

Cybersecurity Courses

BASC 301 Securing Database Management Systems

We will explore current database management systems used in medium and large businesses. We will identify common security vulnerabilities in protocols as well as mitigation strategies for those vulnerabilities. This course includes an introduction to Structured Query Language (SQL) and relational database systems.

BASC 302 Risk Assessment and Vulnerability Management

We will examine risk assessment models, methodologies and processes. We will complete risk assessments and formulate mitigation recommendations to protect the confidentiality, integrity, and availability of critical data. We will examine methods used to prioritize and manage vulnerabilities.

BASC 304 Cyber Threat and Research

We will examine the common types of cyber-crimes and their motivation. We will survey laws, treaties, regulations, and frameworks designed to fight cybercrime and protect privacy as well as the security policy implications of each. We will assume the role of a local business and research the most important cyber threats to our business.

BASC 305 Incident Response

We will practice procedures used to determine if a system is compromised, mitigate the threat, and determine the root cause. We will use common digital forensic tools.

BASC 306 Vulnerability Assessment

We will apply standard techniques to find possible cybersecurity vulnerabilities in systems, document them, determine their root cause, and propose possible mitigations. Students need an understanding of Linux at the command line and basic networking to be successful.

BASC 307 Network Intrusion Detection

We will gain experience configuring, tuning, and administering the core components of modern IPS/IDS systems. We will also analyze results in the form of alarms, packet captures, and log files. We will conduct attacks and analyze the resulting artifacts.

BASC 402 Cloud Security

We will explore the technologies and services that enable cloud computing, different types of cloud computing models and the security and legal issues associated with cloud computing.

BASC 401 Penetration Testing

We will plan, organize and perform authorized penetration testing on a simple network. We will develop skills in interpreting responses as well as researching vulnerabilities and exploits. Improvisation, keeping detailed notes, and clear report writing will become fine arts.

BASC 403 Incident Response Project

Working in teams we will complete a series of increasingly complex incident scenarios. We will use common digital forensic tools. This course emphasizes speed, accuracy, and clear report writing.

BASC 404 Vulnerability Assessment and Penetration Testing Project

Working in teams, we will plan and conduct a series of cybersecurity audits of a simulated medium-sized business. The audits will use both technical and non-technical means. The team will prepare clear reports from both the internal customer and external customer perspectives.

BASC 405 Network Intrusion Analysis Project

Working in teams, we will implement intrusion detection systems (IDS) on a testbed network, tune the systems to ignore normal traffic, analyze alerts, and write new rules to detect new threats. Over the course of the project, the testbed will change requiring us to re-assess our approach.

BASC 406 Capstone Project

You will propose and complete an individual project to clearly demonstrate mastery of at least two of the program outcomes. The project proposal will include a timeline and concrete deliverables. The proposal must demonstrate new work and not rely mostly on previously completed work.

General Education Courses

ENG 310: Business Communications

Focuses on audience-oriented communication in the business environment. Course content includes writing reports, proposals, memoranda, and emails; graphical presentation of data using Excel; and developing and delivering presentations using PowerPoint and other visual aids.

PHIL 310^{DIV}: Professional Ethics

This course increases students' awareness of ethical dilemmas that might occur at work, to show how such ethical issues are subject to management analysis and decision-making action, and to provide students with the conceptual tools necessary to identify and develop an acceptable resolution to these dilemmas.

PSYC 311^{DIV}: Industrial & Organizational Psychology

Examines how people behave and interact with each other at work with an emphasis on the way that this affects job performance. Topics covered in this course include the development of leadership skills; recruitment and retention; motivation and team building; managing change; and conflict resolution.

BUS 310: Project Management

Teaches students some of the techniques necessary to develop realistic and comprehensive project plans the identify risk areas; monitor the plans; and deal with problems. The course will also cover the management of the procurement process and communication with project stakeholders.

MATH 146 Introduction to Statistics

Descriptive and inferential statistics, including measures of central tendency, dispersion or variation, and skewness. Students are introduced to basic concepts in probability, as well as discrete and continuous probability distribution functions. Statistical inference includes sampling, elementary experimental design, and hypothesis testing using normal, student's T, and F-distributions; linear regression and correlation; and the chi-square distribution. A graphing calculator is required.

ENGL& 235 Technical Writing

Focuses on technical writing skills and projects for industry and professions. Strong emphasis will be placed on principles of good writing and research techniques. Students will use appropriate technology and research to prepare letters, resumes, reports, proposals, newsletters, specifications, and other writing tasks typically required in a technical work setting. Discovery and knowledge of workplace ethics and guidelines as they pertain to writing will be researched, discussed, and used to enhance research. Requires use of technology including, but not limited to, computers, printers, and scanners.

Science with Lab (for example):

PHYS 114 General Physics 1 with Lab

Covers problem-solving concepts in physics, including one- and two-dimensional kinematics, force, Newton's laws of motion, uniform circular motion, universal gravitation, work, energy, linear momentum, rotational motion, and angular momentum in an algebra-based approach.

Appendix B – Reviewer Comments

Instructions for colleges submitting a BAS degree proposal:

1. As part of completing a program proposal, colleges must select two external experts to review the program.
2. Reviews should be completed by an independent, third-party person or team with subject/discipline expertise.
3. At least one, preferably two, of these external expert reviewers should come from a university-level institution, i.e. departmental professor, academic dean or department head.
4. A second external expert reviewer may be a professional/practitioner who works for a private or public organization other than the university.
5. External Expert Reviewers should be instructed by colleges to address the criteria listed in this rubric.

Instructions for External Expert Reviewers:

1. External Expert Reviews provide critical feedback to colleges so that they may address potential concerns, issues or criticisms prior to final submission of a program proposal to the State Board of Community and Technical Colleges.
2. Reviewers should be independent, third-party persons or teams with subject/discipline expertise.
3. The goal of a review is to assess the credibility, design, relevance, rigor, and effectiveness of the proposed BAS program.
4. Reviewers should also validate the congruency and consistency of the program's curriculum with current research, academic thinking and industry standards.
5. Reviewers need not provide responses to every criteria listed in the Rubric. If reviewers feel that they cannot adequately address any one of the criteria, they may simply state that this is the case.
6. This form is designed to assist External Expert Reviewers to complete assessments of baccalaureate degree program proposals. External Expert Reviewers are not restricted to the use of this rubric template. Reviewers may choose, instead, to provide a college with a written narrative. In whatever format they choose, reviewers should address the criteria outline in the rubric.

College Name:	Clover Park Technical College	BAS Degree Title:	BAS-Cybersecurity
Reviewer Name/ Team Name:	Alan Carter	Institutional or Professional Affiliation:	Green River College
Professional License or Qualification, if any:	MS Information Assurance and Cybersecurity; Program Director, Green River College BAS Network Admin and Security	Relationship to Program, if any:	none
Please evaluate the following Specific Elements			
a) Concept and overview	Is the overall concept of the degree program relevant and appropriate to current employer demands as well as to accepted academic standards? Will the program lead to job placement?		
	Comment: This degree will prepare students for many different IT jobs, and the job market for IT professionals with cybersecurity training is very much in demand. The content of the BAS degree is very strong, with one exception that I did not see – cloud computing. Cloud does not show up in either the preparation requirements, or in the content of the BAS degree. Since much of the IT infrastructure in the US is moving towards the cloud, I believe this should be covered somewhere in the degree program.		
b) Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?		
	Comment: The program outcomes demonstrate appropriate baccalaureate rigor. They are framed in terms consistent with higher-level thought. They meet the upper-division and		

	breadth requirements for a BAS degree. If I had one criticism it would be that the outcomes may be a little too specific for our rapidly changing field.
c) Curriculum Alignment	Does the curriculum align with the program's Statement of Needs Document?
	Comment: The Statement of Needs was not provided for this review.
d) Academic Relevance and Rigor	Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?
	Comment: The content of the BAS degree is very strong, with one exception that I did not see – cloud computing. Cloud does not show up in either the preparation requirements, or in the content of the BAS degree. It could be interwoven into each of the classes, however that is not obvious from the proposal. Since much of the IT infrastructure in the US is moving towards the cloud, I believe this should be covered somewhere in the degree program.
e) General Education Requirements	Are the general education requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?
	Comment: It meets all of the upper-division and breadth requirements for a BAS degree.
f) Preparation for Graduate Program Acceptance	Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?
	Comment: The proposal will generally prepare students for a graduate degree program entry. It may benefit from a senior <u>research</u> project course rather than what seems to be many

	application-focused project courses. Also, the proposal would benefit from more computer and web programming content to better prepare student for graduate school.
g) Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment: The proposal seems to meet the minimum faculty qualification requirements. This is hard to tell without reviewing the resume' or CV of prospective faculty.
h) Resources	Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?
	Comment: The proposal meets the minimum resource requirements including student support and library services. We started a similar program at Green River College five years ago with a nearly identical resource commitment. We found huge success. Within three years we needed significantly more instructors and infrastructure above our initial projections. My recommendation is to have a plan in place to account for success.
i) Membership and Advisory Committee	Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?
	Comment: I could not comment on this point as I am not a member of the Advisory Committee.
j) Overall assessment and recommendations	Please summarize your overall assessment of the program.
	Comment: I have read this full proposal, and find it to be well thought out, and appropriate. I recommend increasing the cloud content in the curriculum to better address today's job market. While the resource commitment is adequate for the proposal, I recommend planning for success in terms of

additional classroom space, computer resources, and additional instructors.

Reviewer Bio or Resume

Evaluator, please insert a short bio here

Alan Carter, Faculty, BAS Program Director Green River College

Alan taught Microsoft, Novell, and custom courseware throughout the United States for 15 years before joining the faculty at Green River College and teaching information technology courses for the past 10 years. He has also installed and supported complex networks while working as staff for regional and national value added resellers. In addition, Alan published several bestselling technical books, including Windows NT 4.0 MCSE Study Guide (IDG Books Worldwide, 1998) and Windows 2000 MCSE Study System (IDG Books Worldwide, 2000). Alan's certifications include Cisco CCNA, CompTIA A+, Network+ and Security+.

Capella University

Master of Science March, 2006

Major: Information Technology – Network Architecture and Design

GPA 4.0

Troy State University

Bachelor of Science December, 1988

Major: Computer & Information Science

Magna Cum Laude

Saint Leo University

Bachelor of Arts April, 1987

Major: Religion

Magna Cum Laude

Community College of the Air Force

Associate of Applied Science July, 1986

Major: Instructor Information Technology

Published Works:

-Windows 2000 MCSE Study System, ISBN 0-7645-4701-1, John Wiley & Sons (formerly IDG Books), 2000.

-Windows NT 4.0 MCSE Study Guide, ISBN 0-7645-3087-9, John Wiley & Sons (formerly IDG Books), 1997.

Numerous articles in professional journals:

-Managing Migration (MCP Magazine, December 2000)

-MCSE Marathon (MCP Magazine, October 2000)

-Wizard of the Network (MCP Magazine, July 2000)

-Active Directory Knowledge (MCP Magazine, July 2000)

-Real-life Design (MCP Magazine, June 2000)

Contributions to several Microsoft Official Curriculum courses, including:

-Course 2279: Planning, Implementing, and Maintaining a Microsoft® Windows Server™ 2003 Active Directory® Infrastructure

-Course 2282: Designing a Microsoft® Windows Server™ 2003 Active Directory® and Network Infrastructure

-Courses 2801 and 2802: Microsoft® Security Guidance Training I and II

College Name:	Clover Park Technical College	BAS Degree Title:	BAS-Cybersecurity
Reviewer Name/ Team Name:	D.C. Grant	Institutional or Professional Affiliation:	University of Washington
Professional License or Qualification, if any:	MS Infrastructure Planning and Management BS Information Technology and Systems CISSP, CISM, MCSE	Relationship to Program, if any:	none

Please evaluate the following Specific Elements

k) Concept and overview	Is the overall concept of the degree program relevant and appropriate to current employer demands as well as to accepted academic standards? Will the program lead to job placement?
	Comment: Yes. The proposed degree program will help satisfy a large and steadily growing demand for information technology professionals who understand the dynamics and challenges of securing technology systems. Placement out of this type of program is usually nearly 100% in the career field. Starting salaries are over \$50K per year and third year wages average above \$80K per year.
l) Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?
	Comment: The proposed outcomes should qualify as rigorous and are roughly analogous to other Bachelor Applied Science degree outcomes. It can be difficult to tell from course descriptions what level of rigor will be applied in practice and the specific details of academic accomplishments and project foci are not apparent in any program overview.

<p>m) Curriculum Alignment</p>	<p>Does the curriculum align with the program’s Statement of Needs Document?</p>
	<p>Comment: The curriculum does align with the stated needs. I have made some specific suggestions to the Dean of Instruction regarding potential ordering of the courses that might be of benefit.</p>
<p>n) Academic Relevance and Rigor</p>	<p>Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?</p>
	<p>Comment: The proposed core and elective courses should closely align with employer needs and demands. It can be difficult to tell from course descriptions what level of rigor will be applied in practice and the specific details of academic accomplishments and project foci are not apparent in any program overview.</p>
<p>o) General Education Requirements</p>	<p>Are the general education requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?</p>
	<p>Comment: Yes.</p>
<p>p) Preparation for Graduate Program Acceptance</p>	<p>Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?</p>
	<p>Comment: I believe that they would be adequate for acceptance into most graduate degree programs that focus on cyber security and risk management related to technology. At this point, I would recommend articulation from the BAS to our own master’s program in cybersecurity and leadership; pending evaluation of objectives as implemented in the next two to three years.</p>

q) Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment: Unknown. I am unable to comment on faculty qualifications as I have not seen any supporting evidence.
r) Resources	Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?
	Comment: If sufficient priority is assigned to the program, I am confident that the college can sustain and advance it. I would recommend a review of faculty budget, specifically with the option of increasing the allocation for adjunct faculty from zero to some non-zero number. Evening courses can definitely benefit from the use of working professionals to illustrate practical application of concepts. At least a few of the courses being planned might be best taught by seasoned penetration testers and other practitioners instead of academics.
s) Membership and Advisory Committee	Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?
	Comment: I am unable to comment definitively on approvals. I believe that it has, but I have seen no formal proof of it.
t) Overall assessment and recommendations	Please summarize your overall assessment of the program.
	Comment: This is a valuable potential program that will help satisfy a strong and growing need for local, regional and national priorities in government and industry. All type of organizations are currently struggling to cope with an acute cyber security problem. Every opportunity to train more cyber security professionals to ethically manage the security of infrastructure and industry should be explored.

Reviewer Bio or Resume

D.C. Grant is an information technology and cyber security instructor at University of Washington. He graduated magna-cum-laude from University of Washington's BS Information Technology in 2012, was a National Science Foundation Cyber Corps Scholarship for Service recipient and received the Master of Infrastructure Planning and Management from University of Washington in 2014. He has been teaching since 2013, first as an adjunct at Highline College, then as assistant professor at Columbia Basin College, where he designed all of the upper division courses for the Bachelor in Cyber Security degree program and taught the first sessions of each.

Mr. Grant has a strong commitment to helping elementary, middle and high school students understand technology and cyber security concepts and engaging in other ways with the community. He worked with Mid-Columbia STEM Collaboratory to help design initial cyber security courses at Hanford High School. He served as a member of Kennewick School District's Computer Science Advisory Committee. He also worked with Mathematics Engineering Science Achievement (MESA) coordinators from WSU Tri Cities to present multiple groups of middle school students, (from Pasco, Sunnyside, and Granger) on the Columbia Basin College campus. He collaborates with Boze Elementary School and Technology Access Foundation to allow juniors in Information Technology to collaborate with fifth graders on design projects. He has recently begun partnership with the Franklin Pierce School District to develop cyber security courses for two high schools. Mr. Grant has recently completed two Livable City Year projects that provided collaboration between the Tacoma Information Technology Department and Tacoma Fire Department with University of Washington.

D.C. has thirty years of information technology experience, including operations management, information assurance, consulting and systems engineering in various industries including manufacturing, machine tools, industrial supply, retail and service industries, software development, import-export, state government and banking. He has worked extensively in network and data center operations management and in consulting roles for several well-known companies. Mr. Grant became a Microsoft Certified Systems Engineer in 1997, Cisco Certified Network Associate in 1999, UW Certification in Management for Technology Companies in 2000 and achieved both Certified Information Systems Security Professional and Certified Information Security Manager certifications in 2004. He is a member of the IEEE, ACM and ISSA; he is a HoneyNet Chapter Lead and is President of Mt. Rainier ISACA Chapter.

DENNIS CHARLES GRANT

Summary of Qualifications:

Deep understanding of Information Assurance and Risk Management Issues.
Specialist in the management and cyber security of critical infrastructure systems.
Twenty-five years information technology experience, half in a management capacity.
Extensive management experience for enterprise network and data center operations.
Pervasive information technology system design and IT project management expertise.
University of Washington Master's degree in Infrastructure Planning and Management.
University of Washington Bachelor of Science in Information Technology and Systems.
University of Washington Certification: Information Security and Risk Management.
University of Washington Certification: Management in Technology Companies.
Certified Information Systems Security Professional, (CISSP #071890).
Certified Information Security Manager, (CISM #0505649).
Microsoft Certified Systems Engineer (MCSE #346682).

Education:

Masters in Infrastructure Planning and Management

University of Washington Seattle – August 2014 – 3.85 GPA

National Science Foundation Cyber Corps Scholarship for Service Recipient

Information Security and Risk Management Certification

University of Washington Seattle – June 2013

Bachelor of Science in Information Technology and Systems

University of Washington Tacoma – Magna cum Laude June 2012 – 3.90 GPA

Management in Technology Companies Certification

University of Washington Seattle – June 2000

Also attended San Diego State University in pursuit of BS in Industrial Technology (87-92), and Washington State University seeking BS in Mechanical Engineering (93-94) and BA in Business Management (06-08).

Work Experience:

Sept 2015 – Present University of Washington Tacoma Tacoma, WA

Full Time Lecturer in Information Technology and Cyber Security

Create, update and deliver courses in information technology and risk management.

Sept 2013 – Aug 2015 Columbia Basin College Pasco, WA

Assistant Professor in Computer Science - Cyber Security Instructor

Create, update and deliver Bachelor's degree courses in computer science and cyber security.

June 2013 – Sept 2013 Pacific Northwest National Labs Richland, WA

National Security Directorate - Masters Intern

Cyber-security research for industrial controls and smart grid. R and python development.

April 2013 – June 2013 Highline College Des Moines, WA

Adjunct Professor in Computer Information Systems

Teach undergraduate coursework in local area networking technologies and security practices.

April 2012 – May 2013 Topia Technology Tacoma, WA

Systems Administrator and Information Security Analyst

Perform penetration testing and systems administration. Develop incident response plans.

Evaluate encryption related security and development compliance with regulatory standards.

Sept 2011 – June 2013 University of Washington Tacoma Tacoma, WA

Information Technology Intern, Student Worker, and Tutor

Support for Media Services and Information Technology. Teach Undergraduate ITS Seminars.

Jan 2007 – Feb 2008 Computer and Connectivity Services Seattle, WA

Systems Design Consultant

Manage customer relationships. Systems design and technology implementation management.

Jan 2003 – Aug 2006 Rainier Pacific Bank Tacoma, WA

Information Technology Operations Manager

Manage engineering and operations team supporting all servers, applications and networks.

Business Impact Analysis and evaluation of business risk for Business Continuity Planning.

Manage infrastructure vendor relationships, contract negotiations and service agreements.

DENNIS CHARLES GRANT

Work Experience (continued):

Feb 2001 – Jan 2003 **Washington State Liquor Control Board** **Olympia, WA**
Network Operations Manager

Manage the Network Operations Team supporting all servers, applications and networks.
Replace or upgrade all aspects of the network architecture, including all servers and systems.
Founding member of the Washington Computer Incident Response Committee (WACIRC).
Administer multiple infrastructure systems budgets totaling about six million dollars annually.
Network Design Engineering Consultant - *started as a contractor through DMC West, Inc.*
Implementation of a Virtual Private Networking solution integrating 320 remote retail locations.
Consult to WSLCB management on information security and network architecture design.
Architect network and server system security measures and develop operational procedures.

Sept 2000 – Jan 2001 **Lucent Technologies** **Warren, NJ**

Data Center Operations Management Consultant - *contract through Key Data Solutions*
Develop and document processes for the efficient operation of the data center environment.
Provide guidance and training on data center best practices for new business development.

Jan 1996 – Sept 2000 **Microsoft Corporation** **Redmond, WA**

Global Data Center Operations Manager

Manage vendor relationships and coordinate efforts of all data center teams worldwide.
Team with release management, escalation and engineering to improve relationships.
Develop processes and procedures for the increased efficiency of worldwide data centers.
Coordinate a 24/7 worldwide response to computer systems security issue and incidents.
Coordinate with all regional teams for improved communication and inter-group efficiency.
Govern administrative privileges and rights assignments for data center operations teams.
Manage an extended staff of 55 reports and coordinate supervision of 20 teams worldwide.
Received the "Kick Butt" award for the rapid replacement of incident tracking systems.

Network Engineer, Shift Manager - Global Network Operations Center

Provide and maintain worldwide network connectivity between several hundred sites.
Proactive monitoring and resolution of connectivity issues on all Microsoft networks.
Coordinate incident response for all network security and systems integrity incidents.
Provide mentoring and training to all other internal technical support teams worldwide.
Manage the productivity and efficiency of the Global Network Operations Center team.
Assist in worldwide upgrade from 3 COM based serial networks to Cisco based networks.
Coordinate with internal security testing teams to expose potential issues and vulnerabilities.

Senior Technician - Internal Helpdesk - *contract through ENTEX Information Services*

Support Microsoft networking, operating systems and applications for internal customers.
Received the Service Superstar award (September 1996) for outstanding performance.

Interests:

2012 – Present - Pacific Northwest Honeynet Chapter Lead. 2012 – Present – IEEE and ACM Member.
2012 – Present- Infragard member. 2012 – 2013 – Mount Rainier ISSA Chapter Vice President.
2012 – 2013 – Member of the University of Washington Seattle Student Technology Fee Committee.
2012 – 2013 – President University of Washington Tacoma Upsilon Pi Epsilon International Honor Society.
2012 – United States Cyber Challenge Finalist – Attended the Northern California Regional Cyber Camp.
2011 – United States Cyber Challenge Finalist – Attended the West of the Mississippi Regional Cyber Camp.
2011 – 2012 – Vice President of the University of Washington Tacoma Student Org.: Grey Hat Group.
2011 – 2012 – Student Representative, University of Washington Tacoma Campus Technology Committee.
2011 – Present – President of Mount Rainier ISACA Chapter. Participate in Global Leadership Conferences.
2012 – Planned, organized and hosted the ISACA Western North American Regional Leadership Conference.
2011 – Present – Member of University of Washington Chapter of Golden Key International Honor Society.
2011 – Present – Member of the Information Systems Security Association, (ISSA) Mount Rainier Chapter.
2010 – 2012 – Member of the Student Technology Fee Committee – University of Washington Tacoma.
2005 – 2012 – Adjutant and Finance Officer for the Sons of the American Legion, Post 17, Centralia, WA.
2004 – Present – Member of the International Information Systems Security Certification Consortium, (ISC)².
2004 – Present – Member of Information Systems Audit and Control Association (ISACA) Mt Rainier Chapter.
2004 – 2005 – Executive Committee Member, American Cancer Society, Tacoma Washington Relay for Life.

Appendix C Sample Faculty List

Key faculty members are listed below. The faculty and administrators responsible for technical courses will meet certification requirements for professional and technical administrators and instructors in the Washington Administrative Code WAC 131-16-094.

BAS-C Faculty

Faculty Name	Credentials	Status	Course(s)	
Jeff Turner	M.A. Info Sys Management Webster University BSChE, Clarkson University AAS-T, CNISS Clover Park Technical College	Full Time (Tenure)	BASC 301 BASC 302 BASC 304 BASC 307 BASC 402 BASC 405	Securing Database Management Systems Risk Assessment and Vulnerability Management Cyber Threat and Research Network Intrusion Detection Cloud Security Network Intrusion Analysis Project
To Be Hired	Masters Required; Offensive Security Certified Professional or Certified Ethical Hacker preferred	Full Time	BASC 406 BASC 305 BASC 306 BASC 401 BASC 403 BASC 404	Capstone Project Incident Response Vulnerability Assessment Penetration Testing In Incident Response Project Penetration Testing Project
Erwin Swetnam	Juris Doctor Western State University College of Law Master of Business Administration Western Governors University BA, Political Science Idaho State University	Adjunct	ECON 310 PHIL 310	Managerial Economics Professional Ethics
Dr. Joseph Donaldson	Ph.D., English Northern Illinois University	Adjunct	ENG 310	Business Communications
Carolyn Van Beek	ABD Ph.D., Industrial & Organizational Psychology Grand Canyon University MA, Counseling Psychology Chapman University BS., Community Health Central Washington University	Adjunct	PSYC 311	Industrial & Organizational Psychology
Dr. Ali Ostadfar	Ph.D., Engineering Sciences Simon Fraser University M.Sc., Biomechanical Engineering Tehran Azad Science and Research University B.Sc., Mechanical Engineering Tehran Azad University	Adjunct	BUS 310	Project Management

