



STATE BOARD FOR COMMUNITY AND TECHNICAL COLLEGES

NOVEMBER 2022

STATEMENT OF NEED

**BACHELOR OF SCIENCE
COMPUTER SCIENCE**

**CONSORTIUM:
SOUTH PUGET SOUND COMMUNITY COLLEGE
AND GRAYS HARBOR COLLEGE**

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Cover Page — Statement of Need

Program Information

Institution Name: South Puget Sound Community College and Grays Harbor College

Degree Name: Bachelor of Science (BS) in Computer Science (CS)

CIP Code: 11.0701 Computer Science

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

Degree: Associate of Science-Transfer, Track 2

CIP Code: 11.0701 Computer Science

Year Began: Adopted prior to 2019

Degree: Associate in Computer Science DTA/MRP (Associate of Arts)

CIP Code: 11.0701 Computer Science

Year Began: Adopted by South Puget Sound Community College and started Fall 2021

Degree: *in-development* Associate of Science in CS (specific to South Puget Sound Community College and Grays Harbor College)

CIP Code: 11.0701 Computer Science

Year to Begin: By Fall 2024.

Proposed Start Implementation Date: Fall 2024

Projected Enrollment (FTE) in Year One: 25

Projected Enrollment (FTE) by Year: Up to 25-30 additional by Y2 or Y3.

Mode of Delivery

Multiple Campus Delivery: Hybrid program with online and hybrid courses offered from SPSCC's Olympia location as well as Grays Harbor College from Aberdeen.

Off-site: N/A

Distance Learning: Lectures may be hybrid/virtual, online, or both.

Statement of Need

Please see criteria and standard sheet. Page Limit: 20 pages

Contact Information (Academic Department Representative)

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Chief Academic Officer Signature

The Statement of Need must be signed. To sign, double click on the signature line below.

X 

Chief Academic Officer

10/25/2022

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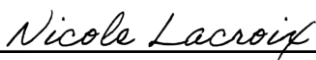
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Chief Academic Officer Signature

The Statement of Need must be signed. To sign, double click on the signature line below.

X 

Chief Academic Officer

10/25/2022

Criteria 1

Relationship to institutional role, mission, and program priorities.

South Puget Sound Community College and Grays Harbor College are collaborating to design and offer a Bachelor of Science degree in Computer Science to serve students from within the Pacific Mountain Workforce Development Region of Washington (specifically northern Lewis, Thurston, southern Mason, Pacific, and Grays Harbor Counties). It is the mission of both colleges to support student success and respond to the needs of the region and the communities served. Accordingly, the consortium is designing a Bachelor of Science degree that will provide access and equity to a diverse range of students so they can pursue a broad spectrum of job and career opportunities in the field of computer science and information technology. Though graduates will be able to work anywhere, the program is being designed specifically to meet high demand, high wage job and career opportunities in the region, including those with state and local government agencies, healthcare providers, information-computer-security service contractors, non-governmental organizations, and employers such as architecture, environmental science, and engineering firms.

The [Guided Pathways](#) approach, developed by the Community College Research Center at the Teachers College of Columbia University, was chosen by the faculty, staff, and administrations of this consortium as the framework to inform their strategic planning and operations. The Guided Pathways framework is leveraged to center all college planning and initiatives on student success using data informed decision-making. Student success is at the core of each institutions' mission and vision and is spotlighted by tracking, reflecting on, and continuously trying to improve the following rates: Fall to Fall retention, course success (i.e., passing with a 70 percent or higher), and credential completion – for full-time and part-time students, including people from historically marginalized backgrounds and those receiving federal financial aid. To streamline decision-making for students and their families, the colleges orient their teaching and learning on career interest pathways rather than a single, narrow credential. For example, the pathway at South Puget Sound Community College for Information Technology includes both transfer and professional-technical degree-related computer science, computer information systems, and cybersecurity-related degree programs. Similarly, Grays Harbor College maintains a pathway for American Indian and Indigenous students desiring to transfer to a Washington university to earn a Bachelor of Arts degree. Within each pathway, pathway “maps” are presented as straightforward sequences of course requirements and recommendations for each credential. Pathway maps communicate to each student the preferred suite of courses that they should complete to prepare for their occupation/career of choice. Through repeated consultations with subject matter experts and employers in each service area, the courses indicated on each pathway map provide students high value opportunities to learn the essential knowledge and skills needed to secure relevant employment and/or advanced education.

Once Washington Senate Bill 5401 was signed into law and enacted in the Summer 2021, the consortium partners decided to collaborate to leverage the Senate Bill 5401 opportunities to meet the needs of students and employers in their adjacent service areas, specifically by closing the gap between regional job demand and local educational capacity. According to the Washington Employment Security Department, the Pacific Mountain Workforce Development region will experience an average of 2,300 job openings annually in computer science/information technology related occupations from 2023 through 2028, far outstripping the estimated 50-60 Bachelor of Science in Computer Science graduates from nearby programs at Saint Martin's University and The Evergreen State College (Education Research & Data Center analysis). The scale of that gap

underscores the urgency of this consortium's commitment to develop and launch of a Bachelor of Science in Computer Science degree by Fall quarter 2024.

Criteria 2

Support of the statewide strategic plans.

According to Washington Senate Bill 5401, "The legislature finds it essential that Washington students, especially low-income students and students of color, have the necessary credentials to secure the high-demand jobs of the future." Washington is fortunate to be home to a large, and growing, technology sector. The technology sector in Washington currently has more than 24,000 job openings, most of which require a four-year bachelor of science degree in computer science." Instead of relying on importing employees from other states and nations to compete for these job openings, the supporters of the legislation envisioned a future where a larger percentage of Washington (WA) residents could become trained and qualified for high-wage, high-demand computer science and information technology jobs and careers.

Clearly, the state's existing higher education capacity is insufficient to meet that goal. In recent years, of the roughly 7,500 first-year applicants to the University of Washington's Paul G. Allen School of Computer Science and Engineering, only seven percent were granted direct admission (Geek Wire, June 2022). By allowing all community and technical colleges to pursue development of Bachelor of Science in Computer Science degree programs, Washington now has a mandate to build greater access and equity to these programs for low-income residents and historically marginalized people. Amongst higher education institutions, Washington community and technical colleges cost-effectively serve a significant percentage of local, diverse populations with financial need and barriers to mobility. The annual tuition and fees associated with the proposed computer science degree program are projected to be far more affordable than private and public computer science programs offered at traditional four-year colleges and universities.

This consortium's proposed Bachelor of Science degree program will support fulfillment of the Washington State Board for Community and Technical College's [2008 Mission Study 20-Year Action Plan](#) and the goals stated in the [WA Student Achievement Council's 2022 Strategic Action Plan](#). By offering courses designed for online, virtual, and hybrid teaching and learning modalities, this consortium will increase the number of underserved Washington residents who are able to avail themselves of training leading to industry recognized credentials to advance their career in computer science and information technology. The proposed program will allow the colleges to collaborate to maximize the efficient use of resources and personnel while reducing students' transportation time, costs, greenhouse gas emissions, and lodging expenses. Furthermore, this consortium's proposed computer science program will integrate opportunities for students to gain proficiency with the [21st century professional skills](#) that employers demand, including: effective communication, information literacy, analytical reasoning, multicultural awareness, and social responsibility.

The Guided Pathways framework indicates that each credential a college offers should be clearly tied to an occupation (or series of occupations) as well as related career and/or advanced education opportunities that can be clearly articulated and explained to students. The proposed Bachelor of Science in Computer Science degree will focus on occupations related to, and at the nexus of, System Administration, Security, and Application Development. The consortium has established

relationships with a number of qualified subject matter experts who can serve as guest speakers, mentors, internship hosts, and future employers. Consistent connection to industry leaders and work-based learning should provide this consortium's computer science students significant motivation to persevere through their program of study to degree completion so they can continue on to an advanced education program and/or embark on a fulfilling career. Within the region, career opportunities exist and are growing with state and local government agencies, healthcare providers, information-computer-security service contractors, non-governmental organizations, and employers such as architecture, environmental science, and engineering firms. The proposed program will help connect employers with soon-to-be graduates, thus providing students the momentum to help Washington achieve its aspirational goal of having 70 percent of the state's 25 to 44 year-old adults earn a postsecondary credential (Washington Student Achievement Council's 2022 Strategic Action Plan).

Criteria 3

Employer/community demand for graduates with baccalaureate level of education proposed in the program.

According to the Washington Employment Security Department, for the period of 2019 through 2024, graduates of a Bachelor of Science degree in Computer Science will find over 1,900 annual computer science and information technology job openings in the Pacific Mountain Workforce Development (Pacific Mountain) region. These jobs will provide annual wages of \$43,653/year to as much as \$131,819/year (see Table 1).

Table 1: 2019-2024 Pacific Mountain computer science-related annual job openings.

Occupational title	Typical Credential Needed for Entry	SOC code	Annual Total Openings 2019-24	Regional Wage
Computer Systems Analysts	Bachelor's degree	15-1211	682	\$109,651
Network and Computer Systems Administrators	Bachelor's degree	15-1244	442	\$96,641
Computer Network Architects	Bachelor's degree	15-1241	240	\$131,819
Computer Occupations, All Other	Bachelor's degree	15-1299	210	\$91,318
Operations Research Analysts	Bachelor's degree	15-2031	190	\$95,893
Information Security Analysts	Bachelor's degree	15-1212	146	\$109,523
Computer Programmers	Bachelor's degree	15-1251	28	\$43,653

To better understand what these occupations and their job tasks will entail for Bachelor of Science in Computer Science graduates in the region, in Summer 2022, South Puget Sound Community College and Grays Harbor College coordinated to modify an existing survey tool presented through the Center of Excellence for Information & Computing Technology. The partners adapted the survey to focus on the eight job classifications that Washington's Office of Financial Management uses for computer science and information technology-related employment across all state government agencies: Application Development, Business Analysis, Customer Support, Data Management, Network and Telecommunications, Quality Assurance, Security, and System Administration. Thirty-one subject matter experts completed the survey across the combined service areas, representing local government agencies, healthcare providers, information-computer-security service contractors, non-governmental organizations, and representatives from architecture, environmental science, and engineering firms. For each of the eight job classifications, respondents were asked to vote to what extent each job task (up to as many as 16 per job classification) was "important" to them as professionals and in their organization's operations. Based on the average score for all job tasks per classification, the job classifications themselves were ranked from most important to least. Using this methodology, the top job classifications came into focus as well as the priority tasks for each job.

From this survey and analysis, the three "most important" job classifications that emerged were: System Administration, Security, and Application Development. Through review of standard occupation codes for computer science and information technology-related occupations within the [O*NET OnLine](#) website (Bureau of Labor Statistics supported), the following occupations are closely related to one or more of the three "most important" Office of Financial Management job classifications and all identify a Bachelor of Science degree as the preferred credential for entry-level employment: Network and Computer Systems Administrators (15-1244), Computer Systems Analysts (15-1211), Information Security Analysts (15-1212), Computer Network Architects (15-1241), Computer Programmers (15-1251), Software Developers (15-1252), and Software Quality Assurance Analysts and Testers (15-1253). At the conclusion of this exercise, the consortium partners found alignment between:

- The top computer science/information technology occupations for the Pacific Mountain region (as listed by the Employment Security Department) AND
- The "most important" Office of Financial Management job classifications and priority tasks (as indicated by the subject matter experts surveyed).

In addition to this analysis, in Summer 2022, the consortium partners held two hybrid in-person/virtual forums with over 40 subject matter experts across the region (preceded by one-on-one interviews during Spring 2022). The majority of the experts offered to develop internships for the consortium's Bachelor of Science in Computer Science students, share job postings regularly, serve or continue to serve on associated advisory committees, present guest lectures, participate in follow-up curriculum development forums, and/or help work directly with faculty to develop specific 300- and 400-level course activities across System Administration, Security, and Application Development.

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Criteria 4

Baccalaureate program builds from existing professional and technical degree and transfer programs offered by the institutions.

South Puget Sound Community College and Grays Harbor College both maintain, and are developing, associate-level and applied baccalaureate degrees with which the proposed Bachelor of Science in Computer Science degree program will build.

Associate in Science-Transfer, Track 2: Until Fall 2021, this was the main pathway South Puget Sound Community College students who intended to complete a bachelor of science degree used to pursue a career in computer science/information technology. Students historically have been advised to transfer to a four-year degree granting college or university to earn their Bachelor of Science in Computer Science degree. The Engineering Physics course series is required, and students are advised to complete two object-oriented programming computer science transfer courses. This is the main pathway Grays Harbor College students use to pursue their Bachelor of Science in Computer Science degree aspirations. Here is the data available related to South Puget Sound Community College's Object-Oriented Programming I and II courses:

1. 2017-2018: 50 students completed the courses with a C or higher; 38 degree completions
2. 2018-2019: 101 students completed the courses with a C or higher; 38 degree completions
3. 2019-2020: 133 students completed the courses with a C or higher; 39 degree completions
4. 2020-2021: 179 students completed the courses with a C or higher; 40 degree completions
5. 2021-2022: 144 students completed the courses with a C or higher; 4 degree completions by Fall 2021 (full year's data not available yet)

Associate in Computer Science Direct Transfer Agreement/Major Related Program (adopted by South Puget Sound Community College): By Fall 2021, this degree was adopted and offered as an additional pathway for students pursuing a computer science/information technology career who stated the intent to transfer. In contrast to the previous pathway which requires two Chemistry courses and Statistics, the computer science direct transfer agreement includes four Calculus courses and a number of prescribed Social Science and Humanities courses (along with one required Natural Science with Lab course). The Engineering Physics course series is required, and students are advised to complete two Object-Oriented Programming computer science transfer courses. See prior pathway for five-year enrollment data.

Associate of Science in Computer Science (in-development by consortium): This is a new associate-level degree that the consortium proposes to offer by Fall quarter 2024. This new degree will be created specifically to attract and graduate students who have strong analytic skills necessary for these jobs but who may be deterred by other programs that emphasize lengthy science and math sequences. Unlike the two previous pathways, the Engineering Physics course series will not be required. Calculus I may be required (or a new logic/critical thinking course will be developed). Instead of requiring the Physics and Calculus series, completion of six (6) five-credit courses from one of three Associate of Applied Science degrees will be required to meet the Electives requirement. This requirement will serve as the on-ramp for Associate of Applied Science degree students (in Network Operations, Cybersecurity and Network Administration, or Software Development) who want to complete the Bachelor of Science degree in Computer Science to open up a wider slate of job/career openings and lifetime earnings. See Table 2.

Associate of Applied Science in Cybersecurity and Network Administration: This program began as Computer Network Administration about 20 years ago at South Puget Sound Community College. At present, the college is working to secure National Security Agency designation for the program as a recognized Center of Academic Excellence for Cyber Defense. In addition, the building the program is housed in will be remodeled during the 2023-2025 biennium. Here is the available full-time enrollment and completion data:

1. 2017-2018: 80 FTE; 29 degree completions
2. 2018-2019: 76 FTE; 23 degree completions
3. 2019-2020: 86 FTE; 20 degree completions
4. 2020-2021: 103 FTE; 17 degree completions
5. 2021-2022: 88 FTE; 7 degree completions by Fall 2021 (full year's data not available yet)

Associate of Applied Science in Software Development: This program began as Office Technology and Administration about 20 years ago at South Puget Sound Community College. The faculty, including two new professors (one with a doctorate and one working on a doctorate), will lead the development of the upper division computer science courses to be determined by this consortium. This program shares the same building as the previous pathway (will be remodeled in the near future). Here is the available full-time enrollment and completion data:

1. 2017-2018: 76 FTE; 15 degree completions
2. 2018-2019: 52 FTE; 21 degree completions
3. 2019-2020: 59 FTE; 23 degree completions
4. 2020-2021: 42 FTE; 17 degree completions
5. 2021-2022: 41 FTE; N/A degree completions

Associate of Applied Science in Network Operations: A program in-development between Grays Harbor College and Clover Park Technical College. A set of six (6) five-credit courses will be identified as one of three options to satisfy the Electives requirement for this consortium's in-development Associate of Science in Computer Science degree – to provide an on-ramp to the proposed Bachelor of Science in Computer Science degree.

Bachelor of Applied Science in Organizational Management: There are several general education, project management, and leadership courses included in the Bachelor of Applied Science in Organizational Management at Grays Harbor College that could be incorporated into the consortium's computer science curriculum. Here is the available full-time enrollment and completion data:

1. 2017-2018: 10 FTE; 10 degree completions
2. 2018-2019: 16 FTE; N/A degree completions (postponed Fall 2017 cohort)
3. 2019-2020: 28 FTE; 8 degree completions
4. 2020-2021: 26 FTE; 10 degree completions
5. 2021-2022: 15 FTE; 8 degree completions

Bachelor of Applied Science in Craft Brewing Management and Quality Assurance: Set to launch Fall quarter 2023 at South Puget Sound Community College (just approved in October 2022). There are several upper division general education courses in the pathway that may be used by this consortium's proposed degree.

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Table 2: Proposed Lower and Upper Division Courses, Bachelor of Science in Computer Science.

Division	AS-T Option II	Associate in Computer Science (Direct Transfer Agreement)	AS in CS <i>In-development by Consortium</i>
Lower-Division courses (min. of 90 credits)	General Education (90): CCS101 Pathways to Success ENGL&101 Composition I Humanities (or Social Science/Diversity) Humanities Social Science Electives (up to 7cr)	General Education (93-103): CCS101 Pathways to Success ENGL&101 Composition I PHIL&120 Symbolic Logic ENGL&235 Technical Writing SOC&101 Into to Sociology Humanities (Art/Music/Phil) Humanities/Diversity (CMST) Social Science (Economics) Social Science (BUS/HIST/PSYC)	General Education (93): CCS101 Pathways to Success ENGL&101 Composition I ENGL&235 Technical Writing PHIL&120 Symbolic Logic Humanities/Diversity (CMST) Social Science (Recommended Micro-Economics)
	CHEM&139 Gen. Chem Prep CHEM&161 Gen. Chem w/ Lab I	Natural Science w/ Lab	Natural Science w/ Lab
	MATH&141 Pre-Calculus I MATH&142 Pre-Calculus II MATH&151 Calculus I MATH&152 Calculus II MATH&146 Intro to Statistics (or MATH&153 Calculus III)	MATH&141 Pre-Calculus I MATH&142 Pre-Calculus II MATH&151 Calculus I MATH&152 Calculus II MATH&153 Calculus III MATH&254 Calculus IV	MATH&141 Pre-Calculus I MATH&142 Pre-Calculus II TBD: MATH&151 Calculus I (or new logic/critical thinking course for BS in CS majors) MATH&146 Intro to Statistics
	PHYS&221 Engr..Physics I PHYS&222 Engr. Physics II PHYS&223 Engr. Physics III	PHYS&221 Engr..Physics I PHYS&222 Engr. Physics II PHYS&223 Engr. Physics III	Required Electives (30) Students will be able to select a prescribed set of 6 courses from <u>one</u> of three prof-tech degree options: Network Operations, Cybersecurity & Network Administration, or Software Development.
	Recommended Electives (10) CS142 Object-Oriented Prog.I CS143 Object-Oriented Prog.II	Area of Study Courses (10) CS142 Object-Oriented Prog.I CS143 Object-Oriented Prog.II	Area of Study Courses (10) CS142 Object-Oriented Prog.I CS143 Object-Oriented Prog.II
BS Upper-Division courses (90 Credits)	General Education (20): <i>MATH course such as Linear Algebra</i> <i>Additional Diversity, Social Science, Communications, or Business courses</i> Upper Division Computer Science degree courses (70 = 14 courses @ 5cr each): <i>Core Courses (50), including NEW CS 300-level bridge/foundations course(s)</i> <i>Upper Division Electives (20)</i>		
Total Credits	Min. 180		

Criteria 5

Student demand for program within the region.

Evidence of Student Interest.

Based on data collected through surveys, social media, enrollment history, and K-12 development plans, the consortium's proposal aligns precisely with student interests, present and future. A Summer 2022 survey reached over 600 people including students who took professional-technical and science-related courses over the past five years at South Puget Sound Community College and Grays Harbor College. Former students, current students, high school students, and community members responded to the survey through social media or an online link. The survey was strategically designed to align with the subject matter expert survey (presented in Criteria 3) by asking participants to select their areas of interest from a list of the same eight Office of Financial Management job classifications. Participants were also asked questions on class modality, time, and location preferences. See Table 3.

From the 612 survey respondents, here is a summary of what the consortium learned:

- The top three student “areas of interest” corresponded with the same three job classifications ranked as most important by the subject matter experts: System Administration, Security, and Application Development.
- Eighty percent of the respondents are not currently employed in a computer science/information technology occupation.
- Nearly seventy-five percent are considering future employment in this field.
- Over eighty-nine percent indicated that they believe additional education (specifically a computer science bachelor of science degree) would benefit them either through success in career searches, promotion, or increased earnings.
- Seventy-one percent of respondents indicated interest in enrolling in a Bachelor of Science in Computer Science degree program.
- Of those who expressed interest to enroll in a Bachelor of Science in Computer Science degree program, nearly eighty-one percent would consider attending this consortium's proposed degree program as an alternative to a four-year university.
- While thirty percent of those surveyed stated their highest education level attained was a high school diploma or equivalent, twenty-eight percent indicated theirs was an associate degree.
- Less than thirty percent of those surveyed earned a bachelor's degree or higher.
- The majority of the respondents indicated hybrid or online as their preferred modality of instruction with availability mostly in the evenings and on weekends.

These survey results are reinforced by an analysis of current enrollment trends.

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Table 3: Participants by affiliation with the consortium colleges.

Survey Participants	Response rates	Number of Responses (610 total)
Current SPSCC student	27.21%	166
Graduate of SPSCC	15.08%	92
Interested community member	14.43%	88
Graduate of GHC	10.66%	65
Former SPSCC Student	9.34%	57
Potential new student	9.34%	57
Current GHC student	7.05%	43
Former GHC Student	6.89%	42

Associate of Science-Transfer Degree Completions.

Student interest in a Bachelor of Science degree in Computer Science is also demonstrated through the number of students graduating with an Associate of Science-Transfer, Track 2 degree and the enrollment in computer science courses. During 2018-2019, 2019-2020, and 2020-2021, over 200 students graduated with a science transfer degree between the two colleges ([SBCTC Credentials Awarded](#)). The Associate of Science-Transfer, Track 2 is intended to prepare students to transfer to a university with junior standing once the majority of the prerequisites for selected science, mathematics, engineering, and computer science courses are completed. Enrollments in computer science courses over the past three years at the institutions reached close to 500 students. South Puget Sound Community College offers multiple sections of Object-Oriented Programming courses each quarter. Grays Harbor College successfully offered the first Fundamentals of Computer Programming course in Spring quarter 2022 with several requests from students and advisors to offer more computer science courses.

Associate in Applied Science Enrollment and Completion.

Student access and interest in computer science and technology is demonstrated by the success of South Puget Sound Community College's Associate in Applied Science programs. South Puget Sound Community College has two professional technical programs in Computer Information Systems. The [Perkins V Dashboard](#) for South Puget Sound Community College demonstrates in the last year of reported data (2019/2020) that the Computer Information Systems programs exceeded the state target for underrepresented enrollments.

Demand in excess of opportunity to enroll in bachelor programs.

Currently, the only option for a student to earn a bachelor's degree in computer science in the South Puget Sound Community College and Grays Harbor College service areas is to transfer to either The Evergreen State College or Saint Martin's University. While these institutions are less than 10 miles

from Olympia, they are over 50 miles from Aberdeen, and this significantly limits students' options in the coastal communities to advance their education let alone their career options and opportunities. As noted previously, despite bachelor of science-level computer science programs at Saint Martin's University and The Evergreen State College, there are more job openings annually in the region (1,900 to 2,300 annually depending on the period projected) than Bachelor of Science in Computer Science graduates (estimated at 50-60 graduates per year currently based on Education Research & Data Center analysis). Thus, there is sufficient regional employment demand, and limited competing degree program offerings, to justify the proposed collaboration to develop and launch a Bachelor of Science degree in Computer Science by Fall quarter 2024.

Expanding access to computer science curriculum and co-curricular activities in regional high schools.

To supplement the student enrollment and survey data, the colleges also considered future trends and increasing demand in the region's K-12 schools to include or improve Computer Science curricula. Future student interest will be generated by the Statewide Office of the Superintendent of Public Instruction initiatives to increase computer science education in K-12 schools. The state legislature provided \$1 million to improve, increase, and implement computer science education in primary and secondary education. The state allocations can also be used to allow districts, schools, and non-profits to train teachers and provide and upgrade technology. This funding expands computer science access to groups of students who historically were underrepresented in computer science training and careers. Two school districts in the Grays Harbor region received funding including Hoquiam and North Beach school districts. North Beach will be participating in a computer science planning process to expand opportunities for the district. The Hoquiam School District has been working in parallel on a multi-year plan to create a comprehensive K-12 computer science curriculum aligned with in-demand software programming skills. Grays Harbor College's eSports program also supports student interest and college opportunities through a [21-22 computer science grant](#).

Enrollment Projections.

Approximately fifty-two percent of the 612 people surveyed conveyed interest to enroll in a Bachelor of Science degree in Computer Science in 2023 or "in 2024, when the South Puget Sound Community College and Grays Harbor College program launches." Once approved, South Puget Sound Community College and Grays Harbor College can begin recruiting and developing students through their Guided Pathways framework for the Bachelor of Science degree in Computer Science. In advance of Fall quarter 2024 when the program is proposed to launch, students can plan accordingly and start completion of their 100- and 200-level course requirements. As indicated in the table below, the program will enroll at least twenty students in the first year with projected growth through the first three years. See Table 4.

Table 4: Proposed Bachelor of Science degree Computer Science projected enrollments.

	2024-25	2025-26	2026-27	2027-28	2028-29
Headcount	25	50	60	60	60

Criteria 6

Efforts to maximize state resources to serve place-bound students.

Describe how program will service place-bound working adults.

Serving place-bound working adults is one of the unique features of this degree. In general, the program will be considered a hybrid model with many courses offered asynchronously online, scheduled online sessions, or scheduled weekend Face-to-Face sessions. Classes that meet during the weekend will alternate between South Puget Sound Community College and Grays Harbor College, even possibly to intermediate locations. The proximity between the colleges allows instructors to simulate real-world collaboration and project-based learning at a distance, while still close enough for students to physically engage monthly or quarterly. Transportation arrangements will be taken into consideration to remove possible financial and transportation barriers.

Both colleges already serve place-bound students by providing a variety of delivery modes for general education courses. All online instruction will follow Universal Design for Learning best practices and courses will be reviewed through Quality Matters and the State Board for Community and Technical College's [Instructional Strategies and Tools](#).

Childcare assistance programs as well as Worker Retraining funding and Opportunity Grants to decrease financial barriers for place-bound working adults are available at South Puget Sound Community College and Grays Harbor College.

Identify similar program offered by public or independent institutions in the region.

Saint Martin's University's "computer science program prepares students with the education and training needed for careers in such high-demand fields as software development, web and mobile technology, and security and database management. Set in the midst of a rich liberal arts curriculum, the program is designed to meet the needs of industry and future advances in technologies."

- Type of Instruction: In Person
- Degree: Bachelor of Science
- 2022-2023 Tuition // Projected Cost: \$20,830 // \$56,366

The Evergreen State College computer science programs support "dynamic skills in coding, cyber security, robotics, and more." Career paths related to computer science include: artificial intelligence, cybersecurity, robotic, parallel programming, data science, software development, software engineering.

- Type of Instruction: Hybrid, Remote, In Person
- Degree: Bachelor of Science
- 2022-2023 Tuition: \$8,528

While these programs exist in the region, they serve a limited number of students. There are far more regional annual job openings than graduates. Most courses offered at these two institutions use the traditional in-person modality for teaching and learning, and thus are not feasible options for most working adult students or students commuting from outside the institutions' immediate vicinity in Thurston County.

Describe options that have been explored for collaboration with other public baccalaureate institutions, businesses, and/or community organizations considered in the development of the proposal and include a brief description of initial conversations.

The foundation of the South Puget Sound Community College and Grays Harbor College computer science program was developed through collaboration of businesses and community organizations. In June 2022, South Puget Sound Community College hosted a gathering of computer science subject matter experts from Olympia and surrounding areas. Grays Harbor College then hosted a meeting in August. The purpose was to cultivate four-year partners who will be willing to guide faculty training and curriculum development and introduce the overall concept of designing an inclusive computer science program to industry partners. The goal was to help identify the necessary knowledge, skills, and abilities of the program, and to discuss future hiring projections for computer science graduates in the Pacific Mountain Workforce Development region. The framework for the meetings was the 2020 study, [Paradigms for Global Computing Education](#). Participants ranged from small business owners, independent contractors, public utilities directors, IT directors from area hospitals and colleges, publicly traded business cybersecurity leaders, and government representatives. A survey was then distributed to the regional professionals to identify priority knowledge, skills, and abilities that align with Office of Financial Management job classifications for computer science and information technology. The methodology described in Criteria 3 was established to help set the direction of the proposed Bachelor of Science degree in Computer Science and narrow the focus of the program. This is how the three areas of focus, System Administration, Security, and Application Development first emerged.

Additional areas of importance identified during the meetings as necessary skills for student success included: portfolios, internships, writing and presentations, focus on 2-3 programming languages, industry certifications, cloud computing, network infrastructure, and cybersecurity. The top learning outcomes included collaboration and teamwork, creation of readable and maintainable computer code, and continuous integration/continuous delivery using Microsoft Azure or similar Dev Ops cloud-computing and data management platforms.

A computer science professional and alum from a local institution's computer science program also contributed valuable insights, including "Offer courses in both Amazon Web Services and Microsoft's Azure cloud that lead to cloud certifications as part of the degree." Other suggestions included, offering courses in or certifications for: VMware, Dockers, Kubernetes, software defined networking, HashiCorp Terraform, CompTIA Cybersecurity Analyst, etc.

Future forums with businesses and community organization representatives will be held in Winter 2023, to present and seek feedback on the Statement of Need, and in Spring 2023, to present and seek feedback on the consortium's draft proposal to the State Board for Community and Technical Colleges. These forums will also include representatives from K-12 education and regional tribal leaders as well as computer science representatives from Saint Martin's University and The Evergreen State College.

Describe collaboration with similar community and technical colleges (CTC) baccalaureate programs and related community and technical colleges Centers of Excellence.

South Puget Sound Community College and Grays Harbor College are members of the collaboration facilitated by the State Board for Community and Technical Colleges to develop guiding principles for bachelor of science in computer science development. Thus, there is now a network of colleges sharing information and providing guidance beyond this proposed partnership.

Grays Harbor College offers a bachelor of applied science degree in Organizational Management. There are possibilities for faculty in the program to collaborate in the development of the computer science program, and as mentioned in Criteria 4, for the proposed degree to share already established 300- and 400-level general education courses or courses on project management, leadership, or entrepreneurship.

This consortium will continue to work with the Center of Excellence for Information & Computing Technology to identify, pursue, and secure funding opportunities, guest speakers, internships, and job postings.

Describe unique aspects of the proposed program that differentiate it from similar programs and/or describe why expansion would be desirable or necessary.

A unique aspect of the proposed program is that it will serve both urban and rural communities and capitalize on the proximity of the colleges to simulate real-world, team-based projects where teams communicate and collaborate across the globe. The curriculum will include elements of project/business management, entrepreneur mindset, and leadership training. Based on the results from the subject matter expert survey, there is a common thread identified between application development, systems administration, and security. Furthermore, the marketplace demands that the consortium design the proposed curriculum with opportunities to discuss and explore

entrepreneurship throughout the upper division courses, so students are prepared to pursue creative and innovative solutions to future challenges and provide leadership.

The program will rely heavily on industry experts and business leaders for their valued involvement in developing the program and courses to ensure that graduates are well prepared. Active advisory boards from across the Pacific Mountain Workforce Development region will help guide the development of the program, introduce industry developments, provide internship placements, and engage students in project development.

Expansion of the Bachelor of Science in Computer Science to South Puget Sound Community College and Grays Harbor College is not only desirable but necessary to close the financial and educational equity gap of the rural and coastal communities in Washington. Between the major Washington universities and other community college consortiums, all investment in technology advancement and potential for community economic growth and personal upward mobility is further removed from the regions most in need of this opportunity.

Strategic planning for program development should rely on a regional labor market analysis that shows a demand for jobs. An equitable analysis also considers where high wage jobs are missing. South Puget Sound Community College and Grays Harbor College reviewed data through the Employment Security Department, Bureau of Labor Statistics, and Pacific Mountain Workforce Development. The June 2022 Employment Security Department top 25 job posting for Thurston County included three areas for computer science with a total of over 220 openings in computer science related jobs. However, the Grays Harbor County report for June 2022 did not include any job openings related to computer science. In fact, the total jobs posted, of the top 25 job postings, in Grays Harbor were less than the total for the three computer science categories in Thurston County. Grays Harbor County and Pacific County are in desperate need of educational opportunities that train people for high wage technology jobs so employers will want to relocate to coastal communities. Building this consortium's proposed program will foster regional economic development and close social equity gaps in the rural and coastal communities.

The future of computer science in rural areas is remote or independent work and computer science jobs in non-tech industries. A report conducted by the [Center for Rural Innovation](#) published in May 2022, "Rural America's Tech Employment Landscape," identified demand for tech jobs in rural areas in non-tech industries like hospitals, school systems, county offices, and utilities (the exact group of participants at the Grays Harbor subject matter meeting in Summer 2022). From the Center for Rural Innovation report, "75% of those 'missing tech jobs' include software developers, computer systems analysis, and cybersecurity and computer systems engineers."

Criteria 7

Promoting equitable opportunities for students, including historically marginalized students.

Student Recruitment and Support Implementation Plan.

The recruiting and implementation plan to support students of color and students Pell-eligible/low-income will start as soon as the program is officially approved. The intentional design of the program will have multiple entry pathways and since the targeted launch date is Fall 2024, there could potentially be over a year to introduce the program, develop guided pathways, and support academic success in prerequisite courses. Both colleges are working to eliminate equity gaps that create barriers to success.

Creating opportunities for underrepresented students to enroll in and succeed in tech-related programs must be intentionally implemented. Common barriers to attending college that students of color and low-income students face include financial obstacles and lack of information. Designing culturally appropriate student outreach programs for and with communities of color, students with disabilities, and low-income communities will work to invite and engage students into the technology conversation. Students will have access to local, affordable, and accessible technology programs at both the associate and baccalaureate level. Academic mentoring, advising, and tutoring will be available to support student success. Financial aid, Worker Retraining, and scholarships will increase persistence through the program. Additional resources and connections through the AnitaB.org Tech Journey Fund, for example, will provide additional support to “struggling yet striving female computing students.”

Another barrier is either access to college or access to resources. The program will be designed to serve rural, low-income communities and working parents through online and remote access. The curriculum will represent diverse voices and explore applications for computer science in communities and professions typically considered non-tech or rural to support high wage job options for place-bound students.

Not fitting in or finding a sense of belonging is a barrier for all students. Developing a sense of belonging is particularly challenging for women and students of color in technology programs. The E-sports programs at Grays Harbor College and South Puget Sound Community College have been successful at creating an inclusive environment while engaging students in technology. Other clubs and support networks will be implemented to foster a sense of belonging. The proposed computer science program will incorporate collaborative and project-based learning that support community development, a sense of achievement, and belonging.

The 2018 study, [*Toward Greater Representation of Equity in Tech: Solutions for Women of Color from Underrepresented Groups*](#), identifies how women of color in underrepresented groups feel about pursuing careers in technology and computer science and offers actionable recommendations. The identified barriers are similar to those faced by community and technical college students. The recommended remedies are relevant to guide any future plans to recruit and support students and set them up for academic and professional success and include:

- Women of color from underrepresented groups seek a greater sense of connection and community to combat feelings of isolation, to develop a support network, and to feel like part of a larger community. *Actionable Recommendation:* Create networking opportunities.
- Women of color from underrepresented groups look for opportunity and indicate a need for professional development, education and training, leadership development, job preparation and negotiations, presentation skills, confidence building, and overcoming imposter syndrome. *Actionable Recommendation:* Encourage and support professional development.

- Women of color from underrepresented groups desire mentors, guidance, and sponsorship to help them navigate a career in tech. *Actionable Recommendation:* Establish formal mentorship and sponsorship models.
- Women of color from underrepresented groups often find that financial limitations become a barrier to advancement. *Actionable Recommendation:* Provide financial support.

Conclusion

South Puget Sound Community College and Grays Harbor College are collaborating to design and offer the proposed Bachelor of Science degree in Computer Science focused on System Administration, Security, and Application Development. The consortium will serve students from within the Pacific Mountain Workforce Development Region of Washington (specifically northern Lewis, Thurston, southern Mason, Pacific, and Grays Harbor Counties). It is the mission of both colleges to support student success and respond to the needs of the region and the communities served. The consortium's design framework will provide access and equity to a diverse range of students so they can pursue a broad spectrum of job and career opportunities in the field of computer science and information technology. High demand, high wage job and career opportunities in the region exist with state and local government agencies, healthcare providers, information-computer-security service contractors, non-governmental organizations, and employers such as architecture, environmental science, and engineering firms. The proposed program, if approved, will lead to workforce development, feed economic development, and help historically marginalized communities develop a renewed sense of belonging and empowerment within the Pacific Mountain region.

WA SBCTC Supply/Demand Rubric for proposed new BAS/BS programs	
College Name: South Puget Sound Community College and Grays Harbor College consortium	
Program Name: BS in Computer Science (proposed for fall 2024 launch)	
Select one: Existing Occupation ☒ or Emerging Occupation ☐	
If local demand/supply information is available for the specified degree program and target occupation(s),**	
For demand: Provide local/regional demand data for the targeted occupation job title(s) from traditional labor market data, industry data, trade association data, or other transactional data. <i>(Provide absolute numbers, not just percentages)</i>	See next page for Table 1.
For supply gap: Provide data on the number of programs and the number of annual program graduates for all four-year colleges that supply your region. Is the number of current annual graduates insufficient to meet current and projected demand? (The result of demand minus supply).	See next page for more information.

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DEMAND:

According to the Washington Employment Security Department, for the period of 2019 through 2024, graduates of a Bachelor of Science degree in Computer Science will find over 1,900 annual computer science and information technology job openings in the Pacific Mountain Workforce Development (Pacific Mountain) region. These jobs will provide annual wages of \$43,653/year to as much as \$131,819/year (see Table 1).

Table 1: 2019-2024 Pacific Mountain computer science-related annual job openings.

Occupational title	Typical Credential Needed for Entry	SOC code	Annual Total Openings 2019-24	Regional Wage
Computer Systems Analysts	Bachelor's degree	15-1211	682	\$109,651
Network and Computer Systems Administrators	Bachelor's degree	15-1244	442	\$96,641
Computer Network Architects	Bachelor's degree	15-1241	240	\$131,819
Computer Occupations, All Other	Bachelor's degree	15-1299	210	\$91,318
Operations Research Analysts	Bachelor's degree	15-2031	190	\$95,893
Information Security Analysts	Bachelor's degree	15-1212	146	\$109,523
Computer Programmers	Bachelor's degree	15-1251	28	\$43,653

SUPPLY:

Saint Martin's University's "computer science program prepares students with the education and training needed for careers in such high-demand fields as software development, web and mobile technology, and security and database management. Set in the midst of a rich liberal arts curriculum, the program is designed to meet the needs of industry and future advances in technologies."

- Type of Instruction: In Person
- Degree: Bachelor of Science
- 2022-2023 Tuition // Projected Cost: \$20,830 // \$56,366

The Evergreen State College computer science programs support "dynamic skills in coding, cyber security, robotics, and more." Career paths related to computer science include: artificial intelligence, cybersecurity, robotic, parallel programming, data science, software development, software engineering.

- Type of Instruction: Hybrid, Remote, In Person
- Degree: Bachelor of Science
- 2022-2023 Tuition: \$8,528

While these programs exist in the region, they serve a limited number of students***. There are far more regional annual job openings (i.e., at least 1,900/year in the PacMtn Region according to the ESD) than graduates (estimated at less than 100 per year between TESC and Saint Martin's

combined).*** Most courses offered at these two institutions use the traditional in-person modality for teaching and learning, and thus are not feasible options for most working adult students or students commuting from outside the institutions' immediate vicinity in Thurston County.

*****NOTE:** According to the WA Education and Research Data Center, Computer Science at The Evergreen State College (TESC) is a "Physical Science." Thus, Computer Science graduates compose some portion of the 179 annual 2018-2019 TESC graduates. According to the TESC webpage for Computer Science, there are roughly 75 students in their program. According to the WA Education and Research Data Center, of TESC FTEs in 2018-2019, 31 percent completed a degree. Using this same rate, of the 75 students in TESC's Computer Science program, roughly 23 graduate per year.

Sources:

<https://www.evergreen.edu/studies/computer-science>

<https://www.evergreen.edu/catalog/offering/computer-science-foundations-18651>

<https://erdc.wa.gov/>