South Puget Sound COMMUNITY COLLEGE | SUCCESS — AMPLIFIED

In coordination with...

GRAYS HARBOR COLLEGE

STATE BOARD FOR COMMUNITY AND TECHNICAL COLLEGES AUGUST 2023

PROGRAM PROPOSAL

BACHELOR OF SCIENCE COMPUTER SCIENCE

SOUTH PUGET SOUND COMMUNITY COLLEGE

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Program Information

Institution Name: South Puget Sound Community College in coordination with 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:

1. Degree: Associate of Science-Transfer, Track 2
   CIP Code: 11.0701 Computer Science
   SPSCC and GHC Year Began: Adopted prior to 2019

2. 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

3. Degree: Associate in CS degrees (in Software Development –and– Cybersecurity & Network Administration -- housed at South Puget Sound Community College; in coordination with GHC's version -- the in-development Network Operating Security Systems program course requirements)
   CIP Code: 11.0701 Computer Science
   Year to Begin: By Fall 2023.

Proposed Start Implementation Date: Fall 2024
Projected Enrollment (FTE) in Year One: 20-25 maximum
Projected Enrollment (FTE) by Year: Up to 20-25 additional by Y4 or Y5.

Mode of Delivery

Hybrid program with weekly online/virtual classes and periodic Saturday face-to-face project-based labs at SPSCC's Mottman campus in Olympia.

Program Proposal

Page Limit: 30 pages

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Chief Academic Officer Signature

Date: 08/03/2023

Introduction to the BS in CS degree

Developed in partnership with Grays Harbor College, South Puget Sound Community College's proposed Bachelor of Science (BS) degree in Computer Science is designed to serve both employers and students from within the Pacific Mountain Workforce Development Region of Washington. The two colleges hope to open new doors to technology sector employment and stimulate new economic development across their service districts. Spanning northern Lewis, Thurston, southern Mason, Pacific, and Grays Harbor Counties, this economically diverse region includes the state capital, other mid-size cities, and rural areas. To meet the needs of those economies, the Bachelor of Science degree is designed to serve state and local government agencies, healthcare providers, information-computer-security service contractors, non-governmental organizations, and small and medium-size employers such as architecture, environmental science, and engineering firms. For place-bound students, the degree will provide local access to a broad spectrum of high demand, high-wage job and career opportunities in the field of computer science and information technology. For students who choose to work elsewhere, the program will provide a lower cost/hybrid option to prepare for a high-tech career anywhere.

The impetus for the work began with the Washington State Legislature's 2021 passage of SSB 5401, authorizing community and technical colleges to offer Bachelor of Science degrees in Computer Science. In its rationale, the Legislature noted significant shortfalls in the number of Washington graduates available to fill technology-sector jobs in-state. Lawmakers further found that few of those degrees were awarded to African American, Latinx, Native American, first generation, and low-income students. The BS in CS degree program at SPSCC, in coordination with GHC, is designed to serve rural, low-income communities and working adults 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 help generate 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 proposed computer science program is being built to recruit and welcome women and people of color through its delivery modalities, content, and learning environment. The program will incorporate collaborative and project-based learning that supports community development to build a well-trained, diverse workforce with high-demand skills and knowledge.

While South Puget Sound Community College (SPSCC) will grant the BS in CS degree, students from Grays Harbor College (GHC) will be able to transfer into the upper-division program through an articulation agreement that provides admission for graduates of the following GHC degrees: AS-T Track 2, CS DTA/MRP, or the in-development Associate in Computer Science focused on Network Operating Security Systems. GHC is currently developing the lower-division courses needed to support these associate-level pathways. Based on demand and capacity, SPSCC will negotiate with GHC to reserve a set number of spots in the BS in CS program on a quarterly or annual basis. The upper-division delivery model will use hybrid and weekend onsite coursework to minimize barriers for GHC transfers. Long-term, as GHC gains the necessary capacity and local demand, GHC and SPSCC seek to transition into a formal collaboration where a student could start and finish the BS in CS degree at either institution. To underwrite those efforts, the two

institutions have received significant support from the American Association of Community Colleges' MentorLinks program as well as the Amazon funding awarded via the WA State Board for Community and Technical Colleges (SBCTC). The program has also garnered substantial interest from industry experts and business leaders during the planning phase. These colleges will continue to rely heavily on those supporters for their valued involvement as the courses are implemented -- to ensure that graduates are well prepared for the workforce. Active advisory board members from across the Pacific Mountain Workforce Development region (see Table 8) will help guide further development of the program by introducing industry developments that need to be considered, providing internship and job placements, and engaging students in real-world projects developed with faculty.

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 (PacMtn) region. These jobs will provide annual wages of $43,653/year to as much as $131,819/year (see Table A).

Table A: 2019-2024 Pacific Mountain computer science-related annual job openings (Source: ESD)

Occupational title	Typical Credential Needed for Entry	SOC code	Annual Total Openings 2019-2024	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

The program will complement CS baccalaureate degree programs at Saint Martin's University and The Evergreen State College. The number of projected annual graduates from the three BS in CS programs will not approach the number of projected annual CS/IT job openings in the region. Though the primary partners are SPSCC and GHC, the degree program will be able to accept students from all Washington high schools and community colleges. The colleges will work with PacMtn region high school computer science and cybersecurity teachers to develop dual credit and articulation agreements to develop a more inclusive guided pathway to the BS in CS degree (and its prerequisite associate degrees), advanced education, and employment. The colleges will work to connect high school educators to professional development through the National Cybersecurity Training and Education Center as well as the Cybersecurity High School Innovations program. BS in CS alumni will be able to pursue graduate studies in CS/IT programs through a number of neighboring and regional institutions. Once approved, the BS in Computer Science program at SPSCC will begin admitting students in the fall of 2024.

Criteria 1

Curriculum demonstrates baccalaureate level rigor.

The proposed Bachelor of Science (BS) in Computer Science degree demonstrates baccalaureate-level rigor through its:

1) Program-level student learning outcomes,
2) Program evaluation and continuous improvement processes,
3) Computation, English, Humanities/Diversity, Social Science, Natural Science, Critical Thinking, Symbolic Logic, and Computer Science related lower-division course requirements,
4) 300- and 400-level Computer Science course (70cr) requirements, and
5) General Education junior and senior year requirements (20cr).

Program Learning Outcomes

The proposed curriculum for the BS is rigorous and is fully supported by South Puget Sound Community College's Instructional Council, the advisory committees for the current associate in applied science degrees in Software Development and Cybersecurity & Network Administration, as well as the college's Board of Trustees. The curriculum has been developed during the 21-22 and 22-23 academic years by South Puget Sound Community College (SPSCC) and Grays Harbor College (GHC) communities. The development team has included faculty, Vice Presidents for Instruction, and community stakeholders from both service areas, as well as the SPSCC dean of applied technology and a National Science Foundation mentor.

The resulting program outcomes reflect a rigorous set of baccalaureate-level expectations in computer science. The outcomes are aligned with SPSCC's institutional learning outcomes (i.e., college-wide abilities) and strategic plan. SPSCC's five college wide abilities are Multicultural Awareness (MA), Effective Communication (EC), Information Literacy (IL), Social Responsibility (SR), and Analytical Reasoning (AR). At the completion of the Bachelor of Science degree in Computer Science, students will be able to:

1. Apply data structures, algorithms, programming languages, and software engineering principles to solve problems. (AR)
2. Develop applications using well-documented, readable, maintainable, and secure code. (EC)
3. Identify and analyze a problem and define the computing requirements to solve it. (AR)
4. Design, implement, evaluate, trouble-shoot and test a computer-based system process, component, or program to meet desired results. (AR)
5. Evaluate the social impact and ethical issues related to use of computers and computer technology. (SR)
6. Apply current and cloud-based techniques, skills, and tools for cybersecurity, network administration, application development. (IL)
7. Demonstrate culturally responsive workplace skills, including teamwork, leadership, critical thinking, creative problem-solving, personal responsibility, and management skills. (MA, EC)
8. Communicate professionally with clients, peers, and managers from varying and diverse backgrounds, perspectives, specializations, and interests. (MA, EC)

Program evaluation criteria and process

The proposed BS in Computer Science program will be embedded within the well-established, robust program evaluation and continuous improvement processes of South Puget Sound Community College (SPSCC). SPSCC uses a comprehensive approach to creating and assessing student learning.

There are two major components of the program evaluation process at SPSCC: 1) Assessment of the College-Wide Abilities (CWAs), and 2) Assessment of disaggregated data on each degree, including course-level student completion data. Each program at SPSCC intentionally links program-level student learning outcomes (listed in the previous section) to the institutional level College-Wide Abilities (CWAs). Where possible, each of the CWAs is contextualized, taught, and assessed throughout the course sequence required for degree completion. CWAs are the universally accepted professional skills that regional employers are seeking college graduates in their workforce possess. Every year, faculty collect data to assess student learning of College Wide Abilities (CWAs). This process begins with faculty identifying the CWAs associated with their course learning outcomes (e.g., as exemplified on page 7). SPSCC has a Student Learning Assessment Committee which has created a common rubric for each of the CWAs. Every quarter, faculty attach the outcome rubrics to assessments within their courses and complete the rubric, for those CWAs under review, for each student -- to indicate whether the student met CWA competence, did not meet CWA competence, or did not attempt the relevant assignment associated with the CWA.

In addition to the quarterly assessments of the CWAs, faculty also complete a comprehensive assessment of student learning, i.e., SPSCC's Data Analysis and Action Plan (DAAP) process. The Student Learning Assessment Committee (SLAC) governs the DAAP process. Each department is guided through the DAAP process by the college's Center for Teaching and Online Learning. SLAC, as a sub-committee of SPSCC's campus-wide Instructional Council, is responsible for creating, implementing, reviewing, and improving the DAAP process. DAAP involves:

- **Year 1:** Completing a per program/department Data Analysis and Action Plan
- **Years 2 and 3:** Completing the Action Plan (involving reflection, implementation, and review)
- **End of Year 3:** Completing the Year 3 Summary (overall reflections and recommendations)

DAAP is a comprehensive process. Faculty members of each department meet to review student success and completion data to make program improvements. They review student data including demographics and student success data at the course and degree level; program curriculum including scope and sequence, articulation agreements, and assessment; industry-specific analysis including labor market changes, industry relationships, certifications, and any other industry shifts; and conclude with an action plan to address any identified gaps. All student data is disaggregated by variables such as part-time/full-time enrollment status, fall-to-fall retention, success (defined as completing a course with a grade C or higher), age, ethnicity, gender, socioeconomics, and credential completion. Reviewing disaggregated data allows faculty to do deeper analysis to identify any potential gaps in student success that need to be addressed. Additional program evaluation processes include:

- Quarterly student course evaluations
- Graduate/Alumni surveys
- Program advisory committee meetings (at least two meetings per year)
- Quarterly review of syllabi
- Five-year review of all courses in the program

To assure ongoing oversight from industry, SPSCC will manage the BS in CS within its Applied Technology Division and has reconstituted its existing Software Development/Computer Science advisory committee with new and returning subject matter experts who are excited to help inform the further development and improvement of the BS in CS curriculum. See Table 8 for the businesses and agencies with representatives serving on the SPSCC advisory committees in Software Development/Computer Science and Cybersecurity & Network Administration.

Course preparation via supporting associate degrees

Students will be eligible to enter the BS in Computer Science degree once they have earned the AS-T Track 2 or CS DTA/MRP degrees – or the new associate in computer science degrees recently adopted locally by SPSCC (with a focus in Software Development and Cybersecurity & Network Administration).

All course requirements for the AS-T Track 2 and CS DTA/MRP pathways, including the two Computer Science (CS) course requirements (i.e., CS142: Object Programming I and CS143: Object Programming II), will be offered by both SPSCC and GHC. For the new local associate in computer science degree pathways, in lieu of the Calculus and Physics series, professional-technical coursework is required from Software Development -or- Cybersecurity & Network Administration (30 credits at SPSCC), or Network Operating Security Systems (32 credits in-development at GHC). For these pathways, all the academic transfer and general education supporting courses will be offered by both SPSCC and GHC -- including the two required Philosophy (PHIL) courses, PHIL115: Critical Thinking and PHIL120: Symbolic Logic.

Beginning in fall 2024, pending SBCTC approval, it will be possible for a student to start and complete an associate degree relevant to the BS in CS at either SPSCC or GHC. Upon completion of a relevant associate degree, students will be able to enter the BS in CS degree program at SPSCC. The upper-division general education course requirements for the BS in CS (20 credits) can be satisfied by completing existing 300- and 400-level courses at GHC or SPSCC. In addition, the required Discrete Mathematics for Computer Science course (CS350) is planned to be offered at both institutions. Students who have completed a relevant baccalaureate degree will also be able to enter the BS in CS degree program at SPSCC.

It is the intent of GHC and SPSCC to begin the BS in CS degree partnership via articulation. SPSCC has the faculty capacity to develop, teach, and assess the new 300- and 400-level courses. SPSCC also holds a base audience composed of the 40-60 students annually enrolled in CS142 and CS143. Longer-term, GHC and SPSCC seek to transition into a formal collaboration where a student could start and finish the BS in CS degree at either institution. Once GHC has the capacity and local demand to progress to a formal collaboration, the necessary coordination will be finalized concerning enrollment, FTE, faculty time, Student Services, etc.

General education component

The general education requirements for the BS in Computer Science degree are shown in Table 1. These meet SBCTC's general education requirements for BS/BAS degrees. Out of the 183 credits total required for BS in Computer Science degree completion, 83 general education credits are required (i.e., 63 credits at the associate-level and 20 credits recommended at the baccalaureate-level). Credits earned at other institutions for equivalent or relevant courses with different course

numbering conventions will be accepted pending evaluation and approval by the SPSCC credential evaluation team in concert with the SPSCC dean of applied technology and/or the SPSCC and GHC vice president(s) for instruction. See Table 1.

Table 1: General Education Requirements in BS in Computer Science

General Education Requirements in BS in Computer Science *(63 credits via Associate in Computer Science degree + 20 credits at Bachelor's level)*			
Subject	**Credits**	**Course Title**	**Typical Completion**
Computer Science	10	CS142 Object-Oriented Programming I –and– CS143 Object-Oriented Programming II	Associate
College & Career Support	3	CCS101 Pathways to Success	Associate
Communication	5	ENGL&101 English Composition I	Associate
	5	ENGL&235 Technical Writing	Associate
Quantitative	15	MATH&141 Pre-Calculus I, MATH&142 Pre-Calculus II, and MATH&146 Introduction to Statistics	Associate
	5	MATH205 Linear Algebra (SPSCC), or MATH220 Linear Algebra (GHC)	Bachelor
Humanities	5	PHIL&115 Critical Thinking	Associate
	5	PHIL&120 Symbolic Logic	Associate
	5	CMST&210 Interpersonal Communication: Diversity, or CMST&230 Small Group Communication: Diversity, or CMST240 Intercultural Communication: Diversity	Associate
	5	PHIL350 Ethics in Business Management (SPSCC), or 300- or 400-level gen ed at GHC	Bachelor
Social Sciences	5	ECON&201 Micro-Economics, or POLS&202 American Government, or POLS&203 International Relations	Associate
	5	BASM309 Project Management (GHC), or 300- or 400-level gen ed at SPSCC (e.g., SOC350 Organizational Theory)	Bachelor
Natural Sciences	5	ENVS&100 Survey of Environmental Science, or ENVS102 Climate Change & Society, or ENVS203 Climate and Energy Solutions	Associate
	5	BASM307 Quantitative Design, Data, and Analysis (GHC), or 300- or 400-level gen ed at SPSCC (e.g., ENVS301 Business and Sustainability Principles and Practices)	Bachelor

Note that the Humanities, Natural Sciences, and Social Sciences courses recommended for entry into the BS in CS may vary slightly for AS-T Track 2 and CS DTA/MRP students compared to those

listed in Table 1 (as Table 1 features the requirements for the new local associate in computer science degrees along with those for upper division general education).

In addition to these general education requirements, for the AS-T Track 2 and CS DTA/MRP degrees, students must complete 15 credits in Engineering Physics and 15 credits in Calculus. However, students completing the new local associate in computer science degree pathways will be required to complete professional-technical coursework (in lieu of the Calculus and Physics series) from Software Development -or- Cybersecurity & Network Administration (30 credits at SPSCC), or Network Operating Security Systems (32 credits in-development at GHC). See Table 2 for a summary listing.

Table 2: Professional-Technical course requirements for the associate in computer science degree pathways

Local Associate in CS Degrees	**Software Development (CIS) track** *5 credits each @ SPSCC*	**Cybersecurity & Network Administration (CNA) track** *5 credits each @ SPSCC*	**Network Operating Security Systems (NOSS) track** (*in-development*) *4 credits each @ GHC*
List of courses required *in lieu of the Physics and Calculus series*	1. CIS160 Programming Fundamentals 2. CIS166 Programming Business Objects 3. CIS182 SQL Fundamentals 4. CIS266 Introduction to Business Applications 5. CIS282 SQL Programming 6. CIS185 HTML, CSS, JavaScript	1. CNA100 Introduction to Networking 2. CNA101 Cisco I 3. CNA120 Command Line Interface 4. CNA122 Microsoft Server 5. CNA130 Intro to Linux/Unix 6. CNA210 Introduction to Network Security	1. NOS100 IT Fundamentals I 2. NOS105CL IT Fundamentals II 3. NOS110 Cyber Security Fundamentals 4. NOS115 Introduction to Networking 5. NOS130 Server OS Installation and Configuration 6. NOS135 Scripting for Network Admins 7. NOS140 Linux I 8. NOS150 Virtualization and Cloud Technologies

Course work needed at junior and senior levels in the baccalaureate program

Computer science courses provided at the junior and senior level (i.e., upper division or 300- and 400-level) for the BS in CS have been aligned with program-level intended student learning outcomes developed through input gathering sessions and surveys with subject matter experts and regional employers from the SPSCC and GHC service areas. The series of surveys were administered and reviewed throughout spring 2023.

A total of 90 junior and senior-level credits are required for completion of the BS in Computer Science (CS) degree: 70 credits in computer science, plus 20 credits of additional general education coursework. Beyond the associate degree-level general education requirements, 20 credits of additional general education coursework are required in years 3 and 4 of the BS in CS. The additional 20 credits of general education courses listed are strongly recommended (as denoted in Table 1 and again in Table 3). Course substitutions require evaluation and approval by the SPSCC Enrollment Services team in concert with the SPSCC dean of applied technology and/or the SPSCC and GHC vice president(s) for instruction. Please see Table 3 for a summary of the 90 junior and senior-level credits required (post-associate degree completion) for the BS in CS.

Table 3: 70 credits of 300- and 400-level computer science course requirements for the BS degree -- along with 20 credits (i.e., four 5 credit courses) of required additional general education courses (with the recommended courses listed in purple)

Course Titles	Learning Outcomes
Year 3	
Quarter 1	
CS310 Database Systems	▪ Apply basic relational database terminology and concepts ▪ Create and modify databases, tables, and views using SQL ▪ Insert, edit and retrieve data from relational database tables ▪ Create and modify database functions, procedures and triggers using SQL ▪ Create roles and users to manage database security ▪ Host a SQL database in the cloud
CS320 Intro to Cybersecurity with Basic Networking	▪ Describe and apply network addressing concepts ▪ Conduct security audits and evaluations ▪ Implement security procedures ▪ Evaluate and respond to security events ▪ Identify and counter common hacking techniques ▪ Identify and counter common social engineering tactics
CS330 Intro to Cloud Computing	▪ Define cloud computing ▪ Identify and evaluate different types of cloud-based architectures ▪ Apply virtualization, containerization, and orchestration technologies ▪ Analyze and apply cloud storage technologies like NoSQL or blob storage ▪ Identify and describe common cloud security issues ▪ Deploy to a cloud environment
Quarter 2	
CS340 Web Programming	▪ Design, develop, and deploy a complete website for a specified client ▪ Design application using geo-redundancy, availability, and scalability requirements ▪ Distinguish and implement frontend layer, middle layer, and backend layer ▪ Implement application using GIT ▪ Deploy web application to local server and then to cloud ▪ Configure alerts to monitor applications
CS350 Discrete Mathematics for Computer Science	▪ Evaluate, interpret, and reduce statements presented in Boolean logic and natural language ▪ Construct proofs using direct proof, proof by contradiction, and proof by cases, or mathematical induction ▪ Model and analyze computational processes using analytic and combinatorial methods ▪ Use and apply basic definitions and properties of sets, functions, relations, and sequences ▪ Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction
MATH205 Linear Algebra (SPSCC), or MATH220 Linear Algebra (GHC)	▪ Define the terms in linear algebra's basic vocabulary (e.g., span, linear independence, subspace, dimension, rank, null space, column space) ▪ Invert and algebraically manipulate matrices ▪ Solve linear systems ▪ Analyze vectors and matrices using solutions to linear system ▪ Compute determinants, eigenvalues, and eigenvectors ▪ Alter a linear map's matrix representation by changing the bases of the spaces on which it acts ▪ Determine whether a given matrix is diagonalizable, and if so, diagonalize it ▪ Use properties of the dot product to answer questions about orthogonality ▪ Apply the theory of linear algebra to problems arising in STEM fields
Quarter 3	
CS360 Algorithms and Data Structures	▪ Identify common data structures ▪ Distinguish and apply correct data structures to solve problems ▪ Identify common algorithms

	▪ Define and apply correct algorithms to solve problems efficiently ▪ Evaluate space and time complexities
CS410 Computer Architecture	▪ Explain the purpose and function of components that make up a computer system ▪ Describe different types of instruction set architectures and related concepts ▪ Explain the memory hierarchy in computer systems ▪ Measure and analyze the performance of computer systems ▪ Measure, analyze, and optimize memory subsystems ▪ Design and optimize a pipelined processor
PHIL350 Ethics in Business Management (SPSCC), or 300- or 400-level gen ed at GHC	PHIL350: ▪ Explain business ethics and corporate social responsibility ▪ Analyze ethical issues as they apply to business management ▪ Apply general ethical principles to particular cases or practices within specific business industries
Year 4	
Quarter 1	
CS420 Software Engineering	▪ Collaborate using source control tools ▪ Evaluate and analyze client requirements ▪ Evaluate and design deployment infrastructure to meet availability and scalability requirements ▪ Design and implement an application using client-side, middle, and server-side layers ▪ Write unit tests and integration tests ▪ Create a continuous integration/continuous deployment (CI/CD) pipeline ▪ Monitor and track applications using alerts and ticketing software ▪ Apply project life cycles like scrum or agile
CS430 Operating Systems	▪ Identify and apply fundamental operating systems concepts ▪ Analyze and evaluate different operating system designs ▪ Implement key operating system components ▪ Diagnose and resolve issues specific to operating systems ▪ Describe modern operating system architectures including cloud-related concepts ▪ Assess and respond to security and privacy issues in operating systems ▪ Configure and optimize operating systems for real-world scenarios.
BASM307 Quantitative Design, Data, and Analysis (GHC), or 300- or 400-level gen ed at SPSCC (e.g., ENVS301 Business and Sustainability Principles and Practices)	BASM307: ▪ Understand and explain how mathematics and science are applied to explain behavior and how scientific explanations can fail to correctly explain behavior ▪ Develop and evaluate theories of behavior that can be tested by mathematical and scientific methods ▪ Explain how the research process works and identify the factors that can affect the results of the research ▪ Distinguish ethical issues involved in the research process ▪ Analyze statistical data and research results, and utilize this information to make management decisions ▪ Present research information and justify management decisions in written reports and oral presentations --or— ENVS301: ▪ Describe multiple factors that influence the environmental impact of businesses ▪ Analyze the social, economic, and policy dynamics involved in both the emergence and the resolution of environmental issues related to business ▪ Apply sustainability frameworks to analyze interactions between business design and environmental impact
Quarter 2	
CS440 System Administration	▪ Manage accounts, network rights, and access to systems and equipment ▪ Configure and monitor internet services

	▪ Apply and assess security and related policies ▪ Identify and resolve performance and capacity issues ▪ Identify and describe common forum moderation issues
CS450 Mobile Application Development	▪ Develop and test mobile applications ▪ Identify and apply software development kit (SDK) resources to programming problems ▪ Design and construct user interfaces ▪ Create, modify, and query a database ▪ Describe and contrast different methods saving or sharing data
CS490 Senior Capstone Project I	▪ Analyze a problem that can be solved by software code ▪ Describe ethical issues related to project management ▪ Create a project proposal ▪ Construct a project schedule ▪ Develop a multi-quarter software development project
Quarter 3	
CS460 Machine Learning	▪ Identify and explain fundamental concepts and principles of machine learning ▪ Apply machine learning algorithms to real-world examples ▪ Evaluate machine learning models to make informed improvements ▪ Preprocess and prepare datasets for machine learning tasks ▪ Address common challenges and issues in machine learning
CS491 Senior Capstone Project II	▪ Analyze a problem that can be solved by software code ▪ Follow and post-review a project schedule ▪ Develop a multi-quarter software project ▪ Evaluate project deliverables against requirements ▪ Present project and results
BASM309 Project Management (GHC), or 300- or 400-level gen ed at SPSCC (e.g., SOC350 Organizational Theory)	BASM309: ▪ Classify desirable characteristics of effective project managers ▪ Plan and execute project management activities ▪ Apply appropriate approaches to plan a new project ▪ Design and manage project and program processes ▪ Examine project risks ▪ Understand the principles and practices of project management and its relation to creating value for the organization and its stakeholders ▪ Understand the project life cycle: initiating, planning, executing, controlling, and closing ▪ Assess major schedule, cost, and performance elements using both quantitative and qualitative techniques ▪ Lead a successful project team ▪ Develop a suitable budget for a new project --or— SOC350: ▪ Explain organizational theories ▪ Identify the major challenges in the designs of an effective organizational structure ▪ Analyze organizational structures to identify functions and dysfunctions based on existing organizational theories

Criteria 2

Qualified faculty.

The SPSCC BS in Computer Science program will build on the scientific expertise and industry experience of the current SPSCC associate-level Software Development, Computer Science, and Cybersecurity & Network Administration faculty. To date, development of the BS in CS has been led by three SPSCC Software Development and Computer Science faculty in coordination with two GHC

Mathematics faculty members. SPSCC has allocated funding to recruit and hire a fourth full-time (FT) Computer Science/Software Development faculty member in winter or spring 2024 for a planned fall quarter 2024 start. In addition to the core faculty, the SPSCC Cybersecurity & Network Administration Department is staffed by a part-time hourly instructional classroom support technician. This department recently hired an adjunct professor with training and experience in cybersecurity and other relevant skills in information technology, computer science, and project management. During the 22-23 academic year, through the National Cybersecurity Training and Education Center and the Cybersecurity Center of Excellence, SPSCC Computer Science/Software Development and Cybersecurity & Network Administration faculty have jointly participated in several state and federal professional development-oriented continuing education and networking opportunities. See Table 4 for a summary of the core instructional team.

Table 4: Core BS in CS Instructional Team

Core Instructional Team			
Faculty	**Degree(s) held**	**Industry experience**	**Primary role**
M. Haensel	BS in Electrical Engineering MBA MS in Electrical Engineering	Software Engineer Electronics Professor Software Development/CS Professor	SPSCC Software Development & CS instructor (associate and BS)
A. Alattar	BS in CS MS in Business IT PhD in Information and Communication Engineering	Completed projects and research focused on digital image processing, database and information retrieval, communication systems, and machine learning	SPSCC Software Development & CS instructor (associate and BS)
S. More	BS in CS and Engineering Systems w/ Minor in Math MS in CS Systems PhD candidate in CS	Software development engineer: created, managed, and updated security software, certificates, and services for Microsoft	SPSCC Software Development & CS instructor (associate and BS)
R. Thompson	MS in CS	Program management: telecommunications, cybersecurity, computer networking, and IT	SPSCC Cybersecurity & Network Administration adjunct instructor (new); BS in CS adjunct instructor (future interest)
FT faculty (F24 start)	MS or higher	Cybersecurity, Systems Administration, and/or Software Development	SPSCC: To be determined
T. Bell	MS in Mathematics	Computer science theory and teaches college-level mathematics	Developing CS350 “Discrete Math for CS” for both colleges and will teach CS350 + MATH220 Linear Algebra at GHC

The remaining general education courses, both at the associate degree-level and for years 3 and 4, will be developed and/or updated, and taught, by full-time and adjunct instructors from SPSCC’s Arts & Communications, Cultural Studies, Social Services and Education, and Science, Engineering, and

Math pathways as well as faculty from GHC's BAS in Organizational Management -- all of whom hold master's degrees or higher.

Criteria 3

Admissions process

General responsibility for the admission to the college process rests with SPSCC's Student Services Division. Program outreach and recruitment is a shared responsibility between the college's outreach and recruitment department and the instructional program. The BS in Computer Science program will not have a selective admission process. Instead, students interested in this program will follow the same steps for admission to the college as follows:

1) Apply to SPSCC using the Online Admissions Application Portal.
2) When the application has been processed, each student will receive an acceptance email with their ctcLink ID which will be used to activate two student accounts: a ctcLink account and a ClipperID.

Applications to the BS in Computer Science degree program will be due no later than the last day of the quarter prior to the quarter the student wants to start the program. The program application will be available online. See Table 5 for the pre-requisite associate-level academic credentials.

Table 5: Pre-requisite associate-level academic credentials for BS in CS

1. **Associate of Science-Transfer** degree (Track 2), or Associate in Computer Science **DTA/MRP** degree (Associate of Arts), from any WA CTC that offers CS142 and CS143 (or equivalents); or
2. **Associate in CS degree in Software Development** (SPSCC); or
3. **Associate in CS degree in Cybersecurity & Network Administration** (SPSCC); or
4. **Associate in CS degree in Network Operating Security Systems** (*in-development at GHC*); or
5. **Equivalent relevant degrees from accredited institutions inside the United States or overseas**.

Information Sessions

To ensure that students are fully apprised of the program's format and expectations, information sessions will be presented three times per year at SPSCC and GHC -- prior to the admission application due date (i.e., no later than the last day of the quarter prior to the quarter the student wants to start the program). The sessions will be facilitated by the BS in CS faculty in conjunction with a representative from SPSCC's Advising, Career, and Transfer center and a GHC representative as appropriate. Information Sessions will provide prospective students with a general overview of the BS in Computer Science degree, including course requirements. The program's hybrid design with weekly virtual/online lectures, and periodic face-to-face Saturday sessions for project-based work, will be of particular focus. Information sessions will also be promoted through an annual public relations campaign in the community and online in coordination with SPSCC and GHC outreach teams who participate in and facilitate relevant job and education-oriented fairs and events throughout the region.

International Students

International Students will be eligible to apply for admission to SPSCC and enter the BS in CS program. Credits earned at other institutions for equivalent or relevant courses with different course numbering conventions will be accepted pending evaluation and approval by the SPSCC credential evaluation team in concert with the SPSCC dean of applied technology and/or the SPSCC and GHC vice president(s) for instruction. Those who have already completed a Bachelor of Science degree program in physical or life sciences, engineering, or computer science at an accredited institution outside of the United States will be eligible to enter the BS in CS program once completion of the following courses (or equivalents) has been verified: CS142, CS143, ENGL101, and ENGL235. Enrollment Services will complete an official evaluation for possible transfer-credit towards the 20 credits of junior- and senior-year general education coursework required for the BS in CS. Courses from accredited institutions eligible for transfer will satisfy the upper-division general education requirements of this program.

Criteria 4

Appropriate student services plan

The core BS in CS instructional team (see Table 4) will work with SPSCC's Student Services Division to support BS in CS students. Upper-division enrollees will have access to SPSCC's college-wide suite of student resources, along with the sense of community that comes with the program's hands-on environment, cohort design, and close interaction with faculty, staff, and industry professionals. The program budget provides a $10,000 annual offset for additional hourly personnel in Student Services (see Table 10).

New Student Advising & Registration at SPSCC

Before new students can register for courses, they are required to complete the online Pathway Selection Survey (PaSS) and New Student Orientation. In their orientation, students will learn about campus resources, their Support Network, and how to get registered for courses.

Though BS in CS enrollees have already selected a career pathway, Educational & Career Planners are on staff to provide support on topics like academic planning, transitioning to upper-division coursework, and how to enhance college success skills. They will also help connect students to needed financial and counseling services as needed. SPSCC BS in CS faculty and staff will provide guidance and mentoring on choosing the correct courses to fulfill pre-requisites, meet general education requirements, secure internships and job opportunities, and stay on track for timely graduation.

Access Services

SPSCC has an institutional commitment to provide equal educational opportunities for qualified students with disabilities in accordance with state and federal laws and regulations, including the Americans with Disabilities Act of 1990 (ADA), Section 504 of the Rehabilitation Act of 1973, and the Revised Code of Washington: Students with Disabilities – Core Services (RCW 28B.10.912), and Students with Disabilities – Accommodations (RCW 28B.10.914). Depending on the nature of the student's disability and how it impacts the educational experience, services and accommodations are provided on an individually determined basis and re-evaluated each quarter. Services may include textbooks in alternative format; note takers; readers and/or scribes for exams; braille text or

e-text; use of tape recorders; large print text and handouts; extended time on exams; sign language interpreter; use of adaptive equipment/assistive technology; preferential seating (e.g. front of classroom, ergonomic chair); and real-time captioning.

Financial Aid

Although the specific financial aid needs of students in the BS in CS program may differ in some respects from the needs of students in traditional two-year associate degree programs, their needs will be handled within the Student Financial Services office which has developed easy-to-use, web-based applications for students. SPSCC's Emergency Funding application has moved online for easier, and more discrete, access by students. These changes will enhance the ability of the largely online/virtual BS in CS student population to easily access Financial Aid resources. Student Financial Services staff will be provided with specialized training as required to help serve BS in CS students. SPSCC's Student Services Division anticipates that current Student Financial Services staff members will have the capacity to serve this population. However, staff will monitor this capacity carefully as student numbers increase over the first two years of the program's operation.

Personal Support Center

SPSCC's Personal Support Center (PSC) is a one-stop support space that connects students with both college and community resources they may need. Such resources include childcare and parent support, food, housing and basic daily self-care needs, technology, and transportation. The PSC's services will be available to BS in CS students.

Counseling Services

Counseling Services are provided and available to all officially enrolled students at SPSCC with the goal of helping students sustain their mental health, emotional well-being, and resiliency. Availing of Counseling Services is free and confidential to current students, including scheduled appointments, walk-in sessions, crisis intervention services, classes, and workshops. The department is staffed by professionally licensed mental health counseling providers.

Tutoring

Learning Support Services (LSS) supports, encourages, and empowers SPSCC students to become independent, self-advocating, and resourceful learners through one-on-one and small group tutoring. LSS offers help with everything from general concepts to specific homework assignments. BS in CS faculty will coordinate with LSS tutors, so students are given helpful and relevant support. Given the BS in CS degree's hybrid/virtual and Saturday model, it is anticipated that most students will take advantage of tutoring, when needed, either online or with cohort peers on-site. SPSCC participates in the state's eTutoring network to provide students access to online tutoring 24/7.

Diversity, Equity, and Inclusion

In shaping the BS in CS proposal, employers and subject matter experts stressed the value of having gender, racial, and socio-economic diverse perspectives and voices in the workplace to strengthen the quality and appropriateness of projects and work products. At SPSCC, the A. Barbara Clarkson Diversity, Equity & Inclusion Center (DEIC) is well positioned to play a key role in helping first generation and historically underrepresented students develop a sense of belonging at SPSCC. The DEIC is committed to supporting the college mission to advance equity and embrace diversity. All students are welcome and are provided with opportunities to pursue their interests and affinities.

Students receive support to bridge perceived differences and struggles along their path to achieving individual personal growth, educational goals, and career aspirations.

In support of BS in CS students, the Clarkson Center will serve as a strong ally and advocate for student success regardless of orientation, ethnicity, or background. To help BS in CS students navigate challenging circumstances and promote diversity and inclusion in all endeavors, the Clarkson Center will provide direct support. In parallel, the center will provide guidance to help students identify strategies and access resources to build a sense of belonging. The center helps willing students persevere through to degree completion despite the barriers they inevitably will encounter.

Library Resources

The primary mission of the South Puget Sound Community College Library is to support teaching and learning. In all its programs, services and collections, the library provides robust, relevant information resources, instruction and support for students, faculty, staff, administrators, and others to ensure quality teaching and learning. SPSCC's librarians are active faculty members who regularly teach students information literacy skills online and in the classroom. If approved, the BS in CS will become the second baccalaureate degree at SPSCC.

The college expects that the new BS in CS program will require additional library resources. Therefore, SPSCC has proposed a budget with at least $5,000 added to the library budget, to support all instructional programs, during the 24-25 academic year i.e., the first year of the BS in CS program (see Table 10). This level of support will be sustained by continued institutional support in subsequent years to maintain library resources for all instructional programs. The dean supervising the library will make an additional request to SPSCC, or request one-time major project funding, for a CS-specific budget increase, if we identify any databases or additional physical items that are needed. SPSCC's librarians are ready to meet the NWCCU standards on libraries as the following assessment outlines (see Table 6):

Table 6: NWCCU standards on libraries with work to be undertaken at SPSCC

NWCCU Standards	SPSCC Library Strategies
NWCCU Standard 2.C.6: Faculty with teaching responsibilities, in partnership with library and information resources personnel, ensure that the use of library and information resources is integrated into the learning process.	BS in CS faculty will work with librarians to identify, integrate, and scaffold appropriate library information resources in project-based learning assignments and other outcomes-based learning activities.
NWCCU Standard 2.E.1: Consistent with its mission and core themes, the institution holds or provides access to library and information resources with an appropriate level of currency, depth, and breadth to support the institution's mission, core themes, programs, and services, wherever offered and however delivered.	The library houses ~27,000 print volumes and ~1,600 films on DVD, and offers over 90 online databases that feature eBooks, articles, and streaming media. BS in CS instructors will work with librarians to identify and secure appropriate information resources to support 300- and 400-level CS courses.
NWCCU Standard 2.E.2: Planning for library and information resources is guided by data that includes feedback from affected users and appropriate library and information resources faculty, staff, and administrators.	Librarians regularly engage in data-driven review of library materials to provide current, secure, relevant, and accessible information resources that support appropriate

	levels of rigor across programs. The library will integrate the BS in CS in these processes.
NWCCU Standard 2.E.3: Consistent with its mission and core themes, the institution provides appropriate instruction and support for students, faculty, staff, administrators, and others (as appropriate) to enhance their efficiency and effectiveness in obtaining, evaluating, and using library and information resources that support its programs and services, wherever offered and however delivered.	Librarians support the current software development, computer science, and cybersecurity programs via scheduled-direct instruction and real-time support of effective, efficient, and responsible use of library and information resources. Librarians will work closely with BS in CS instructors to select key databases to support appropriate upper division coursework as well as develop specialized Library Research Guides that provide relevant industry specific information.
NWCCU Standard 2.E.4: The institution regularly and systematically evaluates the quality, adequacy, utilization, and security of library and information resources and services, including those provided through cooperative arrangements, wherever offered and however delivered.	As good stewards of state funds, the library faculty regularly review costs and use statistics for all subscription services. The library faculty will work with BS in CS faculty to determine when to retire or add a new subscription. In addition, our systems librarian and library technical services staff work in tandem with IT to deliver secure subscription services. Non-subscription print materials are reviewed in a similar data-driven way to determine their value to the collection based on accuracy, age, and use.

The library has carefully considered the BS in CS program's hybrid/virtual and periodic face-to-face Saturdays design in its planning. Students can chat with a librarian after hours via a web portal. As Table 7 illustrates, many (if not most) library services are available 24/7.

Table 7: Key databases and research & help guides available online

Key Databases available online
• ProQuest Research Library or EBSCOhost Academic Search Complete for newspaper, magazine, and scholarly journal articles. • CQ Researcher or Gale Opposing Viewpoints in Context for controversial issues or current events. • Gale Virtual Reference Library or CREDO Reference for encyclopedia entries. • WOIS for career research and planning. • Films on Demand or Kanopy for educational videos • EBSCO eBooks for eBooks you can read on your computer or mobile device. • Global Road Warrior or ProQuest CultureGrams for country and culture information. • EBSCOhost Business Source Complete or ProQuest ABI Inform: Trade & Industry for business and industry topics and news.
Research and Help Guides available online
• Library research guides by subject, class, or area of research need • Alphabetical list of more than 90 databases on a variety of subjects • Get research help from librarians in person or online • Cite sources in MLA or APA • Finding and evaluating scholarly journals • How to sign up for a free New York Times online subscription from the library

WSECU Center for Career Services

The WSECU Center for Career Services at SPSCC is nested within the Advising, Career, and Transfer Center. The Career Services helps students: learn more about their interests, skills, values, and goals; discover the best suited career options; review resumes and cover letters; learn about job interviewing techniques; and research career fields and job outlooks. Career Services is also the point of contact for local employers looking to post jobs and hire SPSCC students and alumni. Career Services seeks to provide career, internship, and employment services to all businesses and residents in the SPSCC service district and larger region. Each May, the center facilitates a Career Day which brings together a variety of local employers to share career and internship opportunities, recruit employees, and share information about their businesses.

Criteria 5

Commitment to build, and sustain, a high-quality program.

As noted above, the BS in Computer Science program builds on the foundation of South Puget Sound Community College's well-established Software Development, Computer Science, and Cybersecurity & Network Administration associate degree programs along with community support from public and private employers. In researching and developing the curriculum for the program over the last two years, we have catalyzed more helpful engagement from regional employers. Table 8 lists the agencies we have galvanized to serve on the SPSCC advisory committees that will support the BS in CS's continual improvement process into the future.

Table 8: Employers represented on SPSCC BS in CS relevant advisory committees

1. Artesia Systems
2. Intelligent Technical Solutions
3. City of Olympia's Information Technology Department
4. Criminal Justice Training Commission
5. Information Technology Department at SPSCC
6. Outlook Insight
7. Ovation Technology
8. Pioneer Technologies Corporation
9. Right Systems!
10. Venmo/PayPal
11. The Evergreen State College
12. Saint Martin's University
13. WA Department of Ecology
14. WA Department of Health
15. WA Department of Labor & Industries
16. WA Department of Social and Health Services
17. WA Employment Security Department
18. WA Recreation & Conservation Office
19. WA Secretary of State's Office
20. WA State County Road Administration Board
21. WA Technology Solutions

At capacity, the BS in CS program will admit a new cohort of 25 upper-division students each year. SPSCC's experience suggests that a year-to-year retention rate of 75 percent is reasonable, yielding an enrollment projection of 35-44 combined BS in CS students (across all 300- and 400-level courses) when at total capacity. Projections for Years 1 through 3 are conservative, with cohort sizes expected to grow gradually from an initial 12 students to the target 20-25 students per year by Year Five of the program (see Table 9).

Weekly modules will be developed for all 14 300- and 400-level BS in CS courses once SBCTC approval is received. Using the 14 BS in CS upper division course outlines as a foundation (to be finalized this summer 2023 with Amazon funding), the SPSCC Software Development and Computer Science faculty will lead the coordinated development of lectures, projects, assignments, and assessments (incorporating on-going industry input) during the 23-24 academic year. The BS in CS core faculty will be paid stipends from a budget of $40,000 that SPSCC has allocated for this work. In addition, SPSCC has dedicated $30,000 for marketing and outreach activities once program approval from the SBCTC and NWCCU has been achieved.

Based on 2022-23 planning figures and assuming a 4% inflation rate, annual expenditures are expected to stabilize at just over $200,000 by Year 3, with $6-7,000 increases each year thereafter (Table 10). Note that by the 2026-2027 academic year, the projected revenue in Table 9 (with 3% annual inflation rate calculated) is projected to exceed the specific annual expenses predicted in Table 10. Surplus revenue will be reinvested in the program to purchase new equipment, hire full-time and adjunct faculty as needed, and potentially cover the addition of an instructional classroom support technician.

Table 9: Enrollment and Associated Revenue Projections for SPSCC BS in CS program over first five years

Anticipated cohort enrollments for BS in CS

Academic Years	24-25	25-26	26-27	27-28	28-29
Cohort5					25
Cohort4				20	15
Cohort3			20	15	
Cohort2		15	11		
Cohort1	12	9			
Total Student retention	**12**	**24**	**31**	**35**	**40**

Anticipated tuition and fees revenue

Tuition	$ 7,000	$ 7,210	$ 7,426	$ 7,649	$ 7,879
College fees	$ 80	$ 82	$ 85	$ 87	$ 90
BS in CS fees	$ 300	$ 309	$ 318	$ 328	$ 338
Per student annual subtotal	*$ 7,380*	*$ 7,601*	*$ 7,829*	*$ 8,064*	*$ 8,306*
Total Revenue	**$ 88,560**	**$ 182,434**	**$ 242,713**	**$ 282,251**	**$ 332,250**

**SPSCC local fees include technology ($50), building ($10), and matriculation ($20).*

As mentioned in Criteria 2/Table 4, specifically to support the new BS degree, SPSCC has budgeted for a fourth full-time, tenure track faculty member to hire in 2024 for the Software

Development/Computer Science Department. In addition to expanding the department's capacity overall, a portion of the new instructor's teaching load will directly involve BS in CS courses. SPSCC has also allocated funding to market the new BS in CS program. Funding for Student Services is projected to help cover the expenses of managing a new pool of incoming students.

Table 10: BS in CS expense projections

FY	24-25	25-26	26-27	27-28	28-29
FT faculty	$75,000	$78,000	$81,120	$84,365	$87,739
PT faculty	$0	$40,000	$41,600	$43,264	$44,995
Benefits (33%)	$24,750	$38,940	$40,498	$42,118	$43,802
Student Services	$10,000	$10,400	$10,816	$11,249	$11,699
Library	$5,000	$5,000	$5,000	$5,000	$5,000
Marketing	$10,000	$8,000	$6,000	$5,000	$4,000
Indirect (10%)	$9,975	$15,694	$16,322	$16,975	$17,654
Totals	***$134,725***	***$196,034***	***$201,355***	***$207,970***	***$214,888***

Within the first five years of the program's inception, based on enrollment increases, hiring part-time faculty to teach specific courses may be indicated. Indirect will need to be charged to support Business Office operations. The budget encapsulated by Table 10 provides details of SPSCC's BS in CS expense projections. The figures projected in Table 10 only reflect the added costs associated with delivery of the BS in CS curriculum. The dean of applied technology and the existing three faculty members in Software Development/Computer Science are already integrated into SPSCC's base budget and, therefore, not included in Table 10.

The BS in CS program will occupy South Puget Sound Community College's soon to be renovated IT/CS Hub in Building 34. The remodeling project's construction is slated to begin in May 2024 and be completed by winter quarter 2025. SPSCC is working with the offices of Senators Cantwell and Murray to elevate the project into federal omnibus funding with a request of $1.5 million. SPSCC has already secured $1.5 million in Minor Project funding via the SBCTC Capital Projects Team from the WA Legislature. In addition, SPSCC has reserved $493,000 in additional funding for HVAC system upgrades, $60,000 for new instructional tables/desks/chairs, and $20,000 for classroom instructional technology. In total, the remodeling project will improve the building's roofing and climate control systems and ensure the BS in CS is operating on its own discrete and secure computer network. Dedicated rooms for student capstone project teamwork, competition preparation, and studying may be constructed, budget allowing.

Once the Cybersecurity and Network Administration program achieves designation as a National Security Agency recognized Center of Academic Excellence for Cyber Defense, SPSCC will apply for a similar designation in 2026-2027 or 2027-2028 for the BS in CS program. Doing so will ensure that the core faculty continue to have access to funding support for student club competitions, professional development training and certification events, and networking opportunities. Students will also be able to access funding for extra-curricular activities from SPSCC's Office of Student Life.

BS in CS student fees will be collected for the program from each student each quarter (indicated in Table 9). These funds can be rolled over year to year and will work to help faculty accrue the funding

needed to purchase new hardware and software instructional tools periodically for students to use to enrich their learning environment and experiences. The BS in CS program will also be able to avail of funding through the college's annual Small Equipment and Large Equipment allotments.

Criteria 6

Program specific accreditation.

South Puget Sound Community College will not seek specialized program accreditation for the BS in Computer Science. The college has informed its Northwest Commission on Colleges and Universities (NWCCU) liaison of the BS in CS degree program's development and is prepared to submit the required Substantive Change request to NWCCU once SBCTC approval is obtained.

Criteria 7

Pathway options beyond baccalaureate degree.

Graduates will have access to Master of Computer Science programs at Saint Martin's University and City University of Seattle initially. By spring 2025, we will seek to formalize articulations with these institutions and with similar MS in CS/IT programs at Western Washington University, the University of Washington, Western Governors University, Central Washington University, Eastern Washington University, and Washington State University.

Criteria 8

External expert evaluation of program.

The reviewers, based at The Evergreen State College and Saint Martin's University, found the proposed BS in CS program at SPSCC to be complementary to their own programs. Working together across the Thurston County based institutions, the number of students projected to graduate annually, even with the addition of the SPSCC and GHC coordinated BS in CS degree program, still will not approach the number of projected relevant annual job openings in the region.

One reviewer recommended considering the addition of coursework in Probability and Parallel Computing in the future. He highlighted apprehension about not requiring the Calculus series as it is a current ABET (the engineering and computer science accreditation body) requirement. However, he did note that the current Association for Computing Machinery recommendation is to focus on linear algebra, probability, and statistics rather than requiring Calculus. The same reviewer also noted that Calculus is not required for graduate studies in computer science at their institution.

The second reviewer highlighted that the proposed BS in CS program's foci on system/network administration is aligned with high regional demand for skilled workers in this area. They noted the learning outcomes for all courses convey baccalaureate-level rigor. The reviewer recommended building in an option for completion of a foreign language course. They noted that some CS graduate programs require completion of an advanced algorithm course. They also reinforced the decision to include an Ethics course within the upper division general education requirements.

Appendix

External Reviewer #1's Rubric

College Name:	South Puget Sound Community College	**BS Degree Title:**	Computer Science
Reviewer Name/ Team Name:	Razvan A. Mezei	**Institutional or Professional Affiliation:**	Saint Martin's University
Professional License or Qualification, if any:		**Relationship to Program, if any:**	External Reviewer
Please evaluate the following Specific Elements			
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, I believe it is.		
Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?		
	Comment Yes, I believe they do.		
Curriculum Alignment	Does the curriculum align with the program's Statement of Needs Document?		
	Comment I am not sure I received that document. The curriculum does seem to align with the needs described in the Introduction section. *NOTE: Statement of Need sent to Reviewers on 7/31/2023.*		
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 At first, I was worried about the lack of **Calculus** in the proposal. For example, ABET requires Calculus (https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-computing-programs-2023-2024/#GC3) in their accreditation criteria. Then, looking at the latest ACM recommendation (the 2023 is in beta stage right now: https://csed.acm.org/wp-content/uploads/2023/03/MSF-Version-Beta.pdf, soon to be officially published) it says: "there is recurring debate on whether calculus should be required of computer science students, accompanied by legitimate concern about the impact of calculus failure rates on computer		

	science students." They also suggest"[…]What is clear, looking forward to the next decade, is that exciting high-growth areas of computer science require a strong background in linear algebra, probability and statistics (preferably calculus-based)." As such, the lack of Calculus in the curriculum doesn't seem as alarming anymore. I do wonder if adding **Probability** is something that you want to consider. Maybe in the future. Another topic that you may want to consider adding (if possible) is **Parallel computing**. Both Abet and ACM recommend Parallel and Distributed Computing.
General Education Requirements	Are the general educations requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?
	Comment I do not have enough relevant experience in this area.
Preparation for Graduate Program Acceptance	Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?
	Comment I believe they do, but for students willing to pursue graduate degrees, you may want to consider adding Calculus. Not all graduate schools require Calculus (I believe Saint Martin's University does not require it) so this may not be very critical.
Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment They seem well qualified for the proposed program.
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 I do not know – I do not have enough relevant experience in this area.
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 The form states that the proposed curriculum is "*and is fully supported by South Puget Sound Community College's Instructional Council, the advisory committees for the current associate in applied science degrees in Software Development and Cybersecurity & Network Administration, as well as the college's Board of Trustees*"
Overall assessment and recommendations	Please summarize your overall assessment of the program.
	Comment The proposal seems great and my only comment (as noted above) is to consider (if feasible) adding Probability and Parallel Computing courses.

Reviewer Bio or Resume
Razvan Alex. Mezei has 10+ years of teaching (mostly) Computer Science courses at universities such as: Saint Martin's University, The Evergreen State College, Lenoir-Rhyne University, Loyola University Maryland, and Lander University. Razvan also has a few (3+) years of industry software development experience. Razvan has attained the following graduate and undergraduate degrees: PhD Mathematics, MS Computer Science, MS Statistics, MS Mathematics, MS Online Teaching and Instructional Design, BS in Mathematics and Computer Science.

External Reviewer #2's Rubric

College Name:	South Puget Sound Community College	**BS Degree Title:**	Computer Science
Reviewer Name/ Team Name:	Richard Weiss	**Institutional or Professional Affiliation:**	The Evergreen State College
Professional License or Qualification, if any:	Ph.D. Mathematics	**Relationship to Program, if any:**	Future: advisory board
Please evaluate the following Specific Elements			
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, Table A estimates 1,900 jobs related to CS in the local area. Job placement will depend on individual student qualifications. If students meet the learning objectives, they should be qualified, although experience is important. Having a strong internship program will help.** **According to Table A, network administration will be in demand, and this program is aligned with that.**		
Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?		
	Comment **Yes, junior and senior level classes cover the most important topics.**		
Curriculum Alignment	Does the curriculum align with the program's Statement of Needs Document?		
	Comment **Yes. The program includes Network and System Administration, which is one of goals of the program and is a high-demand area.**		

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 **Yes, the courses align with demands. The upper level courses are aligned well with Networking and Systems Administration, as well as software engineering. The learning objectives are consistent with academic rigor.**
General Education Requirements	Are the general educations requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?
	Comment **Yes, it includes writing, culture and social science, and science. One thing that I would like to see is an option for a foreign language.** **Employers may not require it, but Ethics should probably be required, while now it is optional. The Gen Ed requirements target breadth. The upper level courses target depth.**
Preparation for Graduate Program Acceptance	Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?
	Comment **In general, yes. However, some graduate programs require an advanced course in algorithms.**
Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment **In general, yes. One exception seems to be Machine Learning. I don't see a faculty member with qualifications in that field. I think that it will be a significant amount of work for the faculty, except in the area of networking and system administration. I don't think that network security or DS&A are currently offered. The faculty all have masters degrees, and one has a Ph.D. For teaching upper level courses and capstone projects, a Ph.D. is often an advantage.**
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 Yes.

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 Yes, from the Advisory Committee for the current associates degrees
Overall assessment and recommendations	Please summarize your overall assessment of the program.
	Comment In general, the new program seems well-planned and has a good chance of success. The strengths include: connections to local businesses, well-defined learning outcomes, and quarterly review of CWAs.

Reviewer Bio or Resume

Evaluator, please insert a short bio here

Education
Ph.D., Mathematics Harvard University, 1976
M.A., Mathematics Harvard University, 1972
A.B., Mathematics Brandeis University, 1969

Industry Experience
Amherst Associates, programmer and systems analyst (1 year)
Intermetrics Inc., Cambridge, MA, senior analyst and software engineer (5 years)
Digital Equipment Corporation/Compaq Computer Corp, Marlboro, MA, Principal Software Engineer (4 years)

Research
University of Massachusetts (Amherst), Department of Computer Science, Computer Vision Lab (15 years)