Whatcom
COMMUNITY COLLEGE

STATE BOARD FOR COMMUNITY AND TECHNICAL COLLEGES
FEBRUARY 2024
STATEMENT OF NEED
BACHELOR OF SCIENCE
COMPUTER SCIENCE

WHATCOM COMMUNITY COLLEGE

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Cover Page — Statement of Need

Program Information

Institution Name: Whatcom Community College

Degree Name: Bachelor of Science in Computer Science

CIP Code: 11.0701

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

Degree: Associate in Arts and Sciences-DTA (AAS/DTA) with a focus on Computer Science

CIP Code: 24.0101

Year Began: 1971

Degree: Associate in Science-Transfer (AS-T/MRP)-Computer and Electrical Engineering, Associate in Science-Transfer

CIP Code: 14.1001

Year Began: 2012

Proposed Start Implementation Date (i.e., Fall 2014): Fall 2025

Projected Enrollment (FTE) in Year One: 12

Projected Enrollment (FTE) by Year: Year Two: 36; Year Three: 60; Year Four: 84; Year Five: 108

Funding Source: State FTE

Mode of Delivery

Single Campus Delivery: Whatcom Community College

Off-site: None

Distance Learning: Primarily hybrid and face-to-face, with some online instruction

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

Click or tap to enter a date.

Criteria 1

Relationship to institutional role, mission, and program priorities.

Whatcom Community College's strategic plan (2023-2028) is composed of a mission statement, vision statement, promise statement, and goals and strategies.

The mission statement identifies the college's most fundamental purposes: "Whatcom Community College contributes to the vitality of its communities by providing quality education in academic transfer, professional-technical, and life-long learning, preparing students for active citizenship in a global society."

Whatcom Community College's promise statement commits the college to transforming lives through education by means of "promoting excellence" and "creating opportunities."

Whatcom Community College's strategic plan goals are:

- Renew and expand impactful community connections within and beyond the college
- Encourage innovation focused on delivering high value education
- Sustain a diverse and inclusive campus community to support success and belonging
- Deliver education experiences that foster improved student success

The college serves students seeking a wide variety of education options. Students come to Whatcom Community College to affordably start (and in some cases finish) their baccalaureate degrees, earn certificates, train for a new job, and experience hands-on training in professional and technical programs, learn English, develop basic skills, finish high school, train for a promotion, or to learn for fun.

The proposed degree will attract students seeking an affordable and accessible bachelor's degree, providing skills for immediate employment in technology occupations as well as pre-requisite requirements to enter graduate programs in computer science. The program will expand access to computer science degrees for students in Northwest Washington to help fill the technology gap identified in SB 5401. Success of the program will be measured by graduates who are poised to meet the existing and rapidly growing demand for computer science across the state and in the region.

A new Bachelor of Science in Computer Science degree at Whatcom Community College will directly support the College's mission and guiding objectives in several ways:

1. meeting the employment needs of the technology sector
2. providing training for living wage employment
3. expanding opportunities for various student populations, including those with limited financial resources or working and place-bound students, to earn a baccalaureate degree

The proposed degree contributes to the vitality of Whatcom County by capitalizing on the college's successful partnerships with local and regional organizations and businesses. These partnerships

include organizations such as the TAGNW, ESO (formerly Emergency Reporting), Körber Supply Chain, SPIE, and Logos (formerly Faithlife).

The program has support from Whatcom Community College leadership, including the Board of Trustees and the Whatcom Community College Software Development Advisory Committee.

Whatcom Community College resides in the traditional and ancestral lands of the Lummi, Nooksack, Samish, and Semiahmoo Indian tribe. These native American Indian tribes were coastal, Salish-speaking tribes primarily living around the Nooksack and Lummi Rivers. The College is also committed to collaborating with the neighboring Northwest Indian College.

Criteria 2

Support of the statewide strategic plans.

The State Board for Community and Technical Colleges' (SBCTC) mission study notes three areas of focus in finding more and better ways to reduce barriers and expand opportunities so more Washingtonians can reach higher levels of education. The proposed Bachelor of Science in Computer Science program will help further these goals.

Economic Demand: Strengthening state and local economies by meeting the demands for a well-educated and skilled workforce.

The proposed Bachelor of Science in Computer Science program will help to reduce the supply/demand gap for software developers and related positions by producing more industry-ready college graduates to expand access to the high-demand field of computer science through a cost-effective community college program, in accordance with SB 5401. More detailed information regarding local industry needs can be found in Criteria 3.

Student Success: Achieving increased educational attainment for all residents across the state.

The proposed Bachelor of Science in Computer Science program will provide more opportunities for students to earn a Bachelor of Science degree, which will need higher levels of individualized support. Set in the community college system, students will benefit from low class size, high engagement teaching strategies, and specialized wrap-around services. This approach is intended to support the state's most vulnerable populations with a holistic, participatory, and intersectional program design which centers the experiences of low-income students and students of color, in accordance with SB 5401.

Innovation: Using technology, collaboration, and innovation to meet the demands of the economy and improve student success.

The proposed Bachelor of Science in Computer Science program will utilize technology and collaboration to allow the college to better serve students in the area. The College has already initiated conversations with other colleges in the Puget Sound area to seek opportunities to learn, model, and collaborate. Additionally, the College will work closely with other stakeholders (e.g., students, SBCTC staff, industry partners, and community organizations) to ensure the program will be designed to meet the demands of the local tech economy while providing increased opportunities for financial mobility for local populations and in particular those who have been historically

underserved.

Overall, the proposed program will address these items of the SBCTC's 20-year mission study action plan (SBCTC, 2021)

- Serve more people, including groups who have been underserved in the past.
- Close the statewide skills gap for technically trained workers.
- Contribute more to the production of baccalaureate degrees.

The Washington Student Achievement Council's *2024 Strategic Action Plan* and the Washington State Board for Community and Technical Colleges *2020-30 Strategic Plan* is built on five priorities: equity, affordability, enrollment, student supports, and completion.

The proposed degree addresses the priorities above by:

Increasing capacity to serve more students in existing institutions in a high employer-demand area of study. The proposed degree will include curriculum in areas of growing local demand including artificial intelligence, data exploration, and application development. A cohort model with hybrid, face-to-face, and online courses will support working adult and place-bound students in Whatcom and Skagit counties with knowledge, skills, and pathways to higher wage employment.

Increasing access for low-income students to earn a four-year degree in an efficient and economical way, in a familiar location with a resource-rich environment. Community colleges serve the bulk of underrepresented students entering post-secondary education. The proposed degree promotes the statewide goal to increase the number of Washington adults earning a four-year bachelor of science degree in computer science to fill the more than 24,000 job openings in the technology sector, most of which require this level of credential (SB 5401). Approximately 12% of Whatcom County's population is below the poverty line (U.S. Census Bureau, 2022) and the area's distance from major metropolitan areas implies a large number of place-bound students. Of Whatcom Community College's degree- and certificate-seeking students, 17% of students are low-income (2022-23 Whatcom Community College Enrollment dashboard, filtered for Pell awarded).

Helping to define, develop and expand community and industry partnerships to develop local talent and address workforce needs. The program will work to create a pathway for qualified computer science professionals to meet the needs of employers in the northwest workforce council region (Island, San Juan, Skagit, and Whatcom counties) by supplying them with a capable, educated workforce. Through the flexibility of being hybrid and face-to-face with potential to earn credit through work-place internships, this program will support working adults. The accessibility of the program will promote retention of students who might otherwise transfer to a traditional university to earn a bachelor's degree while staying employed in a local institution, without relocation.

Criteria 3

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

According to the Washington Skilled and Educated Workforce Report 2021-2022 "the greatest

workforce demand at the baccalaureate level is in computer science and information technology, with jobs primarily going to software developers, programmers, systems analysts, information security analysts, and web developers." While the report acknowledges that there has been a large increase in computer science and information technology educational capacity, the employment demand is still significant especially as the employer workforce demands are also increasing and demand is not met.

Demand

Table 1: Demand for selected technology occupations in Northwest Washington State (Island, Skagit, San Juan, and Whatcom counties) for the period 2020-2030.

Occupation (In demand or Balanced)	SOC code	Projected annual total openings (2020-2030)	Median annual salary (2023)
Entry-level education expectation: **Bachelor's degree**			
Computer and information systems managers	11-3021	32	$139,187
Information security analysts	15-1212	11	$124,458
Software developers	15-1252	125	$112,149
Web developers	15-1254	10	$87,874
Computer occupations, all other	15-1299	30	$90,963
Data scientists	15-2051	11	$110,153
Entry-level education expectation: **Bachelor's degree not required but may be preferred**			
Computer network support specialists	15-1231	Not available	$73,522
Entry-level education expectation**: Doctoral degree**			
Computer and information research scientists	25-1021	3	$163,800
Total/Average		**222**	**$112,763**
Data Sources: Washington State Employment Security Department, 2023; JobsEQ®			

To assess the needs for filling the demand for computing degrees, we surveyed employers that either work with Whatcom Community College or employ our respective students. The survey was sent to the seven (7) members of the College's software development program advisory committee on January 19, 2023, of which two responded. Another industry representative was also interviewed. We also solicited input from our software development program advisory committee fall 2023 meeting (five members present, including the two who subsequently responded to the survey).

Regarding a new bachelor of science degree, we collected the following data and comments:

All saw a strong need for more computer science graduates in Whatcom County.

> *"We continue to see a growing need for software engineers and software developers, especially in artificial intelligence."* – Ben Brigham (Founder & CEO, CAI3p0)

All believe the proposed Bachelor of Science in Computer Science program would improve the pool

of computer science applicants.

> *"There are very few quality candidates which match our needs for specific software development tools and approach when we have postings."* – Scott Ritchey (CTO, SPIE)
>
> *"It's extremely difficult to find the right blend of candidates (training and teachable)."* – Bryan Kenote (Senior Software Engineer, Logos Bible Software)

These comments reinforce what the data is already telling us regarding the supply/demand gap. The Bachelor of Science in Computer Science program will produce highly trained developers ready to assume roles such as software developer responsibilities in their employment context to specifically meet regional needs.

Supply

Table 2: Annual supply of graduates from four-year computer science degree programs in Northwest Washington State (Island, San Juan, Skagit, and Whatcom counties).

Institution	Program	Annual bachelor degree graduates
Skagit Valley College	Computer science	*
Western Washington University	Computer science	128
Total		*128*

*New program with no current graduate data.

Gap

Regional demand: 222

Regional supply: 128

Gap: 94

Additionally, the Washington State Employment Security Department labor market supply/demand gap analysis for year 2023 (through to November) shows there are 556 more job openings than there are job seekers in the region. Statewide, the gap is 76,682 more job openings than job seekers.

Table 3: Washington State Employment Security Department labor market supply/demand gap analysis for year 2023 (through to November).*

		Gap*	
SOC	Occupation title	Washington State	Northwest Workforce Development Area**
151212	Information security analysts	4,422	15
151221	Computer and information research scientists	827	9
151251	Computer programmers	2,145	42
151252	Software developers	37,762	265
151254	Web developers	3,668	15
151299	Computer occupations, all others	20,306	185
152051	Data scientists	7,552	25

		Gap*	
SOC	Occupation title	Washington State	Northwest Workforce Development Area**
Total		76,682	556

*The supply/demand gap is defined as the difference between the number of total job postings compared to job seekers. A positive number indicates there were more job postings than job seekers.

**The Northwest Workforce Development Area includes Island, San Juan, Skagit, and Whatcom counties.

Criteria 4

Baccalaureate program builds from existing professional and technical degree program offered by the institution.

Whatcom Community College has existing computer science associate degree programs aligned with current AAS-DTA, first offered in 1971. Table 4 shows our AAS-DTA degrees with a focus in computer science awarded over the past five years.

Table 4: Five-year completion of computer science degree at Whatcom Community College.

Degree	2018-19	2019-20	2020-21	2021-22	2022-23
AAS-DTA (computer science focus)	16	16	10	9	8
Annual headcount	65	60	54	51	67

The proposed Bachelor of Science in Computer Science degree will be structured as a 2 + 2 program with the flexibility for students to transfer into the program by building on the existing foundation of the associate degree program listed in Table 4.

Furthermore, the program proposal will encompass community-oriented and industry-prepared experiences, such in-program internships and community projects. This empowers students to apply their practical technical skills for the improvement of society. This initiative aligns with the courses that Whatcom Community College has introduced in recent years.

Criteria 5

Student demand for program within the region.

Anecdotally, students enrolled in computer science and related classes have expressed interest in earning a Bachelor of Science in Computer Science at Whatcom Community College rather than transferring to a four-year university program, primarily due to lower costs and smaller class sizes.

Student demand for computer science and related computing programs remains strong even as enrollment at colleges and universities have declined over recent years. In general, higher education institutions are not well equipped to connect historically underserved students to their educational

pathways, personal goals, and career aspirations. However, the proposed program will be designed with features which intend to support a pipeline of students in our college seeking to fill the demand for computing degrees. The program is intended to purposefully guide students through entry into the program and exit into industry to lessen attrition which often occurs at institutional change points. The program will provide a guided path for students coming from the college's K-12 partner institutions and expand opportunities for students who may have never considered computer science as an option in the first place due to societal and industry bias (Sims, 2018; McGee, 2020).

The capacity of higher education within the Puget Sound region remains relatively low in meeting the demand for computer science bachelor's programs compared with the jobs noted in Criteria 3. Additionally, many students within Whatcom Community College are either place bound or need access to a degree within a short distance of their home. Table 3 lists the current programs that exist for students within 100 miles of Whatcom Community College's campus.

Table 5: IPEDs data aggregated by US Department of Education of public institutions offering computer science and related degrees within 100 miles of Whatcom Community College.

Institution	Bachelor's degree	Number of graduates
Bellevue College	Computer Science	40
Lake Washington Institute of Technology	Computer programming	16
North Seattle College	Computer Science	*
Skagit Valley College	Computer Science	*
University of Washington–Bothell Campus	Computer Science	171
University of Washington–Bothell Campus	Computer and Information Sciences, General	24
University of Washington–Seattle Campus	Computer Science	378
Washington State University–Everett	Software Engineering	12**
Western Washington University	Computer Science	128
Total		**778**

*New program with no current graduate data

**This program is not disaggregated from WSU's program in Pullman. This number is based on 12 graduates Spring 2022

Most of these options have a high barrier to entry due to several factors. Whatcom Community College students who transfer to Western Washington University with an AAS-DTA (computer science focus) must take three additional prerequisite courses that can only be taken at Western Washington University and typically have a one-year wait before being able to enter the program.

The University of Washington in Seattle, which encompasses Computer Science and Computer Engineering programs, accepts only approximately 25-35% of applicants through the current University of Washington student pathway. The transfer rate for career and technical college students into University of Washington–Seattle's computer science engineering program is 20% (or about 69 total students across SBCTC) (Allen School Transfer Students, 2023). University of

Washington–Bothell is quickly becoming the top choice for many transfer students; however, this program also has a low acceptance rate at only 34% acceptance for all applicants, including, but not only, CTC transfer students (University of Washington–Bothell Undergraduate Admissions, 2023).

Washington State University–Everett offers a software engineering program that is on campus for Everett Community College students; however, this program extends the standard duration for degree completion which in many cases is up to an additional year, for a total of five or more years to complete bachelor's level coursework. This is due to extra requirements in mathematics and natural science and the relatively close alignment with the engineering degree pathways. Also, these requirements surpass those needed by similar computer science programs at other popular target transfer institutions, such as University of Washington–Seattle and University of Washington–Bothell making it challenging for students to make an academic plan that would give them options to transfer to both institutions.

Additional challenges are that students have a discontinuity of resources especially during the first term of transfer. Both University of Washington–Bothell and Washington State University–Everett currently lack support services such as TRiO that serve traditionally underrepresented populations. In the case of the University of Washington, transfer students are challenged with navigating new resources such as tutoring since they, often, do not have time to transition or establish a sense of belonging at their new institution.

Students often face barriers to persistence on a computer science pathway; however, there are also students who do not even consider a Bachelor of Science in Computer Science as a pathway, particularly those from underrepresented and minoritized populations (McGee, 2020). The proposed program intends to focus efforts specifically to address three areas where this happens: K-12 connections, traditional studies/ESL programs, and professional technical programs and increase opportunities for students to explore computing related careers, especially providing contextualization and project-based learning opportunities.

Proposed enrollment

Though our new Bachelor of Science in Computer Science degree will have capacity for 24 students, we anticipate it may take a year to fully ramp up to that level. Table 6 shows our anticipated enrollments.

Table 6: Proposed enrollment for new Bachelor of Science in Computer Science program.

	AY 25-26	AY 26-27	AY 27-28	AY 28-29	AY 29-30
Freshmen	12	24	24	24	24
Sophomores	0	12	24	24	24
Juniors	0	0	12	24	24
Seniors	0	0	0	12	24
Total	*12*	*36*	*60*	*84*	*108*

Criteria 6

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

Whatcom Community College serves student populations spanning from Canada down to Mount Vernon, from Mt. Baker all the way out to the Olympic peninsula. This broad reach gives Whatcom Community College an opportunity to serve a wide range of students and regions. For example, Whatcom Community College is located just off I-5 which connects many people who commute to work as far south as Seattle and the East side. It also has an Amtrak Passenger train route that parallels I-5 all the way down to Portland, and beyond.

Whatcom Community College has had a preliminary conversation with regional career and technical colleges and intends to explore opportunities for partnerships and collaboration with them, as well as with four-year universities, most notably Western Washington University. The computer science faculty lead also attended a conference in fall 2023 that was focused on developing Bachelor of Science in Computer Science programs where he had the opportunity to collaborate with his peers from throughout Washington state.

Additionally, Whatcom Community College is currently developing comprehensive, and career connected pathways through CTE dual credit. The objective is to facilitate a seamless transition for students from K-12 to higher education programs. This will create entry points into the Bachelor of Science in Computer Science degree for students within the region who otherwise may not pursue a computer science or information technology careers.

Whatcom Community College intends to offer multiple modalities for students to provide flexibility to place bound or time-constrained students. We do not, however, plan to offer a fully online program. Our program will have strategic in-person offerings which target specific goals. For example, in-person interactions are crucial to developing students' sense of belongingness and computer science identity early on in their degree coursework specifically at program entry points such as during the first year and the first year of upper division coursework.

Criteria 7

Promoting equitable opportunities for students, including historically marginalized students.

Whatcom Community College is interested in designing an equity-first Bachelor of Computer Science program. The proposed program will intentionally center equitable opportunities for students, particularly students who come from low-income households and students who have been historically and systematically minoritized due to race/ethnicity. In alignment with SB 5401 (Washington State Legislature, 2021), the proposed degree seeks to fill a need for providing high-demand, living-wage jobs for the populations.

Whatcom Community College offers myriad professional development opportunities related to advancing equity, diversity, and inclusion for faculty and staff (e.g., Opening Week workshops,

Professional Development Day workshops, Faculty Education Workshops, and the Equity Project).

Whatcom Community College's Affirmation of Inclusion

Whatcom Community College is committed to maintaining an environment in which every member of the College community feels welcome to participate in the life of the College, free from harassment and discrimination. We welcome people of all races, ethnicity, national origins, religions, ages, genders, sexual orientations, marital status, veteran status, abilities and disabilities. Toward that end, faculty, students and staff will:

- Treat one another with respect and dignity.
- Promote a learning and working community that ensures social justice, understanding, civility and non-violence in a safe and supportive climate.
- Influence curriculum, teaching strategies, students services and personnel practices that facilitate sensitivity and openness to diverse ideas, peoples and cultures in a creative, safe, and collegial environment.

Student recruitment and support implementation plan

Our program will actively recruit historically underrepresented students, including students of color and low-income students, into our local baccalaureate-level program. Our college will leverage relationships with K-12 in our recruitment activities. Additionally, Whatcom Community College will produce outreach and recruitment materials featuring our diverse student population and the personalized and equity-focused support they receive at our institutions. Additionally, Whatcom Community College hosts workshops on campus that bring local and regional middle and high school students to participate in hands-on STEM activities.

Key benefits for our students include: a significantly lower cost-to-degree compared to four-year universities in the region, the potential for a small cohort model to build belonging and support for individualized needs, and wrap-around support services. Support services, such as academic planning, student success skills development, navigation and advising, tutoring, TRiO, and financial aid will increase persistence through the program.

Whatcom Community College demographics

As gathered from Whatcom Community College's 2022-23 WCC Enrollment dashboard, the following table depicts a snapshot of relevant demographics at our college (unduplicated headcount, academic year 2022-23).

Table 7: Students of color and need-based aid enrollment data for Whatcom Community College.

Institution	Students of color	Received need-based aid
Whatcom Community College	1,682/4,608 (37%)	906/5,518 (17%)

Barriers and challenges for BIPOC and low-income students

STEM education has historically excluded BIPOC folks and low-income students due to a variety of systemic practices and structures which are present both in the tech industry and its gateway educational system (McGee, 2020; Sims, 2018; Sims, et. al., 2020). As noted by Sims, et. al. (2020), equitable educational opportunities are rare for students who identify as BIPOC or from low-income

households. Further, McGee (2021) points out that underrepresented and minoritized students in STEM education often face the challenges of having to continually prove themselves, racial microaggressions in educational settings, a tremendous amount of internal pressure to succeed, and an expectation to be resilient.

Specific to the attainment of a bachelor's credential, students who have been underrepresented in higher education face numerous obstacles when attempting to access a bachelor's degree program (WTIA, 2023). These challenges often include geographical limitations, the need to balance work and childcare responsibilities, potential lack of knowledge in basic skills and academic planning, as well as financial constraints that hinder their pursuit of a bachelor's degree. The financial burdens are particularly detrimental to student retention, notably affecting those with low incomes, as these constraints frequently serve as the primary impediments to full-time enrollment. Conversely, students who can attend college full-time and take on heavier credit loads tend to have a higher likelihood of degree completion. In contrast, pursuing a degree on a part-time basis tends to have an adverse impact on degree completion, often due to the juggling of school alongside family duties, childcare expenses, and work schedules.

Beyond historical challenges, many students of color and those from low-income backgrounds have had to make challenging decisions to navigate the intersection of family obligations, employment commitments, and educational pursuits. These factors should be taken into consideration when deciding program offerings such as course modalities, entry and exit ramps, course designs, and partnerships with other programs (e.g., internships which fit our students' needs and mentorship which addresses their challenges in persistence toward a degree).

This program will be designed to cater to the specific needs of these demographics by offering an affordable education that acknowledges student responsibilities beyond the classroom. It aims to prepare students for meaningful, adaptable, and fulfilling careers within the expanding knowledge-based economy.

The proposed Bachelor of Science in Computer Science program will allow Whatcom Community College to build a program plan, including coursework sequencing, professional expectations, and course objectives, which center these practices for equity and justice-based education. Because our program is relatively small and our campus is heavily invested in equity-based work, the proposed program can be built (rather than the more difficult task of re-building) to provide radical, justice-centered support for our students.

Additionally, the proposed Bachelor of Science in Computer Science will enable students to continue utilizing supports and resources that they may already be using at Whatcom Community College. Whatcom Community College offers TRiO's federally funded program that provides academic support services and focuses on personal growth, academic progress, and community development. In addition, Whatcom Community College offers a BFET program. Whatcom Community College offers robust cost-free academic tutoring and is organized by college staff. Building on these existing resources will provide continuity as students transition to upper division coursework to achieve a bachelor's degree.

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Whatcom Community College would also like to acknowledge that it drew from the statement of need for a Bachelor of Science in Computer Science submitted by the Everett Community College and Shoreline Community College consortium.

Attachment A: Applied Baccalaureate Degree Supply/Demand Gap Rubric for Colleges

The goal of this rubric is to help you build a program that will meet the needs of your community. We have given you options about the information you can use to support the need for your new program. Also, the guidelines for estimating the supply/demand gap are similar to the ones we use for other program applications. We hope this makes the rubric more familiar to you. If not, contact the Director of Transfer Education at SBCTC for further information.

The application needs to show the information below for program approval:

- employers demand* the level of technical training proposed within the program, making it cost-effective for students to seek the degree;
- lead to high wage-earning jobs; and
- the proposed program fills a gap in options available for students because it is not offered by a public four-year institution of higher education in the college's geographic area.

College Name: Whatcom Community College
Program Name: Bachelor of Science in Computer Science
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. (*Provide absolute numbers, not just percentages*)

Table 8: Regional demand: Island, San Juan, Skagit and Whatcom counties.

Occupation (In demand or Balanced)	SOC code	Projected annual total openings (2020-2030)	Median annual salary (2023)
Entry-level education expectation: **Bachelor's degree**			
Computer and information systems managers	11-3021	32	$139,187
Information security analysts	15-1212	11	$124,458
Software developers	15-1252	125	$112,149
Web developers	15-1254	10	$87,874
Computer occupations, all other	15-1299	30	$90,963
Data scientists	15-2051	11	$110,153
Entry-level education expectation: **Bachelor's degree not required but may be preferred**			
Computer network support specialists	15-1231	Not available	$73,522
Entry-level education expectation**: Doctoral degree**			
Computer and information research scientists	25-1021	3	$163,800
Total/Average		**222**	**$112,763**
Data Sources: Washington State Employment Security Department, labor market information 2023 (esd.wa.gov/labormarketinfo/learn-about-an-occupation#/search); JobsEQ®			

Table 2: Statewide demand: Washington state

Occupation (In demand or Balanced)	SOC code	Projected annual total openings (2020-2030)	Median annual salary (2023)
Entry-level education expectation: **Bachelor's degree**			
Computer and information systems managers	11-3021	2,330	$166,777
Information security analysts	15-1212	650	$129,588
Computer programmers	15-1251	650	$172,944
Software developers	15-1252	17,030	$149,624
Web developers	15-1254	2,970	$144,828
Computer occupations, all others	15-1299	Not available	$122,968
Data scientists	15-2051	420	$131,458

Entry-level education expectation: **Bachelor's degree not required but may be preferred**			
Computer network support specialists	15-1231	Not available	$101,802
Entry-level education expectation**: Doctoral degree**			
Computer science teachers, postsecondary	25-1021	Not available	Not available
Total/Average		**24,050**	**$141,844**
Data Source: Washington State Employment Security Department, labor market information, 2023 (esd.wa.gov/labormarketinfo/learn-about-an-occupation#/search)			

The U.S. Bureau of Labor Statistic's Occupation Outlook Handbook, updated 2023, also predicts growth nationally for these occupations, as shown in Table 3, indicating program graduates will not only be set up for success locally and throughout Washington state, but across the nation as well (Bureau of Labor Statistics, 2023).

Table 3: Outlook for bachelor's level computer and information technology occupations nationally, for the period 2022-32, by entry-level education expectation

Occupation*	**Projected growth relative to all occupations**	**Work experience in a related occupation**	**Job outlook**
Entry-level education expectation: Bachelor's degree			
Computer and information systems managers	15% (much faster than average)	5 years or more	Demand will grow as organizations increasingly rely on information technology services.
Computer programmers	-11% (decline)	None	Despite declining employment, about 6,700 openings for computer programmers are projected each year, on average, over the decade.
Data scientists	35% (much faster than average)	None	Growth is expected to stem from an increased demand for data-driven decisions.
Information security analysts	32% (much faster than average)	Less than 5 years	Cyberattacks have grown in frequency, and analysts will be needed to create innovative

				solutions to prevent hackers from stealing critical information or creating problems for computer networks.
	Software developers, quality assurance analysts, and testers	25% (much faster than average)	None	Increased demand will stem from the continued expansion of software development for artificial intelligence, Internet of Things, robotics, and other automation applications.
	Web developers and digital designers	16% (much faster than average)	None	Growth is projected as e-commerce continues to expand.
	Data Source: U.S. Bureau of Labor Statistics, 2023 (bls.gov/ooh/)			

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).

Table 4: Regional supply

Institution	Program	Annual bachelor degree graduates
Skagit Valley College	Computer science	*
Western Washington University	Computer science	128
Total		*128*

*New program with no current graduate data.

Regional Demand: 222
Regional Supply: 128
GAP: 94

Additionally, the Washington State Employment Security Department labor market supply/demand gap analysis for year 2023 (through to November) shows there are 556 more job openings than there are job seekers in the region. Statewide, the gap is 76,682 more job openings than job seekers.

Table 5: Washington State Employment Security Department labor market supply/demand gap analysis for year 2023 (through to November).

		Gap*	
SOC	Occupation title	Washington State	Northwest Workforce Development Area
151212	Information security analysts	4,422	15
151221	Computer and information research scientists	827	9
151251	Computer programmers	2,145	42
151252	Software developers	37,762	265
151254	Web developers	3,668	15
151299	Computer occupations, all others	20,306	185
152051	Data scientists	7,552	25
Total		**76,682**	**556**

Affordability is another important consideration for regional students. Graduating with a bachelor's degree from a regional university would cost approximately $36,772 (in tuition and fees only), one-third more than

	the cost of four years earning a bachelor's degree at WCC (estimated at approximately $24,492 in tuition and fees only). The lack of local private four-year schools and limited public school options severely limits the number of students who can afford to attend either option and underscores the need for local efficient educational pathways.
OR, if demand information is not available or it is a new/emerging/changing occupation, **	
For demand: Provide employer survey results for local demand for the targeted occupation job title(s) to support the demand and education level for the program. Survey requirements are listed below.	N/A
For supply gap: Provide employer survey results for local supply for the targeted occupation job title(s) to support that there is a gap in the number of qualified applicants available to fill jobs. Survey requirements are listed below.	N/A
OR, if based on a statutory or accreditation requirement, **	
Select one: Statutory Requirement☐ **or** Accreditation Requirement ☐	

For demand: Provide labor market information on the current education requirements for the job, including evidence of recent openings for requiring or preferring bachelor's degrees or above. Cite the statute or certifying body, your proposed program is based upon that has specified a bachelor's or above in the field is needed.	N/A
For supply gap: Provide employer survey results for local supply for the targeted occupation job title(s) to support that there is a gap or that employers anticipate a gap in the number of qualified applicants that will be available to fill jobs with the new requirements. Survey requirements are listed below.	N/A
* Demand is defined by state law as "***an occupation with a substantial number of current or projected employment opportunities.***" **Applications may include information related to more than one option (i.e., labor market data to support the local demand for the occupation and a local employer survey to support that there is a gap in the number of qualified applicants available to fill jobs).	

Appendix B – Survey Results

Student survey (fall 2023)

Throughout fall 2023, students enrolled in computer science and related classes were asked about their interest in earning a Bachelor of Science in Computer Science at Whatcom Community College rather than transferring to a four-year university program. Anecdotally, they expressed interest in such an option, primarily due to lower costs and smaller class sizes. Whatcom Community College plans to formally survey students in winter 2024.

Employer survey

Whatcom Community College solicited input from employer representatives at its fall meeting of the software development program advisory committee, and via a follow-up survey in January of those same representatives plus a one-on-one interview with another employer representative. Whatcom Community College plans to conduct a broader survey of industry representatives in winter 2024.

Software development advisory committee (October 26, 2023)

Following is a summary of feedback received from the five (5) of seven (7) voting members present at the Whatcom Community College software development program advisory committee on October 26, 2023.

1. Do you anticipate demand for software developers / software engineers?

Most of the members said that they anticipated growth this coming year and made offers to provide software developer internships.

2. If there is demand, how many positions do you currently have open?

Most of the committee anticipated hiring 1 to 3 employees each.

3. Is a bachelor's degree required for this position?

Yes, a bachelor's degree is required for software developer.

4. Do you have difficulty finding bachelor's degree level applicants for this position?

Yes, definitely.

5. Will the proposed program assist you in finding the qualified applicants?

Definitely.

Employer survey (January 2024)

n = 2 responses/N = 7 employers

1. Do you see a strong need for more computer science / software engineer majors in this area?

Yes, talent is still needed to support businesses in Whatcom County.

Faithlife was just acquired by Logos and is in the process of consolidating their operations, but they anticipate hiring more SW Engineers soon. Too soon to say how many.

2. Do you anticipate a growing demand for software developers, software engineers, and other related fields? Which ones?

Yes, both developers and engineers?

Yes, I do expect growing demand for software developers and related fields. In particular, AI related development, Data exploration and visualization, as well as application development.

3. Do you expect your software developers to continue to work in-person, partially or fully remote?

Hybrid (some in-person, some remote)

Our expectation is that it will be a blend of the two. Recent reports and our own experience has been that younger professionals benefit strongly from having an in-person experience for at least a portion of the work week.

4. How hard is it to find qualified candidates?

Moderately difficult

There are very few quality candidates that match our needs for specific software development tools and approach when we have postings.

5. Do you believe that the proposed bachelor of science in computer science program will improve your applicant pool?

Yes

Yes, based on our internship experience with WCC, I believe WCC could help develop qualified candidates that would be appropriate for our organization in the future.

6. Do you have a hard time competing with other companies for talented workers?

Yes

That is highly dependent on the individual under consideration. Our non-profit mission, great benefits, solid compensation, and friendly team are an asset. Some developers would like to work remotely full time which we do not offer.

One-on-one interview (January 2024)

1. Do you have anticipated demand for Software Developers / Software Engineers?

Faithlife was just acquired by Logos and is in the process of consolidating their operations, but they anticipate hiring more SW Engineers soon. Too soon to say how many.

2. If there is demand, how many positions do you currently have open?

We're still consolidating from the merger, but we anticipate expanding within the next year.

3. Is a bachelor's degree required?

Yes, a bachelor's degree is required for software developer.

4. Do you have difficulty finding bachelor's degree level applicants for this position?

Yes, definitely. We're looking for candidates who are "teachable" and have the proper technology background.

5. Will the proposed program assist you in finding the qualified applicants?

Definitely. We actually prefer hiring candidates with a community college background.