



**STATE BOARD FOR COMMUNITY
AND TECHNICAL COLLEGES
FEBRUARY 2023
STATEMENT OF NEED
BACHELOR OF APPLIED SCIENCE
DEVOPS ENGINEERING
*SPOKANE COMMUNITY COLLEGE***

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Cover Page — Statement of Need

Program Information

Institution Name: Spokane Community College

Degree Name: BAS DevOps Engineering

CIP Code: 11.0899

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

Degree: AAS Computer Network Design and Administration

CIP Code: 11.1002

Year Began: 2007

Degree: AAS Software Development

CIP Code: 11.0801

Year Began: 2007

Degree: AAS Cloud Computing

CIP Code: 11.0902

Year Began: 2023

Proposed Start Implementation Date: Fall 2024

Projected Enrollment (FTE) in Year One: 20

Projected Enrollment (FTE) by Year Two: 28

Funding Source: State FTE

Mode of Delivery

Single Campus Delivery: Spokane Community College, main campus

Distance Learning: Offered as 100% online program

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.

A handwritten signature in blue ink that reads "Jenni Martin". The signature is written in a cursive style.

9/14/2022

INTRODUCTION

What is DevOps?

DevOps bonds Software development with the Networking operations needed to deploy and manage software. Software development and Networking operations historically worked independently of one another, DevOps is the process of combining people, processes, and technologies to build higher quality software rapidly.

The DevOps model combines the developers (Dev) with the networking (Ops) team rather than working as separate entities. This combination helps these teams to act as a single entity that manages the entire application lifecycle.

Cloud platforms provide ideal environments for DevOps deployment.

Spokane Community College is proposing to offer a Bachelor of Applied Science degree in DevOps Engineering.

What does Development in DevOps Mean?

The major objective of a development team is to convert ideas into a product that solves end-user's problems. Responsibilities of the development team include requirements gathering, design, development, testing, product backlog refinement, and ensuring continuous delivery.

What does Ops in DevOps Mean?

The major objective of the operations team is to deploy the product and manage it throughout the product's life. Responsibilities of the operations team include renting out/managing server space, configuration of server and storage, managing outages, managing backups and security, deployment, and maintenance.

Spokane Community College DevOps skill sets

Software Development – Software development skills including developing code in at least one high-level programming language.

Computer Network Design and Administration – Computer Network design skills including building highly automated infrastructures; and administering operating systems.

Cloud Computing – Design, deploy, and evaluate applications on cloud platforms including managing, and operating workloads.

DevOps Engineering - Implement and manage continuous delivery and lifecycle systems and methodologies

Summary points

- Labor market projections for DevOps are high wage and high demand in both the Community Colleges of Spokane 6-county service region and the states of Washington and Idaho.
- There are no other DevOps engineering offerings at regional higher education institutions.
- The DevOps BAS aligns with current Spokane Community College AAS offerings. Two current degrees (Software Development AAS and Computer Network Design and Administration AAS) will be entry points to the DevOps BAS. One new SCC AAS degree (Cloud Computing AAS) will be an additional entry point.
- Students completing the DevOps BAS degree will have completed courses that map to multiple computer industry certifications.

Criteria 1

Relationship to institutional role, mission, and program priorities.

Spokane Community College (SCC) mission, values, and priorities are listed in the most recent strategic plan:

Mission: To provide all students an excellent education which transforms their lives and expands their opportunities.

Vision Statement: Providing the best community college experience in the northwest

Values: Students First / Equity / Access / Excellence / Integrity / Leadership / Responsive / Stewardship

Priority Statements:

Student Success: Expanding the recruitment, enrollment, retention & academic achievement of a changing student population through consistently high-quality academic programming and innovative student support models that best serve the needs of tomorrow's regional workforce.

Operational Excellence: Ensuring the continuous improvement of our financial sustainability through on-going academic and student service innovation, consistent data-informed decision-making and the constant pursuit of organizational efficiencies that make us quick to respond to student needs and external opportunities.

Employee Success & Excellence: Advancing the engagement and change management capacity of a high-quality faculty and staff through purposeful recruitment, development & retention, consistent standards of performance and accountability, and the relevant, timely and transparent internal communication needed to best serve our students.

The DevOps BAS program supports the SCC mission and priorities of student success, operational excellence and employee success and excellence. Specifically, it provides an equitable pathway to high wage high demand employment opportunities. Additionally, this will be SCC's second BAS degree (the other BAS degree is in Respiratory Care) so the two BAS programs will compliment each other and share marketing and support resources.

Criteria 2

Support of the statewide strategic plans.

The State Board for Community and Technical Colleges' (SBCTC) 2010 Mission Study includes long-term needs analyses for priority areas: economic demand, student success, and innovation.

Spokane Community College's proposed Bachelor of Applied Science in DevOps Engineering program will support each of the priority areas in the following ways:

Economic Demand: The proposed Bachelor of Applied Science in DevOps engineering program will support state and local economies by closing the supply/demand gap with a well-educated and skilled workforce.

Student Success: The proposed Bachelor of Applied Science in DevOps Engineering program will increase educational attainment across the Community Colleges of Spokane six county service region which includes Lincoln, Whitman, Stevens, Spokane, Ferry, and Pend Oreille counties and the program will be offered in a fully online option. It will attract students from feeder program across the state, contributing to increased educational attainment at the state level. The program will improve student success as it offers new opportunities for current and prospective students and incumbent workers in high-demand, high-wage occupations.

Innovation: The proposed Bachelor of Applied Science in DevOps Engineering program will use technology and collaboration in new ways to meet the demands of the economy by working with regional employers and advisory committee members to develop curriculum and program outcomes.

Two of the focus areas identified in the Mission Study are the need to increase the education level of more people and to serve place-bound working adults. The Mission Study states that, “Washington also needs more people with baccalaureate and graduate degrees. Community and technical colleges must expand their contribution to help meet this need” (pg. 4). Recognizing that many community college students are place-bound and balancing school, jobs, and families, SBCTC plans to address this through the production of more baccalaureate degrees. In the Community Colleges of Spokane six-county service area, there are no other colleges or universities offering bachelor’s degrees in DevOps Engineering to place-bound students.

The Washington Student Achievement Council (WSAC) Strategic Action Plan 2019-21, states that two thirds of jobs in Washington will require an associate’s or higher and the biggest gaps are in the STEM pipeline such as engineering and advanced manufacturing-related programming. Spokane Community College’s proposed degree program will also support Washington Student Achievement Council’s policies and goals for higher education. Specifically, the proposed Bachelor of Applied Science in DevOps Engineering will address the following specific points from the Washington Student Achievement Council Action Plan:

Close Opportunity Gaps: Spokane Community College’s equity, diversity, and inclusion (EDI) strategic plan is articulated in criteria 7 and will build and sustain an equitable, diverse, and inclusive (EDI) culture and opportunities at Spokane Community College and close identified equity gaps. As more local Bachelor of Applied Science programs are available to historically underrepresented populations, it is more likely they will continue their education to the baccalaureate level. Spokane Community College continues to be committed to closing the gap in educational outcomes for systemically marginalized students, and this Bachelor of Applied Science program is another key component of that commitment. Along with the traditional development of the Bachelor of Applied Science curriculum, Spokane Community College will leverage its existing work around inclusive pedagogy to inform program outcomes and curricular design to model instructional strategies intended to serve a diverse student population.

Create Affordable, High-Quality Pathways: The Bachelor of Applied Science in DevOps Engineering will be very affordable to students. Leveraging current facilities and technology, the students will not be burdened with extra fees or extra charges for this program. The total cost of the program to the student is 15 percent up to 30 percent lower than a four-year university, and significantly lower than at private institutions.

Engaging Adult-Learners: The program will use an online model to support working and place bound adults. Courses will be supported with the most current technology including mobile platforms for the Learning Management System, low-bandwidth multi-media streaming, Americans with Disabilities Act technology accommodations, multiple online resources, and a student friendly Learning Management System. Support will be available through faculty advisors.

Criteria 3

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

Demand for bachelor's degree graduates

Source: Labor Insight (Burning Glass Technologies)

Occupational Analysis – DevOps Engineer for Washington State

- Job Postings last 12 months: 1,814 (high demand)
- Projected Growth 10 years: +44.3%
- Time to Fill: 44 days
- Median Salary \$115,515
- Education Level: 95.6% require bachelor's degree
- Top Employers: Amazon, Fisher Investments, Palantir Technologies, Inc., DIRECT TV Incorporated, First American Corporation, Fisher Investments Incorporated, 2nd Watch, Microsoft Corporation, Sogeti USA, Costco

Occupational Analysis – DevOps Engineer for Spokane Community College 6 County Service Region (Lincoln, Whitman, Stevens, Spokane, Ferry, Pend Oreille)

- Job Postings last 12 months: 35 (average demand)
- Projected Growth 10 years: +44.3%
- Time to Fill: 41 days
- Median Salary \$106,428

- Education Level: 94.1% require bachelor's degree
- Top Employers: Comcast, 2nd Watch, FIS, General Dynamics, Washington Trust Bank, Dish Network, Fidelity Brokerage Services

Supply gap:

There are no other DevOps engineering offerings at regional higher education institutions.

- There are no other Community or Technical colleges in Washington State that offer a 4-year DevOps or Cloud degree.
- Washington State University – None, only a generalized degree in Computer Science and one in Computer Engineering.
- Eastern Washington University – None, there are two degrees that have several courses that offer content like Spokane Community College 2-year degree courses but no course offering in DevOps or Cloud.
- North Idaho College – None, there are two degrees that have several courses that offer content like Spokane Community College 2-year degree courses but no course offering in DevOps or Cloud.
- Gonzaga University – None, only generalized degrees in Computer Science, Computer Engineering and Data Science.
- Whitworth University – None, only a generalized degree in Computer Science with an emphasis on Business, International Project Management and Network Systems.

Relevant computer industry certifications:

Students completing the DevOps Bachelor of Applied Science degree will have completed courses that map to some or all the following computer industry certifications which are commonly requested skills:

- AWS (Amazon Web Services) Certified:
 - DevOps Engineer Professional
 - Solution Architect Professional
 - Solution Architect Associate
 - SysOps Administrator Associate
 - Cloud Practitioner
- Cisco CCNA (Cisco Certified Network Associate)
- CompTIA Linux+ and/or LPIC-1 Linux Certification

- VMWare Certified Technical Associate VCTA-DCV
- CompTIA Security+

As shown above, there are a significant number of job postings in both Washington State and SCC's six-county service region. No other regional higher education institutions are offering programs to meet demand. The SCC DevOps Engineering BAS program will fill this demand gap and provide opportunity for graduates to obtain high paying jobs.

Criteria 4

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

Two current Spokane Community College AAS programs (Software Development AAS, Computer Network Design and Administration AAS) and one new AAS program (Cloud Computing AAS) will be used as the foundation for the DevOps Engineering Bachelor of Applied Science degree program. The Software Development AAS and Computer Network Design and Administration programs were both established in 2007 and have solid enrollment histories as shown by the below tables.

Spokane Community College 5-year enrollment history – All CIS programs

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Annualized FTEs	155.6	169.9	172.5	183.2	176.0
Enrollment Headcount	1490	1599	1702	1833	1727

Computer Networking Design and Administration AAS enrollment history (program started 2007)

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Annualized FTEs	50.6	62.4	60.4	47.8	43.9
Enrollment Headcount	485	588	569	452	423

Software Development AAS enrollment history (program started 2007)

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Annualized FTEs	41.4	42.5	52.9	82.5	81.7
Enrollment Headcount	397	405	513	809	783

The cloud computing AAS program is being developed during the 2022/2023 academic year and will enroll its first cohort of students Fall 2023. Projected enrollment is shown below:

Cloud Computing AAS projected enrollment (anticipated program start 2023)

	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Annualized FTEs	10	20	30	40	50
Enrollment Headcount	100	200	300	400	500

The three technical AAS degree programs will provide a basis for DevOps Engineering BAS graduates to complete the program with all the required DevOps skill sets:

- **Software Development** –Software development skills including developing code in at least one high-level programming language.
- **Computer Network Design and Administration** – Computer Network design skills including building highly automated infrastructures; and administering operating systems.
- **Cloud Computing** – Design, deploy, and evaluate applications on cloud platforms including managing, and operating workloads.
- **DevOps Engineering** - Implement and manage continuous delivery and lifecycle systems and methodologies

Criteria 5

Student demand for program within the region.

Since the BAS in DevOps Engineering degree will be offered in a 100% online format, we will be able to accept students who have completed a technical AAS degree from any higher education institution.

Source: Labor Insight (Burning Glass Technologies)

In 2020, there were a total of 1,062 associate's degrees in computer information sciences and

support services conferred at 36 Washington community and technical colleges.

In 2020 in Spokane county there were a total of 57 associate's degrees in computer information sciences and support services conferred at 2 community colleges (Spokane Community College and Spokane Falls Community College)

Any of these associate degree graduates have the educational foundation to be successful in the BAS DevOps Engineering program.

Informal surveys of current Spokane Community College Software Development AAS and Computer Networking Design and Administration students show a high level of interest in the Bachelor of Applied Science in DevOps Engineering program.

DevOps BAS Annual Enrollment Projections

Year	2024-25	2025-26	2026-27	2027-28	2028-29
Cohort Size	20	30	45	50	55

Criteria 6

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

Spokane Community College plans to offer the Bachelor of Science in DevOps Engineering degree in a 100% online format which will make it completely accessible to place-bound students.

There are currently no other Community or Technical Colleges in Washington State that offer a 4-year DevOps or Cloud degree.

There are no other higher education institutions in the Spokane Community College service region that offer a 4-year DevOps or Cloud degree:

- Washington State University does not offer a DevOps degree. They have one generalized degree in Computer Science and one in Computer Engineering.
- Eastern Washington University does not offer a DevOps degree. They have several courses that offer content like the SCC Software Development AAS but no course offerings in DevOps or Cloud Computing.
- North Idaho College does not offer a DevOps degree. They have two degrees that have several courses that offer content like the SCC Software Development AAS but no course offerings in DevOps or Cloud Computing.
- Gonzaga University does not offer a DevOps degree. They have generalized degrees in Computer Science, Computer Engineering, and Data Science.
- Whitworth University does not offer a DevOps degree. They have a generalized degree in

Computer Science with emphasis on Business, International Project Management, and Network Systems.

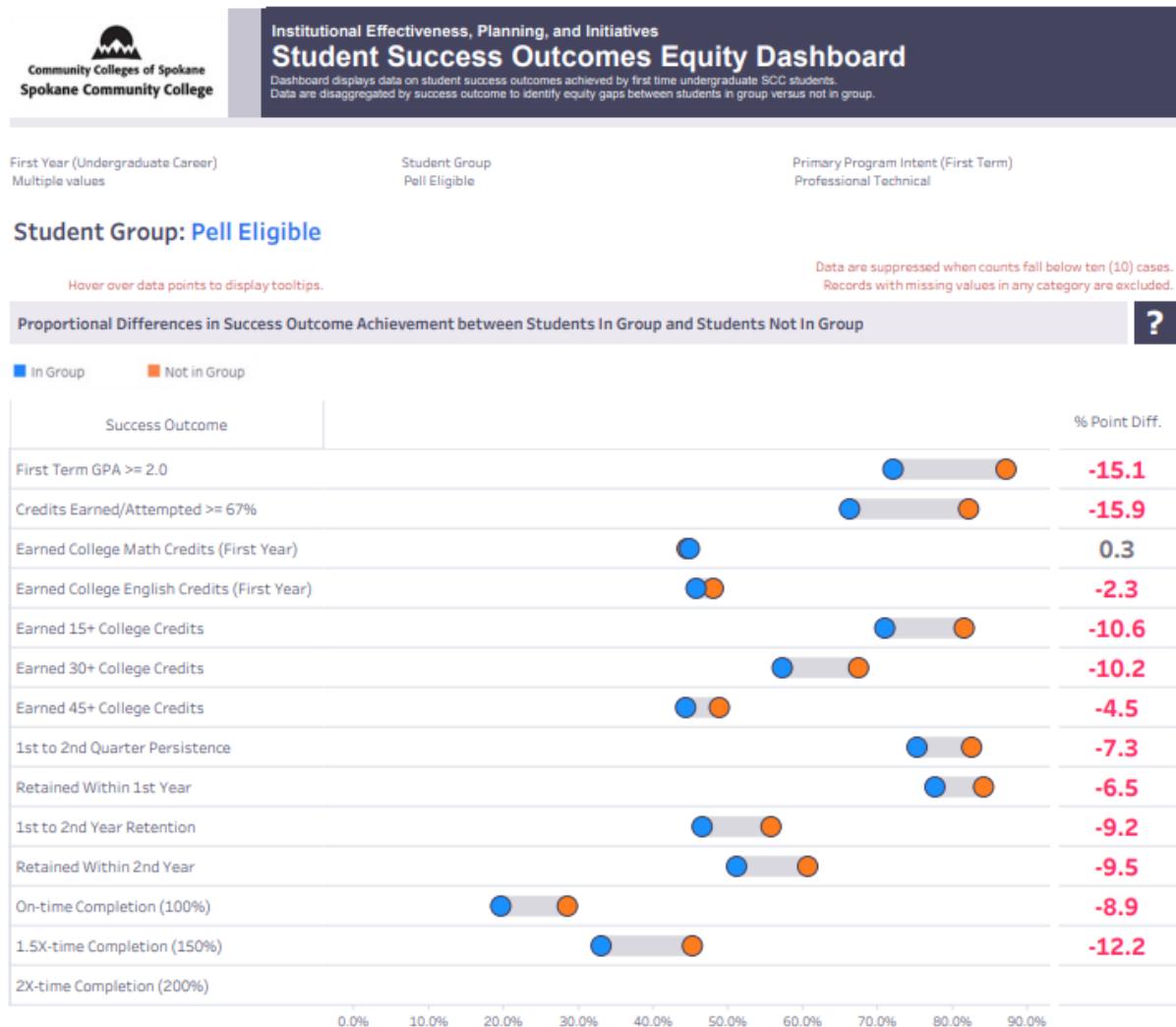
- Spokane Falls Community College does not offer a DevOps degree. They have associate degrees in computer science and information technology and a Bachelor of Applied Science degree in Cybersecurity.

This will be a program that is completely differentiated from offerings at other regional higher education institutions. SCC has experience in supporting student success in 100% online programs. The Software Development AAS program converted to 100% online during Spring 2020. Since then, faculty have developed and refined skill sets in delivering content via recorded videos, meeting with students via Zoom and other online tools, and grading giving feedback on online assignments and assessments. Student services including registration, financial aid, counseling, tutoring, disability services, advising, library, and IT support are all available online.

Criteria 7

Promoting equitable opportunities for students, including historically marginalized students.

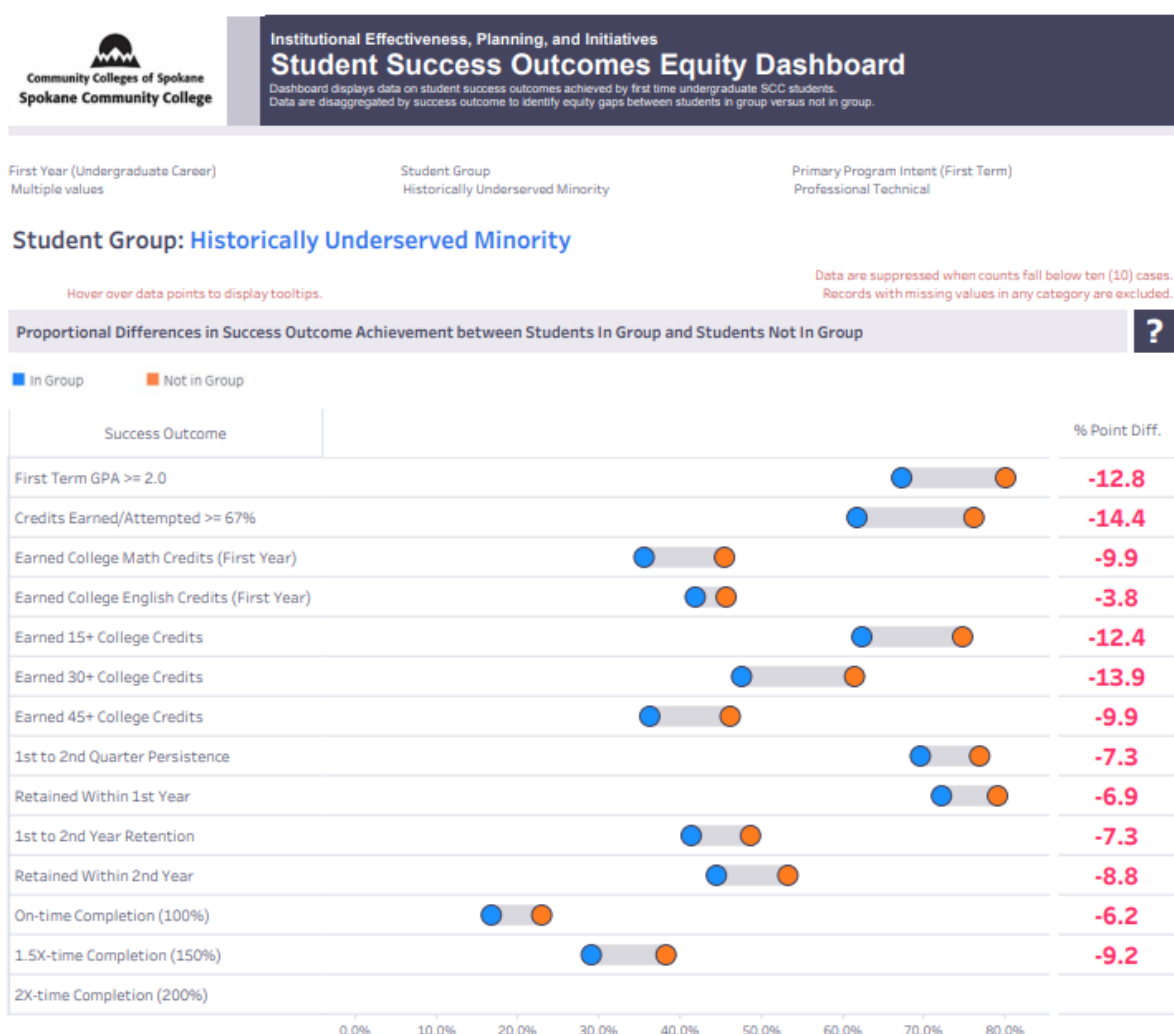
Equity gaps for low income (Pell Eligible) students are shown in the following graphic:



Based on the data in the above student success outcomes graphic, the largest equity gaps for Pell eligible students are:

- First term GPA >2.0
- Credits earned/attempted >67%
- 1.5X time to completion

Equity gaps for historically underserved minority students are shown in the following graphic:



Based on the data in the above student success outcomes graphic, the largest equity gaps for Historically Underserved Minority students are:

- First term GPA >2.0
- Credits earned/attempted >67%
- Earned 15+ college credits
- Earned 30+ college credits
- 1.5X time to completion

In conjunction with the Spokane Community College equity, diversity, and inclusion (EDI) strategic plan, the DevOps Engineering BAS program will engage in the following strategic priorities, goals, objectives, and actions:

1. Build and sustain an equitable, diverse, and inclusive (EDI) culture at Spokane Community College
 - a. Improve transparency and accessibility throughout the student onboarding process
 - i. Transparency In Learning and Teaching documents and student processes (Align with Guided Pathway's 'Get on the Path')
 1. Create supporting documents that further explain the FAFSA/WASFA process for students
 2. Creating guides for the SCC student application
 - ii. Create instructional videos of the onboarding process with diverse perspectives
 1. Intake (Admissions, Orientation, Registration, Financial aid, Counseling)
 2. Placement (Testing)
 3. Structured Exploratory Experiences (GUID 102, BT 152, HED 103, APLED 102)
 - b. Increase available resources to students and awareness of these resources (Interactive Map and website)
 - i. Accessible all-gender restrooms
 1. Ensure that there is at least one all-gender restroom in each building
 2. Include locations on website and maps
 - ii. Publish list of multilingual employees across the institution
 1. Put list on the SCC EDI website (Intranet)
 - iii. List of employees' culture and intersectionality for representation and support
 1. Create a list of "friendly" contacts based on components of culture
 - iv. Interactive directional kiosks around campus
 1. Obtain and install touch screen kiosks (building 15 and building 1)
 - v. Updated SCC website with all EDI efforts
 1. Create a page on the SCC website
 - vi. Include satellite campuses
 1. Create maps with resources for satellite campuses and add that to the SCC website
 - c. Enhance SCC's welcoming and inclusive environment and continue building a sense of community

- i. Include signage in various languages
 - 1. Obtain stakeholder's input on sign location and languages
 - ii. Renaming a building in the local indigenous language (i.e., Salish)
 - 1. Include stakeholder's input on building name and location
 - iii. Culturally diverse visual elements
 - 1. Incorporate culturally diverse artwork around the institution and reevaluate as the strategic plan is updated
 - 2. Improve school marketing images to be more inclusive and representative of our student population
 - iv. Option of using pronouns in various modalities
 - 1. Ctclink, Canvas
 - 2. Student ID cards, Employee Name Tags
 - v. Supporting clubs that welcome systemically marginalized students
 - 1. Included on the SCC website
 - 2. Marketing in the onboarding process
 - 3. Bigfoot forward
 - 4. Welcome week
 - 5. Bigfoot app
 - 6. Fund a position through Student Government for a multicultural position advertising/supporting cultural clubs
 - vi. Peer mentorship for students
 - 1. Fully funded peer mentoring program, including scholarships for student participants, led by the Dean for Student Success
- d. Getting feedback from faculty/staff/students
 - i. Campus Climate Assessment every other year starting 2022
 - 1. Institutional Research conducts a climate assessment for students, staff/faculty in 2022, 2024, 2026
 - ii. Listening and feedback sessions every other year starting in 2023 (consistent with SB 5227)
 - 1. Institutional Research and DEGA partner to conduct listening and feedback session in 2023, 2025, 2027
 - iii. External audit of EDI practices every five years
 - 1. Find an external organization and complete an evaluation of SCC racial equity practices
 - iv. Student feedback of strategic plan
 - 1. Send the strategic plan to Associated Student Government (ASG), Student Groups, and work-study students
 - 2. Host a student town hall with student government to solicit feedback
- e. Institutional EDI assessment and performance evaluation at all levels
 - i. Incorporate EDI as a standard of evaluation for all SCC employees
 - 1. Evaluate each summer with all stakeholders about modifying evaluations to include EDI
- f. Combat the culture of fear across campus that employees and students have concerning campus climate, especially inclusion.
 - i. Ombudsperson available to students, faculty, and staff which includes non-retribution and follow through.
 - 1. Hire or establish an Ombudsperson (mediator) or establish an equivalent office, which is neutral and unbiased

2. Create EDI training programs for faculty, staff, and students
 - a. Increase the amount, variety, and frequency of EDI training events
 - i. SCC Quarterly EDI Events
 1. Dedicate one day per quarter to an Equity Development Day with a focus on racial equity.
 2. Include student groups & organizations
 - ii. Increase our participation in regional conferences and join communities of practice and/or associations.
 1. Faculty and Staff of Color Conference
 2. National Association of Diversity Officers in High Education (NADOHE)
 - iii. Administer Intercultural Development Inventory (IDI) across the institution
 1. Develop a five-year plan where all departments will have completed a group and personal IDI debrief
 2. Increase the number of qualified administrators at SCC to administer the IDI
 - b. Collaborate with CCS Human Resources (HR), SCC Teaching and Learning Center, and Safe Campus Advocates to build and expand a comprehensive list of HR approved trainings that qualify as EDI and antiracist trainings
 - i. Collaborate with CCS Human Resources to survey the number of training courses offered on EDI and antiracist training
 - ii. Update current EDI and antiracist training to be included as part of the approved HR training
 - c. Mandatory EDI HR training for all employees every other year
 - i. Post on SCC EDI website the approved training offered
 - ii. Human Resources to track EDI training
 - d. Develop program aimed at retaining and supporting faculty and staff of color
 - i. Develop mentoring relationships for educators of color
 1. Sponsored affinity luncheons for specific faculty/staff, to be considered part of their work schedule
 2. Support for tenure and tenure track faculty to participate in state-wide mentoring and affinity groups
 - ii. Offer training and education to tenure review committees and Board of Trustees on bias in instructional evaluations
3. Continue closing equity gaps for systemically marginalized students in all Student Achievement Initiative (SAI)- related metrics.
 - a. Increase number of systemically marginalized students across all programs at SCC
 - i. Build and support a culturally appropriate outreach program
 1. Health Sciences
 2. Education (Academy for Rising Educators)
 3. Hire an outreach specialist dedicated to connecting with community organizations and help students through the enrollment process
 4. Incorporate Student Groups
 5. Multi-lingual admissions and registration forms, placement testing, and CASAS testing (Innovation fund)
 - b. Improve retention of systemically marginalized students
 - i. Identify equity gaps in SCC courses, specifically predictive courses and toxic course combinations

1. Institutional Research disaggregates student success in these courses
- ii. Peer mentorship for students
 1. Fully funded peer mentoring program including scholarships for student participants led by the Dean for Student Success (Innovation fund)
- iii. Connect students with community-based organizations
 1. Build a community pipeline to culturally based organizations
- c. Align instructional culture with principles and practices of equitable teaching and learning (GP)
 - i. In support of SCC's institutional intercultural literacy, students will develop an intersectional understanding of modern social realities, which will help enable effective participation and communication in cross-cultural professional, academic, and social settings.
 1. Create equity-minded course content and curriculum to support intercultural literacy
 2. Continue to offer education on ways to interrupt bias within course outcomes and instruction

Summary points

- Labor market projections for DevOps are high wage and high demand in both the Community Colleges of Spokane 6-county service region and the states of Washington and Idaho.
- There are no other DevOps engineering offerings at regional higher education institutions.
- The DevOps BAS aligns with current Spokane Community College AAS offerings. Two current degrees (Software Development AAS and Computer Network Design and Administration AAS) will be entry points to the DevOps BAS. One new SCC AAS degree (Cloud Computing AAS) will be an additional entry point.
- Students completing the DevOps BAS degree will have completed courses that map to multiple computer industry certifications.
- Graduates of the DevOps Engineering BAS program will fill a local labor demand by getting high paying jobs.

Appendix A

Supply/Demand Gap Rubric

College Name: Spokane Community College	
Program Name: Bachelor of Applied Science DevOps Engineering	
Select one: Existing Occupation ☒ or Emerging Occupation ☐	
If local demand/supply information is available for the specified degree program and target occupation(s),**	
For demand: Provide local/regional demand data for the targeted occupation job title(s) from traditional labor market data, industry data, trade association data, or other transactional data. <i>(Provide absolute numbers, not just percentages)</i>	For the four-state region that includes Washington, Idaho, Montana, and Oregon there was an average demand of 2,064 job postings in the last 12 months with median salary of \$112,107 and a projected growth of 45.4% over the next 10 years. Targeted occupations include DevOps engineers and related occupations including build/release engineer, performance engineer, and various developer positions.
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).	There are currently no colleges in our region that offer a DevOps Engineering degree.