STATE BOARD FOR COMMUNITY AND TECHNICAL COLLEGES
OCTOBER 2023
PROGRAM PROPOSAL
BACHELOR OF APPLIED SCIENCE
DEVOPS ENGINEERING

SPOKANE COMMUNITY COLLEGE

TABLE OF CONTENTS

Cover Page — Program Proposal

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 (i.e. Fall 2014): Fall 2024

Projected Enrollment (FTE) in Year One: 20

Projected Enrollment (FTE) by Year: 28

Funding Source: State FTE

Mode of Delivery

Single Campus Delivery: Spokane Community College, main campus

Distance Learning: Offered as 100% online program

Program Proposal

Please see criteria and standard sheet. ***Page Limit: 30 pages***

Contact Information (Academic Department Representative)

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Chief Academic Officer signature

The Program Proposal must be signed. To sign, double click on the signature line below.

X Jaclyn Jacot 10/10/2023

Chief Academic Officer

Introduction

Institutional Overview

Spokane Community College (SCC) is a beautiful campus set along the Spokane River and near the urban city center of Spokane. Spokane is a mid-sized city in the inland Pacific Northwest with a high quality of life and quick access to the outdoors. In addition to the 148-acre main campus in Spokane, SCC serves over 10,000 square miles in eastern Washington including educational centers in Colville, Newport, Inchelium, and Republic. SCC is one of two accredited community colleges that comprise the Community Colleges of Spokane. Serving about 22,000 students, SCC is an educational leader and responsive partner with the community and region to provide access to relevant programs of the highest quality. Offering state-of-the-art career technical programs (approximately 50% of total enrollment) as well as liberal arts/transfer programs (about 25%) and basic education for adults (about 25%), SCC's comprehensive opportunities transform lives and enrich our communities. As a college we are collectively committed to the work that embraces diversity

Program Overview

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

What makes Spokane Community College unique?
The student's first two years are spent specializing in Software Development, Networking Design & Administration, or Cloud Computing. The field the student chooses for the first two years will determine the subject matter that will be learned during the DevOps B.A.S. typical student schedule.

Criteria 1

Curriculum demonstrates baccalaureate level rigor.

1.1 Program learning outcomes

Spokane Community College has carefully designed the overall curriculum scope, as well as individual courses, to help students gain the knowledge, skills, and abilities needed to be successful DevOps Engineering professionals. Successful graduates of the program will meet all course and program learning outcomes. The Bachelor of Applied Science (BAS) in DevOps Engineering will provide students with a foundation of theoretical and technical knowledge in DevOps. This degree prepares graduates to close the gap between software development and IT operations to create a unified and responsive approach to changing business needs and rapidly releasing high-quality application software and IT systems.

This degree completion program is designed for individuals with two-year degrees in Computer Networking & Administration, Cloud Computing, or Software Development.

Program graduates should be able to:

- Create automated processes to build, test and merge new code written by multiple programmers;
- Enhance the company's IT infrastructure security protocols;
- Identify manual processes that can be automated;
- Consider the organization's entire IT infrastructure when making changes and improvements; and
- Maintain and improve the company's cloud infrastructure.

1.2 Program Evaluation Criteria and Process

Spokane Community College uses a multifaceted approach to review and ensure continuous improvement. Table 1 shows the multiple modalities used and what each modality assesses.

Table 1: Program Assessment

Effectiveness of curriculum/ program — continuously refines curriculum and program design, keeping the program current, including discipline-based, general education and electives	
Course evaluations by students - Quarterly	Effectiveness of curriculum & teaching methods in courses Effectiveness of program in skills & knowledge progression
Student survey and/or focus group mid-point through the program and at graduation- Annually	Effectiveness of the program in skills & knowledge progression Adequate balance of knowledge & skills, theory & practice Effectiveness of program in meeting students' expectations Effectiveness of institutional and program resources and support Preparedness of faculty Preparedness of students upon entering individual courses
Program Review- Every 5 years	Student retention Student course success Student progression through program Correlation of student success and training/job experience prior to entry
Program Viability- Annually	Enrollment rates Faculty/student ratio Financial data
Survey of BAS DevOps Engineering program faculty- Annually	Preparedness of students upon entering individual courses

	Preparedness of students upon entering the program
Graduate follow-up and industry feedback — assesses effectiveness of program in meeting career goals and employer expectations and uses findings to refine curriculum and teaching methodologies	
Survey of program graduates - Quarterly	Effect of program completion on career Effectiveness of program in meeting job expectations Wage and career progression
Survey of employers of program graduates- Annually	Effectiveness of program in meeting job expectations Observed increased skills and performance Perceived strengths and weaknesses of current program
Oversight by Advisory Committee – provides ongoing support and program review	
BAS DevOps Engineering Program Advisory Committee – Twice a Year (minimum)	Completeness & relevance of curriculum to employer needs Trends in field, technologies, practices and job markets
Survey of faculty satisfaction — assesses adequacy of program support and faculty training	
Survey of program faculty- Annually	Effectiveness of institutional & program resources & support Preparedness to teach the curriculum
Impact on two-year programs — assesses impact of BAS DevOps Engineering program on existing degrees	
Survey and/or focus group of students enrolled in two-year degree programs- Annually	Impact of BAS DevOps Engineering program on the quality of the 2-year degrees Impact on faculty availability and support Impact on institution & program resources & support
Survey of faculty teaching the two-year associate degree programs - Annually	Impact of BAS DevOps Engineering program on the quality of the 2-year degree Impact on faculty availability and support Impact on institution & program resources & support

Assessment for the proposed Bachelor of Applied Science (BAS) in DevOps Engineering program is based on the comprehensive student achievement and program assessment processes in place at Spokane Community College for all programs, including associate and baccalaureate degrees. Program review occurs every five years and provides a thorough assessment of every aspect of the program. This peer-review process closely aligns with the College's core themes of Student Success, Teaching and Learning Excellence, College Life and Culture, and Community Engagement. The data-informed process asks the program chair and faculty to review key metrics on student success and enrollment, providing analysis and action plans for improvement.

In 2022, faculty and staff completed the college's 5-year program reviews in Computer Network Design & Administration and Software Development.

This review evaluated the Computer Network Design & Administration and Software Development effectiveness by collecting and analyzing data on student satisfaction, preparedness, and retention; faculty assessment of student preparedness; and effectiveness of courses to meet the program outcomes. The program advisory committee provides an opportunity for college faculty to learn from and engage with industry leaders as these professionals review the curriculum and program elements on a regular basis. The Software Development advisory committee has been expanded from the current 2-year degree advisory committee to better serve the expanded outcomes and scope of the BAS DevOps Engineering program. The role of this committee will be to advise the program on recommended curriculum improvements; help keep the program abreast of changes in the field; assist in student recruitment and placement; and make recommendations for other changes that will keep the program current.

1.3 Course Preparation Needed by Students Transferring with Technical Associate Degree

The BAS DevOps Engineering has been designed for individuals who have earned a professional technical associates degree in Computer Network Design & Administrations, Cloud Computing and Software Development.

In addition to holding a technical associate degree in Computer Network Design & Administrations, Cloud Computing or Software Development, applicants to the BAS DevOps Engineering will need to meet the minimum requirements outlined in Table 2 below. In keeping with the open access mission of the community college, admission requirements have been designed to provide access to many and to ensure that prospective applicants are prepared for success upon entering the program.

Students with technical degrees in Computer Network Design & Administrations, Cloud Computing or Software Development are well prepared for the BAS DevOps Engineering.

Table 2: BAS DevOps Engineering Eligibility

BAS DevOps Engineering Eligibility	
Students may be admitted with an associate degree in Computer Network Design & Administration, Cloud Computing and Software Development	
Eligibility	An associate's degree (90 credits or more) from a regionally accredited college or university in the area of Software Development, Computer Networking, Cloud

	Computing, Computer Science, Information Technology, Information Systems, or related field. Minimum 2.5 cumulative G.P.A. 1. Minimum G.P.A. of 2.0 in one of the following groups of courses: • HTML/CSS3 equivalent to CIS111, Programming equivalent to CIS146, Mobile Development equivalent to CIS218 OR • A+ certification course equivalent to CIS201, Linux/Unix equivalent to CIS213, Database Administration equivalent to CIS277 OR • Cloud Practitioner equivalent to CIS246, Windows Server equivalent to CIS263, SysOps Administrator equivalent to CIS203
Program Prerequisites (General Education) 15 Credits	ENGL& 101 – English Composition I 5 CR CMST&210 – Interpersonal Communication 5 CR MATH& 107 – Math in Society 5 CR

1.4 General Education Component

Spokane Community College has planned carefully to ensure that general education credits and courses meet state guidelines for general education within applied baccalaureate degrees. Over the course of the degree, the state requires that general education credits include a minimum of ten credits of written communication skills, including English composition; five credits of quantitative skills; five credits of humanities; five credits of social science, and five credits of natural science, including at least one life sciences course and one course with a lab.

All BAS DevOps Engineering degree graduates will have taken 50 credits of general education. Fifteen credits of which are typically satisfied at the associate-degree level as confirmed by entrance prerequisites. See Appendix A for list of general education courses included in the Spokane Community College AAS in Computer Network Design and Administration, Cloud Computing, and Software Development. The remaining 35 credits are satisfied by courses in health, business, communication studies and general education distribution courses. General education requirements in the DevOps Engineering degree are outlined in Table 3 below. Courses annotated with an asterisk will be completed as part of the AAS degrees. Course numbers with an ampersand symbol (&) are common course numbers at all Washington State community and technical colleges. Course numbers without the ampersand symbol refer to Spokane Community College Courses.

Table 3: General Education Components

Course Number	Course Title	Credits
Communication – 10 credits:		
*ENGL& 101	English Composition I	5
ENGL& 102	Composition II	5
ENGL& 235	Technical Writing	5
CMST& 101	Introduction to Communication	5
*CMST& 210	Interpersonal Communication	5
CMST& 220	Public Speaking	5
Quantitative/Symbolic Reasoning – 5 credits:		
*MATH& 107	Math in Society	5
MATH& 141	Precalculus I	5
MATH& 142	Precalculus II	5
MATH& 146	Introduction to Statistics	5
MATH 201	Introduction to Finite Mathematics	5
Social Sciences – 5 credits:		
ANTH& 100	Survey of Anthropology	5
GEOG 101	Introduction to Geography	5
PSYC& 100	General Psychology	5
SOC& 101	Introduction to Sociology	5
Humanities – 5 credits:		
CMST 226	Gender Communication	5
CMST 227	Intercultural Communication	5
FILM 141	Introduction to Film	5
MUSC 106	History of Popular Music	5
Natural Sciences with a lab component – 5 credits:		
ASTR& 101	Survey of Astronomy	5
BIOL& 160	General Biology with Lab	5
CHEM& 110	Chemical Concepts w/Lab	5
ENVS& 101	Introduction to Environmental Science	5
GEOL& 101	Introduction to Physical Geology	5
PHYS 100	Introduction Physics	5
Electives – 20 credits:		
CS& 141	Computer Science Java	5
CIS 110	Introduction to Computer Applications	5
CMST 227	Intercultural Communication	5
CMST 250	Managing Conflict Through Communication	5
BUS& 101	Introduction to Business	5
BUS& 201	Business Law	5
HLTH 102	Health Enhancement	5
MATH 108	College Algebra	5
PE 275	Diversity in Sports	5

1.5 Course Work Needed at Junior and Senior Levels in the BAS program

The BAS DevOps Engineering is being designed with working students in mind. Courses will be taught entirely online. All students take the 20 credits of core courses in DevOps (see Table 4), 35 credits of DevOps elective courses (see Table 5), as well as general education courses in communication studies, business, and health. Full course descriptions for the BAS coursework are listed in Appendix B.

Table 4: DVOP Core Courses (20 credits)

Course Number	Course Title	Credits
DVOP 320	Introduction to DevOps	5
DVOP 400	DevOps I	5
DVOP 401	DevOps II	5
DVOP 480	AWS DevOps Engineering	5

Table 5: DVOP Electives (35 credits)

Course Number	Course Title	Credits
DVOP 310	DevOps Programming I	5
DVOP 311	DevOps Programming II	5
DVOP 325	Intro to Virtualization/Cloud	5
DVOP 330	Cloud Architecting I	5
DVOP 340	Linux Server Administration I	5
DVOP 341	Linux Server Administration II	5
DVOP 375	Cisco Infrastructure Automation	5
DVOP 371	Cisco Network Infrastructure I	5
DVOP 372	Cisco Network Infrastructure II	5
DVOP 373	Cisco Network Infrastructure III	5
DVOP 374	Cisco Network Infrastructure IV	5
DVOP 410	DevOps Programming III	5
DVOP 425	Cloud Architecting II	5
DVOP 430	Cloud SysOps Administrator	5

BAS program staff will work with each student to develop pathways into the BAS program based on their education background.

Criteria 2

Qualified faculty.

Faculty	Qualifications
Tami Absalonson Department Chair Full-time	19 years of collegiate teaching 12 years of technical work experience A.A.S. Electronics Engineering Technician Vocational Teaching Certificate, EWU

Karmen Blake Full-time	11 years of collegiate teaching 25 years of technical work experience B.A.E. in Computer Science / Mathematics M.Ed in Computer Science
Scott Dawson Full-time	24 years of collegiate teaching 26 years of technical work experience A.A. Spokane Falls Community College A.A.S. Spokane Community College B.A. Eastern Washington University
Bret Dickey Full-time	15 years of collegiate teaching 23 years of technical work experience A.A. Spokane Falls Community College B.A.E. in Computer Science / Mathematics M.Ed in Computer Science
Dave Jones Full-time	16 years of collegiate teaching 42 years of technical work experience B.S. California Polytechnic University M.S. Pepperdine University
Laura Kier Full-time	15 years of collegiate teaching 20 years of technical work experience Industry Certifications: CCNA, A+, Net+ B.S. Oregon State University

The full-time faculty listed above share appointments with DevOps Engineering and other disciplines. Computer Information Systems will be recruiting for one additional full-time faculty and additional adjunct faculty as needed, with the following qualifications (core competencies):

- Master's degree from a regionally accredited institution in Information Technology or related field.

- Applicable industry certifications.

- Substantial, recent full-time experience in the industry and/or teaching experience in DevOps, Networking, Network Security, Cloud Computing, Software Development, and related areas.

- Demonstrate commitment to working with students and colleagues from diverse backgrounds and academic readiness.

Criteria 3

Selective admissions process, if used for the program, consistent with an open-door institution.

The Spokane Community College Mission and Spokane Community College Equity, Diversity, and Inclusion Strategic Plan specifically focus on eliminating student equity gaps and providing access to high-quality education in a safe and inclusive environment. This focus also applies to the BAS in

DevOps Engineering selection process will primarily come from the existing students in our CIS AAS degree completers. Our newly expanded SCC Outreach team will continue to recruit to our underserved communities and communities of color with our Community Outreach Manager, Adult Reengagement, and Manager. The BIPOC students in our AAS degree programs will be supported along their way to completion by our Diversity/Equity Retention Specialist, ensuring these students make it to the BAS application stage.

Admissions for this degree program will be like Spokane Community College's other Bachelor of Applied Science program. Specifically, it will be a collaborative effort between the Admissions and Registration division, the Outreach department, and Computer Information Systems department faculty.

The Community Colleges of Spokane Marketing and Public Relations office will provide high-level marketing support that includes web development and public facing information. The Spokane Community College Outreach department will provide information sessions and individual appointments. The counseling department and program faculty will provide academic advising and career guidance. The admissions and registration division will accept applications, communicate acceptance status, and register students for classes.

Admissions Criteria

The degree program will use the following admission requirements:

2. An associate's degree (90 credits or more) from a regionally accredited college or university in the area of Software Development, Computer Networking, Cloud Computing, Computer Science, Information Technology, Information Systems, or related field.
3. Minimum 2.5 cumulative G.P.A.
4. Minimum G.P.A. of 2.0 in one of the following groups of courses:
    - HTML/CSS3 equivalent to CIS111, Programming equivalent to CIS146, Mobile Development equivalent to CIS218 OR
    - A+ certification course equivalent to CIS201, Linux/Unix equivalent to CIS213, Database Administration equivalent to CIS277 OR
    - Cloud Practitioner equivalent to CIS246, Windows Server equivalent to CIS263, SysOps Administrator equivalent to CIS203

Selection Process

A small team of faculty and admissions staff will evaluate student admission materials based on the selection rubric in Table 1. Enrollment staff, including a credentials evaluator, will be utilized to review transcripts. Students selected for the program will be contacted with a letter of acceptance and asked to confirm their participation.

Table 1

Application Requirement	Max Points	Notes
Cumulative College Level Associate Degree GPA	40	Multiply cumulative GPA by 10 to determine total points
Average GPA for highest grade in group of required CIS courses	20	Multiply average GPA by 5 to determine total points

Admissions Materials

- Spokane Community College Application (for students new to SCC)
- Spokane Community College BAS Application Form
- Official Transcripts from all previous colleges

Criteria 4

Appropriate student services plan.

Spokane Community College is one of two community colleges that serve the Spokane area and the eastern region of Washington State. Under the authority of the Community Colleges of Spokane (CCS), District 17, SCC helps CCS fulfill the district mission to develop human potential through quality, relevant and affordable learning opportunities that result in improved social and economic well-being for students and the state. This commitment to student achievement is evident in the services provided by student services. Each student at SCC receives support services that are high-quality, student-centered, and easily accessible. As SCC implements new applied baccalaureate degrees, the College will evaluate the increased workload of departments within Student Services. SCC has capacity to serve this new program with current staffing.

Access to Support Services

Students entering the program will receive the same high-quality services offered to SCC's current population. SCC has numerous services available, including online registration, tutoring, 24/7 access to librarians through "ask a librarian," extensive research databases suitable for baccalaureate-level research, KHAN academy links, degree audit, transcript request, and more.

SCC offers in-person, phone and on-line access to admissions, registration, counseling, and financial aid, as well as multiple tours of the campus during any week throughout the academic year. Student success is also encouraged by involvement in student organizations, many of which are connected to career fields.

Admission and Student Advising

Student Success is a core value at SCC and ensuring students complete the educational process is a major responsibility of SCC faculty and staff. The Enrollment and Onboarding Advisor (EOA) will work closely with each student from pre-admission to graduation to ensure student success in the completion of the BAS degree. Faculty will advise students enrolled in the program. Each student will have an individualized schedule and advising plan. Faculty and the EOA are available to students in person, by phone or email to assist with educational planning and the application process.

BAS program faculty will work with students who need additional assistance to develop personalized student success strategies or work with the tutoring center to ensure students have adequate support to be successful. Audits of progress toward degree will be conducted for every student enrolled in the program on a regular basis. Students can also use internet advising services and degree planning worksheets to access their information.

Career Services

Career Services helps students connect to careers and financial assistance. Staff provide career assessments and workshops to support students in reaching career goals while offering opportunities for job connections. Job fairs, Meet the Employers events, interview prep and resume building activities, guide students through various stages of securing a job utilizing individual skills and talents.

Computer Labs

The College provides access to a variety of specialized computer and learning labs. A list of Computer Labs and Instructional Labs including location and hours of operation is located on the college website.

Credentials Evaluation

The Enrollment and Onboarding Advisor has experience evaluating transcripts from accredited institutions and will evaluate incoming students for compliance with admission requirements. Credentials Evaluators in our Transcripts Office will review student records for all degree requirements when students near graduation.

Disability Access Services (DAS)

The DAS office provides assessment and accommodations for students with documented disabilities. Academic accommodations and adjustments for BAS students are available based upon individually needs and may include interpreters, assistive learning devices and technology, note takers, readers, scribes, materials and textbooks in alternate format, large print or Braille materials, alternate testing, information and referral services, and assistance with accessing campus processes. Other academic adjustments may be determined on an individual basis.

Financial Aid

The financial aid office prepares and disburses federal, state, and institutional aid for all SCC students. Students can monitor the status of their application online by accessing the Student Self Service Center located on the Financial Aid website https://ptprd.ctclink.us/psp/ptprd/?cmd=login

Job Placement

Providing help with career advancement and job placement will be priorities for program faculty and career center staff. The advisory committee, comprised of health care professionals, will help to identify jobs. The SCC Career Services has been successful in helping students find jobs by providing comprehensive career services including career planning and exploration, job search and placement assistance, career fairs, work-study, internships, and service-learning opportunities.

Multicultural Services

SCC Multicultural Student Services provides students with assistance in accessing resources on and off campus to enhance their educational experience. Services include but are not limited to advocacy, mentoring, college navigation and personal awareness. The office creates a safe space to engage in culturally responsive practices and discussions that contribute to the overall preparedness of students' success in a global economy. There is a newly remodeled physical space in the main student services building that houses the Center for Inclusion and Diversity. Students are encouraged and challenged to experience education through multiple lenses to learn empathy and increase knowledge. Office staff provide individualized and group support as needed to empower students of color to identify, pursue, and complete educational and personal objectives aligned with their career and life goals.

Library

A computer lab, administered by CCS IT, is located in the library. The library has extensive e-book and periodical databases which support undergraduate students' general research needs. In addition, the library provides interlibrary loan service through which students may request any periodical articles not in the SCC Library collection. Faculty librarians are available to provide Information Literacy instruction to groups in a variety of modes. College librarians provide research help and instruction for individuals through multiple modes including 24/7/365 chat with a Zoom option.

Prior Learning Assessment

The Prior Learning Assessment coordinator works as a liaison between students and faculty. Students who have acquired significant amounts of college level learning based on job training and competencies learned on the job may choose to petition for college credit. Program faculty will evaluate all transfer or prior learning requests for core courses.

Student Engagement and Co-Curricular Opportunities

SCC's size and nature as a comprehensive college creates opportunities for its over 35 student organizations, including several clubs representing professional and technical fields of study. Student organizations, along with other campus programs, are funded through Services and

Activities fees. These funds enable students to travel to regional and national competitions and leadership conferences. Clubs include Architecture, Engineering, and Technology. In addition to clubs and organizations, students have leadership and engagement opportunities through the College's student government and leadership societies. These organizations host educational programs, featured speakers, and social activities throughout the year that help students develop personally and professionally.

Tutoring Center

The Tutoring Center is available from Monday thru Friday to assist students in successfully completing their college courses through one-on-one and group tutoring, workshops, classes and open labs in a variety of subjects including English, math, anatomy & physiology, biology, and chemistry. Students may also access enhanced services in the center including Cranium Café, eTutoring and the KHAN Academy. In addition, the center manager has worked closely with program faculty to align tutoring services with course curriculum. The tutoring center currently employs students from local baccalaureate institutions who will be available to tutor upper-division students.

Veterans Services

The Veterans Services Office assists all eligible veterans, reservists, dependents, and VA chapter 31 students enrolled in the BAS program. The office has created an environment in the Veteran One Stop that encourages interaction between Veterans and civilians to assist with students transitioning out of the Military. The College's Veteran Friendly Contact program provides a network of trained faculty and staff across campus as a resource to support the unique needs of Veterans. Students are invited to participate in the campus Vet club, events and programs. Center staff partner with local and regional resources to support students and maintain a positive relationship with the Washington State Department of Veteran Affairs (WDVA) and the Washington State Vet Corp. Relevant military credit is awarded once a student has earned 10 college level credits and has applied for assessment through the established prior learning assessment process.

Workforce Transitions/Funding

Workforce Education funding programs like Worker Retraining offer tuition assistance to eligible BAS students. In addition to tuition assistance, students may qualify for assistance with books, required class materials and other educational expenses. Office staff provide individualized and group support as needed.

Criteria 5

Commitment to build and sustain a high-quality program.

Assumptions

SCC's financial plan assumes the following:

- Total BAS FTE enrollment will be 10 in year 1, 15 in year 2, 30 in year 3, 40 in year 4, and 50 in year 5
- One new full-time CIS faculty position will start in Year 1. A second new full-time CIS faculty position will start in year 3. Salary is based on 2022/2023 faculty high demand pay scale and will increase by 4% per year.
- Full-time benefits will be 35% of gross salary
- Adjunct/Part-Time faculty salary cost will increase by 10 credits/quarter in years 1 and 2. Adjunct/Part-Time faculty salary cost will increase by 20 credits/quarter in years 3, 4, and 5. Adjunct salaries are based on 2022/2023 pay scale and will increase by 4% per year.
- Current CIS faculty will cover some of the instructional workload and continue to be funded through state allocation and AAS student tuition.
- Per-credit tuition and fees are based on the 2022/2023 rate and assume students are taking full loads and have resident status. Tuition will increase by 4% per year.
- Student fees will be $30 per credit
- SCC areas such as Library, Student Services, and Facilities have their own budgets which cover program specific support
- Budget shortfalls during year 1, year 2, and year 3 will be covered by SCC reserve funds.

Projected program expenses and revenue

	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029
Enrollment (Full-time Equivalent)	10	15	30	40	50
Projected Revenue					
Tuition	71,428	111,428	231,428	319,999	414,285
Course Fees	13,500	20,250	40,500	54,000	67,500
Total Revenue	**84,928**	**131,678**	**271,928**	**373,999**	**481,785**
Projected Expenses					
F/T Faculty Salaries	70,920	73,647	152,750	158,205	163,661

F/T Benefits	24,822	25,777	53,463	55,372	57,281
P/T Faculty	25,865	26,860	55,709	57,698	59,688
Curriculum Development	15,000	15,000	5,000	5,000	0
Goods & Services	5,000	5,200	5,400	5,600	5,800
Marketing and Outreach	20,000	20,000	10,000	10,000	5,000
Total Expenses	**161,606**	**166,484**	**282,321**	**291,876**	**291,430**
Balance	**(76,678)**	**(34,805)**	**(10,893)**	**82,123**	**190,355**

Appropriate facilities

Spokane Community College currently has sufficient computer labs and support for students who want to come on campus. Classes will be taught 100% online so there will not be a need for additional computer labs.

Equipment, technology, and instructional resources

Spokane Community College has existing revenue sources (state funding, student technology fees, Perkins, Worker Retraining, Other grant funds) to fund faculty technology upgrades, eLearning support, learning management system (Canvas), tutoring, and faculty professional development.

Ability to sustain the program over time

Spokane Community College has a successful integrated system for recruiting students into its baccalaureate programs. Marketing, recruiting, and admissions teams will work together to incorporate recruiting Bachelor of Applied Science seeking students as well as students for related associates degree programs.

According to Labor Insight (Burning Glass Technologies), the demand for DevOps engineers is expected to increase by 44% over the next ten years. Both in Washington State and in Spokane Community College's six county service region (Lincoln, Whitman, Stevens, Spokane, Ferry, Pend Oreille). The SCC DevOps Engineering BAS program will fill this demand and attract a growing number of students who want skills and high paying jobs.

Criteria 6

Program specific accreditation.

There is no program specific accreditation required for the DevOps Engineering BAS.

Spokane Community College has already received accreditation from the Northwest Commission on Colleges and Universities (NWCCU) as a four-year degree granting institution effective Spring 2017.

Once Spokane Community College has received SBCTC approval, the college will apply for an NWCCU review of program via the accreditor's process for substantive change.

Criteria 7

Pathway options beyond baccalaureate degree.

While the emphasis of this new degree program is to prepare graduates for employment opportunities within industry, we recognize that some students may want to pursue graduate level education as well.

Central Washington University Information Technology and Administrative Management (MS-ITAM) program offers three IT management specializations and fully accepts students with completed BAS degrees.

Western Governors University offers a master's degree in Information Technology Management and an MBA in Information Technology Management. Both WGU Master's programs accept students with completed BAS degrees.

Additionally, graduates may choose from a variety of Graduate Certificate Programs including Seattle University's Graduate Certificate in Computer Science Fundamentals and UW Bothell's Graduate Certificate in Software Design and Development. Graduates can complete certificates in about a year and then continue with a traditional MS degree in Computer Science.

Criteria 8

External expert evaluation of program.

Spokane Community College selected the following two external experts to evaluate the DevOps Engineering BAS program:

Tom Capaul, MS
Email: tcapaul@uw.edu
Assistant Teaching Professor
Computer Science and Systems, University of Washington Tacoma
https://www.tacoma.uw.edu/set/computer-science-systems-home

Aaron Longwell
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Software Development Manager
Amazon Web Services (AWS)

Suggestions from both experts were used to update curriculum. Completed external review rubrics for both external experts are listed in Appendix C.

Appendix A:

Spokane Community College AAS degrees in Computer Network Design and Administration, Cloud Computing, and Software Development.

Associate of Applied Science Degree - Computer Networking & Administration

Brief Description

In this Computer Networking & Administration degree, you'll develop the critical thinking skills and knowledge needed to create and maintain computer networks. You'll practice optimization, troubleshooting, and using different operating systems and hardware such as Microsoft, CISCO, or LINUX/UNIX.

Course Number	Course Title	Credits
ENGL&101	English Composition I	5
CMST&210	Interpersonal Communication	5
CIS 103	Mobile Devices	2
CIS 106	Network Math	2
CIS 108	Computer Math	3
CIS 134	Virtualization Technologies	5
CIS 201	IT Essentials	5
CIS 206	Introduction to Linux/Unix	5
CIS 213	Advanced Linux/Unix	5
CIS 236	Windows Server Administration	5
CIS 244	Windows Server Installation and Configuration	5
CIS 246	AWS Cloud Practitioner	5
CIS 250	Cisco I Introduction to Networks	5
CIS 251	Cisco II Switching, Routing, and Wireless I	5
CIS 252	Cisco III Switching, Routing, and Wireless II	5
CIS 253	Cisco IV enterprise Networking Security and Automation	5
CIS 263	Advanced Windows Server	5
CIS 270	Principles of Network Security	5
CIS 275	Networking Capstone	5
CIS 277	Database Administration	
CIS 286	Cisco Emerging Technologies	3
Total		90

Associate of Applied Science Degree - Cloud Computing

Brief Description

In this Cloud Computing degree, you'll develop the critical thinking skills and knowledge needed to create and maintain computer networks in the cloud. You'll practice optimization, troubleshooting, and using different operating systems and hardware such as Microsoft, CISCO, or LINUX/UNIX in the Amazon Web Services (AWS) infrastructure.

Course Number	Course Title	Credits
ENGL&101	English Composition I	5
CMST&210	Interpersonal Communication	5
CIS 106	Network Math	2
CIS 108	Computer Math	3
CIS 134	Virtualization Technologies	5
CIS 200	Cisco DevNet	5
CIS 201	IT Essentials	5
CIS 203	AWS SysOps Administrator	5
CIS 206	Introduction to Linux/Unix	5
CIS 207	AWS Solutions Architect I	5
CIS 208	AWS Solutions Architect II	5
CIS 210	Introduction to Multi-Cloud	5
CIS 213	Advanced Linux/Unix	5
CIS 236	Windows Server Administration	5
CIS 244	Windows Server Installation and Configuration	5
CIS 246	AWS Cloud Practitioner	5
CIS 250	Cisco I Introduction to Networks	5
CIS 263	Advanced Windows Server	5
CIS 270	Principles of Network Security	5
CIS 277	Database Administration	5
Total		90

Associate of Applied Science Degree - Software Development

Brief Description

The Software Development AAS degree works with modern technologies and programming languages. The degree exposes students to technologies such as HTML5, CSS3, Responsive Website Design, JavaScript, Node.js, PHP/Laravel, Android/Kotlin and DBMS/SQL. The degree also allows students to develop soft skills in agile development, project management and job preparation techniques.

Course Number	Course Title	Credits
ENGL&101	English Composition I	5
CMST&210	Interpersonal Communication	5
CIS 107	Software Math	2
CIS 108	Computer Math	3

CIS 111	HTML5/CSS3	5
CIS 114	Frontend Development I	5
CIS 117	Frontend Development II	5
CIS 126	DBMS/SQL	5
CIS 130	Responsive Website Design	5
CIS 146	Introduction to Programming	5
CIS 217	Mobile Development I	5
CIS 218	Mobile Development II	5
CIS 225	Content Management Systems	5
CIS 230	PHP I	5
CIS 233	PHP II	5
CIS 258	Backend Development I	5
CIS 259	Backend Development II	5
CIS 272	Agile Software Development	5
CIS 282	Programming Principles	5
Total		90

Appendix B:

Course Descriptions

DVOP 310 DevOps Programming I

This course will teach core programming concepts using examples from strongly typed programming languages. Debugging techniques are utilized by students to solve beginning-level DevOps Engineering problems. The understanding and mastery of the terms, concepts, and theories used by DevOps Engineers are the main objectives of this course.

Prerequisite(s): None

Course Outcomes:

- Understand how weakly and strongly typed programming languages are used in DevOps Engineering
- Identify the five operations common to all programming languages used in DevOps Engineering
- Demonstrate the ability to save information using variables, constants, and abstract data types
- Evaluate arithmetic and Boolean logic expressions used in DevOps Engineering
- Implement Selection and Looping structures used in DevOps Engineering

DVOP 311 DevOps Programming II

Students learn object-oriented fundamentals using a modern programming language. Students are challenged to solve problems in an object-oriented fashion. Students learn scripting of DevOps deployment and management of web-based applications.

Prerequisite(s): DVOP 310 with a passing grade of 2.0 or better, or permission of instructor.

Course Outcomes:

- Understand object-oriented terminology
- Approach, plan for and solve a problem using object-oriented techniques
- Use abstract data types
- Store and retrieve data from files
- Write simple to complex console-based applications
- Use Scripting to control DevOps deployment and Continuous Integration
- Use Scripting to attach to DevOps API's

DVOP 320 Introduction to DevOps

This course provides an explanation and demonstration of Source Control, Continuous Integration, Continuous Delivery, Infrastructure Automation, Deployment Automation, Container Concepts, Orchestration & Cloud Computing. At the end of this course, students will understand and be able to explain the primary responsibilities of a DevOps Engineer.

Prerequisite(s): None

Course Outcomes:

- Explain how Source Control is used in DevOps
- Explain how Continuous Integration is used in DevOps
- Explain how Continuous Delivery is used in DevOps
- Explain how Infrastructure and Deployment Automation is used in DevOps
- Explain how Containers are used in DevOps
- Explain how Orchestration is used in DevOps
- Explain how Cloud Computing is used in DevOps

DVOP 325 Intro to Virtualization/Cloud

This course is designed to provide students with a working knowledge of VMware virtualization and AWS cloud technologies. Students will use VMware to learn the installation, configuration, and setup of virtual machines, how to design, plan, performance-tune, optimize, upgrade, troubleshoot and repair a virtual environment. Additionally students will learn fundamental AWS cloud concepts, pricing, services, security, and architecture.

Prerequisite(s): None

Course Outcomes:

- Understand virtualization and vSphere components including virtual machines, client UI, networking, and storage
- Monitor network connectivity, datastore usage, and virtual machines using performance charts, alarms, tasks, and events
- Manage the lifecycle of virtual machines, create virtual machines using templates and clones
- Identify the global infrastructure components of AWS
- Understand the 6 core AWS services categories and the core subcategories in each

DVOP 330 Cloud Architecting I

Cloud Architecting I covers the fundamentals of building IT infrastructure on AWS, teaching students how to optimize use of the AWS Cloud creating a flexible, scalable, reliable, and highly available infrastructure using the AWS Well-Architected Framework. This course introduces topics to prepare for the AWS Certified Solutions Architect - Associate certification.

Prerequisite(s): DVOP 325

Course Outcomes:

- Make architectural decisions based on AWS architectural principles and best practices
- Use AWS services to make infrastructure scalable, reliable, and highly available
- Use AWS managed services to enable greater flexibility and resiliency in an infrastructure
- Increase performance and reduce cost of a cloud infrastructure built on AWS
- Use the AWS Well-Architected Framework to improve architectures that use AWS solutions
- Build a flexible, scalable, reliable, and highly available infrastructure using the AWS Well-Architected Framework

DVOP 340 Linux Server Administration I

This course introduces students to the LINUX/UNIX operating system providing essential skills needed for Linux systems administration and management including OS installation and configuration, working with the BASH shell, locating and managing files and directories, creating, mounting and managing file systems and server deployment.

Prerequisite(s): None

Course Outcomes:

- Perform basic and advanced OS installation and configuration
- Create, modify, manage, and administrate files, file systems, and directories
- Administrate file and directory permissions
- Manage server deployment including device drivers, system rescue and Linux server storage
- Advanced user management

DVOP 341 Linux Server Administration II

This course expands student knowledge of the LINUX/UNIX operating system providing essential skills needed for Linux systems administration and management including managing processes, version control, administrating users and groups, system backups, application software installation and server application configuration.

Prerequisite(s): DVOP 340 or permission from the instructor

Course Outcomes:

- System customization and management using the shell
- Understand version control
- Understand system initialization and manage system services
- Complete Linux system administration tasks
- Understand application server configurations in Linux
- Configure and maintain security administrative tasks
- Troubleshoot basic system issues

DVOP 375 Cisco Infrastructure Automation

This course focuses on integration and automation of network infrastructure using a variety of programming and infrastructure automation technologies.

Prerequisite(s): DVOP 371

Course Outcomes:

- Identify basic software development and design best practices
- Use basic Python and Linux skills
- Explain basic processes and devices that support network infrastructure connectivity
- Recognize technologies to deploy and secure applications and data in a cloud environment
- Identify Cisco platforms used for collaboration, infrastructure management, and automation
- Implement a development environment using DevNet resources

DVOP 371 Cisco Network Infrastructure I

Cisco Networking Infrastructure I introduces students to networking architectures, models, protocols, and networking elements that connect users, devices, applications and data through the internet and across modern computer networks. Topics include network terminology, IP addressing and Ethernet fundamentals. By the end of the course, students can build simple local area networks (LANs) that integrate IP addressing schemes, foundational network security, and perform basic configurations for routers and switches.

Prerequisite(s): None

Course Outcomes:

- Configure switches and end devices to provide access to local and remote network resources
- Explain how network protocols enable devices to access local and remote network resources
- Explain how the physical, datalink, network, transport, and application layers support communications across data networks
- Configure switch, router, and end device settings to enable end-to-end connectivity between devices
- Understand numbering systems and create IPv4 and IPv6 addressing schemes and verify network connectivity between devices
- Configure switches and routers with device hardening features to enhance security
- Build a simple Ethernet network using routers, switches, and end devices

DVOP 372 Cisco Network Infrastructure II

This course focuses on switching and routing technologies, introducing students to common network operations, configuration, and administration topics, including basic security fundamentals and layer two and small network configuration.

Prerequisite(s): DVOP 371 with a passing grade of 2.0 or better, or permission of instructor.

Course Outcomes:

- Explain layer two forwarding, security, and troubleshooting processes
- Plan, implement, configure, and troubleshoot VLANs and inter-VLAN routing
- Explain, configure, and troubleshoot common link aggregation protocols
- Explain the purpose and types of common redundancy protocols used in networks
- Explain and configure dynamic address allocation with common protocols used in a network
- Plan, implement, and present a network design demonstrating understanding of the topics from this course

DVOP 373 Cisco Network Infrastructure III

This course expands on infrastructure operations topics in switching and routing, including intermediate layer 2 security, WLAN, and routing concepts and configuration. Students are introduced to dynamic and static IPv4 and IPv6 routing and troubleshooting techniques.

Prerequisite(s): DVOP 371 and DVOP 372 with a passing grade of 2.0 or better, or permission of instructor.

Course Outcomes:

- Understand and explain infrastructure operations layer 2 security vulnerabilities and threats, types of attacks, and attack mitigation within a LAN
- Configure switch security to mitigate LAN attacks
- Configure WLANs using a WLC and layer 2 security best practices
- Explain routing concepts, including the routing table and static and dynamic routing
- Configure and troubleshoot IPv4 and IPv6 static routing
- Plan, implement, and present a network design demonstrating understanding of the topics from this course

DVOP 374 Cisco Network Infrastructure IV

This course introduces wide area network (WAN) infrastructure technologies and concepts, such as secure remote access, virtualization, automation, and software defined networking. Basic enterprise network design, management, and troubleshooting are also covered.

Prerequisite(s): DVOP 371, 372 and 373 with a passing grade of 2.0 or better, or permission of instructor.

Course Outcomes:

- Understand and configure basic single-area OSPFv2
- Explain how to mitigate security threats using access control lists
- Configure and verify NAT
- Describe VPN and Ipsec Concepts
- Explain the characteristics of scalable network architectures, including VPN and Ipsec concepts
- Explain the purpose and characteristics of network virtualization and how network automation is enabled through RESTful APIs and configuration management tools
- Plan, implement, and present a network design demonstrating comprehensive understanding of concepts presented in DVOP 371, 372, 373, and 374

DVOP 400 DevOps I

This course teaches the use of popular DevOps tools to implement Continuous Integration (CI) and Continuous Delivery (CD) pipelines for deploying a new version of an application and infrastructure automation used to streamline processes needed to reduce manual intervention.

Prerequisite(s): DVOP 320

Course Outcomes:

- Understand the different between Continuous Deployment and Continuous Delivery
- Implement Continuous Integration using popular DevOps tools
- Implement Continuous Delivery using popular DevOps tools
- Understand how Terraform is used in Infrastructure As Code (IAC)
- Write Terraform configuration files to automate the creation of infrastructure for multiple cloud platforms
- Understand how to manage multiple infrastructure environments with Terraform

DVOP 401 DevOps II

This course teaches the creation of containers and the automated deployment, scaling and management of container applications.

Prerequisite(s): DVOP 400

Course Outcomes:

- Understand the difference between automation and orchestration
- Create containers using popular DevOps tools
- Automate the deployment of container applications
- Automate the scaling of container applications
- Perform management of container applications
- Understand container adoption and managements challenges
- Maintain container security

DVOP 410 DevOps Programming III

This course presents the standards of creating Mobile Applications through the use of either Android Operating System Development and the Kotlin Language. Students will be using remote DevOps pipelines and technologies for application building, testing, and deployment.

Prerequisite(s): DVOP 311

Course Outcomes:

- Use proper language coding techniques in Kotlin
- Build smartphone/tablet applications that utilize the native interface
- Test applications using virtual devices as well as physical smartphone/tablet devices.
- Utilize remote GIT repositories and triggers for incorporation into DevOps pipelines
- Utilize remote mobile application building and testing using DevOps technologies

DVOP 425 Cloud Architecting II

This course expands on the AWS Solutions Architect I topics to prepare for the AWS Certified Solutions Architect Associate Industry certification. The course addresses in-depth knowledge of the Amazon Web Services cloud platform and helps students understand and prepare for remote infrastructure operations.

Prerequisite(s): DVOP 330

Course Outcomes:

- Deploy an Amazon RDS Multi-AZ and Read Replica
- Create a multi-region network with VPC peering using SGs, IGW, and RTs
- Create and configure a network load balancer
- Troubleshoot AWS network connectivity
- Migrate from a relation database to DynamoDB
- Scale EC2 using SQS
- Plan, implement, and present a cloud solution demonstrating understanding of the topics from the AWS Solutions Architect courses, including evaluating customer needs and cost optimization strategies

DVOP 430 Cloud SysOps Administrator

This course introduces topics to prepare for the SOA-COS certification exam through AWS (AWS Certified SysOps Administrator – Associate certification). It provides an overview of the following topics:
- Monitoring, Logging and Remediation
- Reliability and Business Continuity
- Deployment, Provisioning and Automation
- Security and Compliance
- Networking and Content Delivery
- Cost and Performance Optimization

Prerequisite(s): DVOP 330

Course Outcomes:

- Use CloudWatch to monitor/log issues and come up with corrective actions based on the logs in AWS
- Deploy a basic infrastructure using scaling plans with high availability
- Create an automated and/or manual process to provision and maintain cloud resources
- Implement and manage security policies and data/infrastructure protections strategies
- Configure and troubleshoot networking features and connectivity
- Implement cost and performance optimization strategies

DVOP 480 AWS DevOps Engineering

This course teaches how to create deployment pipelines using the AWS Developer Tools suite and the deployment of infrastructure using CloudFormation, Elastic Beanstalk, and OpsWorks. By the end of this course, you will be prepared to take the AWS DevOps Engineer – Professional exam.

Prerequisite(s): DVOP 400

Course Outcomes:

- Understand how Continuous Integration (CI) & Continuous Delivery (CD) concepts are implemented in AWS
- Clone, Commit, Push and Pull an application using CodeCommit
- Setup and configure an application using CodeDeploy
- Deploy an application using CodePipeline
- Deploy infrastructure using CloudFormation, Elastic Beanstalk, and OpsWorks
- Monitor an application using CloudWatch
- Implement AWS Security Monitoring and Auditing Solutions

Appendix C:

Completed external review rubrics.

College Name:	Spokane Community College	BAS Degree Title:	DevOps Engineering
Reviewer Name/ Team Name:	Aaron Longwell	Institutional or Professional Affiliation:	Amazon Web Services Software Development Manager
Professional License or Qualification, if any:		Relationship to Program, if any:	
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 The DevOps movement is the most impactful development in the software industry in the last two decades. There was a time where a minority of innovative firms embraced DevOps practices. Now the vast majority of software development job opportunities require awareness of DevOps concepts like continuous delivery. This program is well positioned to lead to job placement for graduates.		
Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?		
	Comment The learning outcomes cover appropriate breadth for development, operations, and the combined practices of DevOps. The coursework covers sufficient depth with regards to networking, general software development skills, and architecture of cloud-based solutions.		

	A few areas could use more depth: Infrastructure as Code (IAC): CloudFormation is covered in DVOP 480. While CloudFormation is one of the oldest and most widely used infrastructure-as-code platforms, it lacks features of newer alternatives which can be important for DevOps practices. I would encourage inclusion of multi-cloud IAC tools like Terraform, or those which work at a higher level of abstraction (AWS Cloud Development Kit – CDK, Pulumi, etc). Serverless and Kubernetes: Computing operations have evolved from manual processes to highly automated ones. First, we got the basic automation of BASH, then the machine virtualization with VMWare and Xen, then server orchestration with Puppet and Chef, and finally to the commoditization of infrastructure via cloud providers. We are now in the "datacenter as computer" phase with several competing paradigms. One approach uses standardized application components (containers) to program the datacenter via an orchestration layer (like Kubernetes or Elastic Container Service). The other approach (often called "serverless") targets the datacenter's capabilities directly, programming directly against the computation primitives offered by cloud service providers (Lambda, StepFunctions, SQS, SNS, DynamoDB, etc). While the coursework does cover containerization, more could be done to cover operational concerns of containers in production systems. And while individual "serverless" services of AWS are covered (SQS and DynamoDB), more coverage of the serverless paradigm would be useful. Both of the above are highly related. It's difficult to use serverless paradigms without relatively advanced IAC skills. And using containers at scale requires using infrastructure as code tools in the Kubernetes or ECS spheres.
Curriculum Alignment	Does the curriculum align with the program's Statement of Needs Document?
	Comment I'm not aware of the Statement of Needs document.
Academic Relevance and Rigor	Do the core and elective courses align with employer needs and demands? Are the upper-level courses, in particular, relevant to industry? Do the upper-level courses demonstrate standard academic rigor for baccalaureate degrees?

	Comment The upper-level courses seem targeted at the AWS DevOps Engineer – Professional certification. This is an appropriate goal for a DevOps degree. Outside of an academic setting, AWS expects that engineers with about 2 years of professional experience would sit for this certification. The curriculum of this degree appears to cover equivalent experience that should prepare students for this certification. The core coursework also look appropriate, in some cases targeting "associate" level certifications on AWS and other foundational knowledge in preparation for later coursework.
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. Success in software development requires understanding the socio-technical dynamics. The general education curriculum's coverage of technical writing, statistics, public speaking and the liberal arts cover an appropriate depth and breadth.
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 imagine not many graduate degree programs currently exist with a specific focus on DevOps, but I expect that the foundations in computer science and software engineering covered in this degree should be sufficient to prepare graduates to go on to graduate degree programs in a related field.
Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
	Comment Yes, the faculty's multi-disciplinary experience is appropriate to this degree. The emphasis on recent experience in industry will be helpful to encourage continuous evolution of the curriculum.

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 Educational facilities and resources seem adequate for this program. I would have expected to see some expenses accounting for AWS services required to complete coursework. Presumably, students will be responsible for running their own AWS account and can leverage the free tier for most coursework. However, even the free tier requires either a credit or debit card, which may present access issues for unbanked or underbanked students. Has the college considered mechanism to address this need via scholarships?
Membership and Advisory Committee	Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?
	Comment I'm not aware of the Advisory Committee.
Overall assessment and recommendations	Please summarize your overall assessment of the program.
	Comment The BAS in DevOps Engineering program looks like an excellent addition to Spokane Community College's technical programming. The programming aligns with needs in the software development industry and covers the breadth of topics I would expect for a BAS degree in DevOps. While I have some suggested improvements in the depth of curriculum, these tend to be on the leading edge of industry and could be easy to incorporate in future evolutions of the program.

Reviewer Bio or Resume

Aaron Longwell is an engineering manager at Amazon Web Services for Application Composer, a web-based visual editor for CloudFormation and Serverless Application Model (SAM) templates. Aaron has 25 years of experience in the software industry. Prior to AWS, he led a multi-year initiative for the United States Department of State (via Tetra Tech Consulting) to develop a case management system to support rule-of-law in Afghanistan. Prior to that, Aaron was the CTO of Culture Foundry, a development consultancy for mobile and web application development servicing clients like Goodwill, Trimble, 24 Hour Fitness, the Kentucky Derby, and artists like Bonnie Raitt, Crosby Stills & Nash. Aaron has also led the engineering teams for startups in music & entertainment, real estate and e-commerce.

College Name:	Spokane Community College	BAS Degree Title:	DevOps Engineering
Reviewer Name/ Team Name:	Tom Capaul	Institutional or Professional Affiliation:	University of Washington, Tacoma
Professional License or Qualification, if any:	Associate Teaching Professor	Relationship to Program, if any:	none
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 The area of DevOps continues to be an understaffed area in Software Development and Engineering. Washington State technology companies must import most of their DevOps expertise from outside the state. The proposed program helps meet a need that has not yet been met. The depth of coverage in the subject area is thorough and current. I feel strongly the program will lead to either job placement, or the opportunity for subsequent education in software or IT at the Master's level.		
Degree Learning Outcomes	Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?		
	Comment While I did not find specific mention of degree learning outcomes, there were ample course learning outcomes to validate the degree content. It would be nice to include a section describing degree level student outcomes that the courses collectively contribute to. ABET is an excellent resource for bigger picture outcomes for a degree.		

Curriculum Alignment	Does the curriculum align with the program's Statement of Needs Document?
	Comment I was not given access to a Statement of Needs Document, just a Program Proposal Document, so am unable to answer this question at this time.
Academic Relevance and Rigor	Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?
	Comment The requirement of an Associate's Degree in Software Development, Computer Networking, Cloud Computing, Computer Science, Information Technology, Information Systems, or related field ensures a solid foundation for the curriculum. The 50 credits of General Education provides communication skills, both written and oral, as well as exposure to Humanities, Mathematics, and Sciences. The 55 upper level courses have a pure DevOps focus. The courses are relevant to current industry practices. The course descriptions validate there is ample rigor at the junior and senior levels appropriate for a baccalaureate degree.
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 As mentioned in letter d, the General Education requirements are well balanced and typical of a baccalaureate degree in both breadth and 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 Yes. Given the incoming Associate's requirement along with the General Education and core DevOps courses, students will be prepared for graduate programs in similar areas. I like how the proposal mentions specific programs as examples. I would also add that my institution (UW Tacoma) has a Graduate Certificate in Software Development and Engineering that students could easily step into. Additionally, they might also be able to enter the MSIT program at my institution.
	Faculty	Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?
		Comment Faculty have a great deal of industry experience and specialties in the DevOps subject area. I feel they can keep the curriculum current and have vast educational background to assess and improve the curriculum as necessary.
	Resources	Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?
		Comment The proposal lists ample institutional support for prospective students. Labs, libraries, and student support are all in place to aid student success.
	Membership and Advisory Committee	Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?
		Comment I am not aware of approval from any Advisory Committees based on the content of the Degree Proposal.

Overall assessment and recommendations	Please summarize your overall assessment of the program. Comment I feel the faculty that built the proposal did an excellent job considering entry requirements, core curriculum, relevance to industry needs, and possibilities for advanced degrees after graduation. There is sufficient faculty to start the program and with support for growth by adding more faculty over time (also articulated in the draft proposal), I feel the program should be successful. Students that graduate from the program can expect to be employable immediately in the DevOps subject area.

Reviewer Bio or Resume
Evaluator, please insert a short bio here
Tom Capaul

Education

MS Computer Science, Eastern Washington University, 1997

Research Report/Thesis: Online Helpdesk driven by Expert System Engine

BA Computer Science, Eastern Washington University, 1994

Academic Experience

University of Washington, Tacoma, Assistant Teaching Professor Computer Science and Systems. September 2020 to Present, full-time.

Eastern Washington University, Senior Lecturer in Computer Science. June 2003 to August 2020, full-time.

Eastern Washington University, Lecturer in Computer Science, September 1997 to June 2003, full-time.

Eastern Washington University, Graduate Instructor in Computer Science, April 1994 to June 1997, part-time

Edmonds Community College, Computer Science Instructor specializing in C++, Visual Basic, Unix, and Java Programming, September 1999 – June 2000, full-time.

Industry Experience

Aon Intellectual Solutions (2019), worked with team of interns using Python toolkits and AWS to perform natural language processing to identify owners of intellectual property. (part time)

NextSentry Corporation (2010), research on document fingerprinting – created prototype. (part time)

NextSentry Corporation (2009), developer on project to monitor suspicious user activity at banks and credit unions using C# and C++. (part time)

Aurora Consulting Group (2001-2), developer on project to update a bank loan amortization program written in Visual Basic; front and back end website tester. (full time)

Aurora Consulting Group (2000), updated a math calculus and linear algebra education program written in Win32 code. (part time)

Pacific Northwest National Laboratories (PNNL) (1996), Richland Washington: graduate research analyst specializing in modeling data using Visual Basic (part time)

Soph-Ware Associates (1997), developer on a variety of projects, used SGML, Java, Visual Basic, C, C++ (part time)

Washington State Department of Labor and Industries, Olympia Washington: July – December 1994, research analyst intern specializing in database management and queries using Focus and JCL for IBM mainframe (full time)