Bachelor of Applied Science:
IT Networking

Program Proposal

February 26, 2016

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Program Information

Institution Name: Seattle Central College

Degree Name: BAS in IT Networking
Level: Bachelor's Degree
Type: Science
CIP Code: 11.1001
Name of existing associate degree(s) that will serve as the foundation for this program:
Degree: AAS-T in Network Design and Administration **CIP Code:** 11.1001

Proposed Start Implementation Date: Fall 2016

Contact Information (Academic Department Representative)

Name: Wai-Fong Lee, Ph.D.
Title: Interim Vice President for Instruction
Address: 1701 Broadway, BE4180, Seattle, WA 98122
Telephone: 206.934.4062
Fax: 206.934.4390
Email: wai-fong.lee@seattlecolleges.edu

2-26-16

_____   _____
Chief Academic Officer   Date

Bachelor of Applied Science in IT Networking

Program Proposal
Seattle Central College

Introduction

Seattle Central College seeks approval to offer a Bachelor of Applied Science Degree in Information Technology Networking (BAS-ITN) beginning in fall 2016. The proposed BAS-ITN degree will help address market demand for high-level, high-demand occupations, including computer and network administrators and network systems and security analysts. The degree will help meet the growing regional demand for employees with advanced certifications or skills. These include Cisco Certified Network Professionals (CCNP); industry certifications in Microsoft SQL and SharePoint; supplemental skills in PERL; and fluency in advanced programming languages, mobile application security, and cloud-based hybrid environments. Along with these specific skills and certifications, general education in the curriculum will prepare graduates for the current labor market by developing the ability to communicate and build working relationships, solve problems, and plan and structure tasks while allocating time and resources effectively. Graduates will demonstrate determination and logical analysis as they solve problems, anticipate challenges, and work through setbacks.

Seattle Central takes pride in offering top-of-the-line certificate and Associate Applied Science-Transfer (AAS-T) programs for Network Design & Administration with a Cisco Certified Network Administrator (CCNA) certification, as well as building supplemental skills that many employers value. Currently, Seattle Central offers three options for students interested in IT Networking: a four-quarter certificate, an AAS-T degree, and a three-quarter CISCO certificate. These options provide students with the latest industry network skills for entry-to-mid-level jobs. However, for high-level occupations, industry experts report that employers prefer graduates with baccalaureate degrees.

The program will start with a group of twenty FTEs who will enroll in thirty upper division credits and subsequently enroll in thirty additional upper division credits the following year, ultimately graduating with a BAS-ITN degree in the spring of 2018. The courses will be taught by highly qualified faculty in a variety of delivery modes, including face- to-face, hybrid, and fully online. To accommodate working students, courses will be offered during the evening and weekends.

The college plans to add faculty, staff, and library resources in order to support this new degree. Faculty will include both full-time and part-time subject matter experts, along with a full-time faculty BAS-ITN. In addition, to ensure student success, the program will have a dedicated student development specialist and resources allocated for financial aid and library services.

Curriculum Demonstrates Baccalaureate Level Rigor

The BAS-ITN curriculum was developed with input from external industry representatives, along with content experts within the Seattle Colleges District. Program outcomes and course-level outcomes were a result of studying similar curricula at four-year institutions across the Unites States and assessing learning outcomes with local information technology experts from HP, Microsoft, Amazon, and Alaska Airlines to identify required skills. The approved Statement of Need was reviewed by the IT Center for Excellence, who also gave input on program outcomes.

The BAS-ITN is designed for students seeking to pursue employment in the following job categories[1]:

- **Network and Computer Systems Administrators** are responsible for the day-to-day operation of these networks. They organize, install, and support an organization's computer systems, including local area networks (LANs), wide area networks (WANs), network segments, intranets, and other data communication systems.

- **Network Systems and Security Analysts** monitor their organization's networks for security breaches and investigate security violations; install and use software, such as firewalls and data encryption programs to protect sensitive information; prepare reports that document security breaches and the extent of the damage caused by breaches; research information technology (IT) security trends; help plan and carry out an organization's security protocols; and assist in developing security standards and best practices for their organization.

New courses that meet the identified learning outcomes for the BAS-ITN degree were developed based on outcomes assessments, and the program provides for applied learning through internships and practicums. In addition, course sequence and program structure were designed to address the Seattle Colleges District initiative to increase the number of short-term stackable credentials.

The grouping of coursework provides opportunities for full-time students, incumbent workers who wish to upgrade their skills through short-term certificates, and others who want to leverage their existing coursework and experience by adding upper division courses designed specifically to prepare professionals in networking fields. The program is structured to meet the needs of working students whose schedules may require evening and weekend classes and options for enrolling in online and hybrid modalities.

BAS-ITN Program Learning Outcomes

The BAS-ITN program prepares graduates for careers in Networking fields by providing industry-relevant applied education. Instruction focuses on current industry requirements including CCNA, CCNP, Linux,

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[1] Occupational descriptions for The Bureau of Labor Statistics

security, enterprise applications, and hybrid distributed environments. A strong emphasis on industry-based projects throughout the program will prepare graduates to meet current and future industry needs. When students complete the BAS-ITN, they will be able to:

- Describe LAN design using network fundamentals and terminology, such as topology and configuration depending on types of users accessing the network.
- Identify different types of network interfaces and their uses by selecting basic Network components and choosing their appropriate network type and media
- Perform basic network installation and administration of network operating systems by creating and administering user accounts and permissions and configuring network hardware
- Monitor, manage, and troubleshoot networks to track users and network resources such as printers and other peripheral hardware and software
- Explain and implement network industry standards such as: the OSI model; Routing protocols, Address Resolution, and Reverse Address Resolution Protocols; IP Addresses and Sub netting; and MAC addressing.
- Communicate effectively with a wide variety of audiences using appropriate modes such as in-person presentation and electronic formats, preparing network documentation, and strategic operating plans.
- Plan and manage multiple projects, both individually and as a team member
- Apply industry standard techniques for collecting, analyzing, and optimizing data within an enterprise network infrastructure.
- Assess, develop, and maintain network security systems using ethical best practices and standardized tools.
- Design, implement, and manage hybrid-distributed environments.

General Education Learning Outcomes

In addition to the program learning outcomes, Seattle Central students will achieve college-wide student learning outcomes (CWSLO) in diverse and multicultural settings, because they are able to:

Think

- Analyze, create, and reflect to address and appreciate challenges and opportunities
- Gather, interpret, and evaluate information
- Identify problems and issues
- Formulate hypothesis
- Generate and implement creative strategies
- Create and appreciate aesthetic work
- Evaluate their thinking process

Collaborate
- Work effectively with others to learn, complete tasks, and pursue common goals

- Identify problems and create action plans
- Apply understanding and knowledge of group process
- Pursue and critically evaluate different social and cultural perspectives
- Manage conflict productively
- Engage in community and civic life

Communicate
- Exchange ideas and information through intentional listening, speaking, signing, reading, writing, or presenting
- Determine the purpose and context for communicating
- Organize and present information purposefully
- Seek feedback and revise to enhance effectiveness
- Attend to conventions of communication to minimize barriers
- Consider perspectives, experiences, and cultural differences to develop understanding

Connect
- Apply knowledge and skills to solve problems.
- Select and use theoretical models, quantitative and qualitative techniques, information sources, and technology tools
- Identify and solve problems using logical strategies and evaluate results
- Gather data from various reliable sources and assess the validity and relevancy
- Critically evaluate solutions using research–based evidence
- Use technology and apply to a wide range of practices, fields, and industries

Continue Learning
- Self–evaluate and act to improve knowledge and skills.
- Analyze own performance and revise to improve
- Transfer learning by applying it in other contexts
- Increase knowledge by identifying gaps and acting to fill them
- Seek mentors and share knowledge with others
- Provide and receive feedback

Program Evaluation Criteria

Seattle Central has an extensive review process that will be used to examine all aspects of the BAS-ITN degree. At the inception of the Statement of Need, Technical Advisory Committee (TAC) members, local industry representatives, faculty, and staff identified required skills, which led to the development of program and course level learning outcomes. Identified learning outcomes are mapped to Seattle Central's CWSLOs and are vetted through the Curriculum Coordinating Council (CCC).

The CCC committees include Instructional Assessment Committee (IAC), Course Approval Committee (CAC), and the Program Review Committee (PRC). The mission of the IAC is to foster curriculum

development and faculty participation in program planning and maintenance of academic standards, primarily through the development and assessment of student learning outcomes at course, program, and college-wide levels. The CAC reviews new and revised courses submitted by faculty. The course approval process evaluates compliance with college practices, accreditation standards, and alignment with the college mission, core themes, and learning outcomes.

The BAS-ITN degree program will be internally reviewed by the PRC on a four-year cycle to determine if course-level learning outcomes align with the relevant program and CWSLOs. One year before the PRC review, the IAC conducts a learning outcomes assessment review to help guide the program on its assessment efforts. Further, the review process may suggest solutions to challenges, foster collaboration among programs, and provide guidance to strengthen assessment practice and reporting.

Seattle Central is committed to external program studies on a five-year cycle. The BAS-ITN will be reviewed independently to analyze strengths and weaknesses to ensure that the program is relevant to the needs of the local industry and program graduates are successfully securing employment in the field.

In addition to internal program reviews and external program studies, the TAC convenes meetings each quarter. The TAC assesses the program based on the criteria stated above as well as their own workforce needs and the needs of the information technology economic sector. In coordination with the Executive Dean for Workforce Education, program staff will monitor economic trends and gainful employment to ensure that the program offers students relevant curriculum, including work opportunities and internships, along with growth opportunities for graduates. Program staff will track employment rates, wages, and advancements through graduate surveys. The program will also develop a survey to gauge both employer satisfaction with graduates and employed graduates' satisfaction with the BAS-ITN degree.

BAS-ITN program administrator and the Executive Dean for Workforce Education will assess how the BAS-ITN program aligns and articulates with certificates and associate degrees at the college. In addition, the college's Office of Strategic Initiatives and Institutional Research will regularly provide program data such as:

- Total state and contract funded enrollments
- Student FTES
- Faculty FTEF
- Student/faculty ratio
- Student demographics including ethnicity, gender, age
- Completion rates, retention, progression

On an annual basis, the Vice-President for Instruction and the division Dean will analyze this data to assess program quality, resource allocation, student success, and the cost effectiveness of the program.

Lastly, the Northwest Commission on Colleges and Universities (NWCCU) requires ad hoc reports on the implementation and progress of new BAS degree programs. The college is committed to providing the required report for the BAS-ITN program.

EVALUATION AND ASSESSMENT SCHEDULE		
ASSESSMENT REVIEW Review of program and course learning outcomes and associated assessments	PROGRAM REVIEW Review program curriculum, outlines and assessment reports for currency	EXTERNAL REVIEW Review program viability from external industry – using employment data, community perception …
Winter 2018 (All IT AAS-T Programs: Networking, Programming, Web)	Spring 2016 (All IT AAS-T Programs: Networking, Programming, Web)	Winter 2019 (BAS Only)
Spring 2019 (BAS Only)	Spring 2018 (2-yr follow-up for All IT AAS-T Programs: Networking, Programming, Web)	
	Spring 2020 (BAS Only)	

Prerequisites

Full-time applicants to the BAS-ITN Program must possess a minimum of an AAS-T degree in Networking from any one of the many options at regional two-year institutions, or from other regionally accredited institutions. Additionally, applicants must have a cumulative grade point average (GPA) of at least 2.0, and a 2.5 or higher cumulative GPA.

Prior to acceptance into the BAS-ITN, applicants will have completed the following coursework:

- Networking Introduction – 5 credits – specific courses such as: NET 120
- Cisco I, II, III (CCNA) – 15 credits – specific courses such as: NET 142, NET 144, NET 146)
- Network Operating Systems (Desktop OS, Server OS, Network Infrastructure) – 15 credits - specific courses such as: NET 122, NET 124, NET 126
- Unix and Security – 15 credits – specific courses such as: ITC 136, NET 138, ITC 151
- Enterprise Applications – 10 credits – specific courses such as: NET 200
- Technical Writing and IT Math – 6 credits – specific courses such as: MATH 119, ENGL 106
- Related Coursework in Programing and Database – 10 credits – specific courses such as: ITC 110, CSC 110, ITC 15, CSC 142
- General Education – 30 credits – 10 credits of English (ENGL& 101 and ENGL& 102); 5 credits VLPA (HUM 105); 5 credits of Q/SR (MATH& 146); 5 credits of ICS (PSYC& 100); and 5 credits of NW (CSC)

- In addition to general education, students who lack business/management skills will be advised to consider enrolling in any of the Business Technology Management courses that include human resources, supervision, project management, and customer relations as part of their AAS-T degree.

Full-Time Program Planning Sheet

The BAS-ITN curriculum is designed to meet the needs of AAS-T graduates and incumbent workers who may already possess a baccalaureate degree in a non-networking related field. Full-time students may enroll any quarter, fall through spring.

FULL-TIME STUDENT PATHWAY		
BAS-ITN YEAR 1		
FALL	WINTER	SPRING
Linux and Enterprise Scripting Technologies (5) **NTI 300**	Linux Applications (5) **NTI 310**	Optimization and Monitoring of Enterprise Networks (5) **NTI 320**
Enterprise Routing - CCNP 1 (5) **NTI 340**	Enterprise Switching - CCNP 2 (5) **NTI 350**	Enterprise Troubleshooting - CCNP 3 (5) **NTI 360**
Gen Ed: Information Literacy (5) **SOC 330**	Gen Ed (5): Intro to Logic **PHIL& 106**	Gen Ed (5): Programming **CSC 110 or Higher**
BAS-ITN YEAR 2		
FALL	WINTER	SPRING
Collaboration and Secure Content Management (5) **NTI 430**	Network Security for the Enterprise (5) **NTI 410**	Enterprise Virtualization and Cloud Management Capstone or Internship (5) **NTI 470**
Identity and Information Security for the Enterprise (5) **NTI 400**	Devices and Services Cloud Environments (5) **NTI 440**	Practicum (5) **NTI 460**
Gen Ed: International Relations (5) **POLS& 203**	Gen Ed (5): **ECON& 201** or **ECON& 202**	Gen Ed (5): **Lab Science**

Part-time Stackable Pathway Certificates

Courses will be grouped into content areas, such as CCNP, Linux, and Cloud Specialization, providing short-term certificate opportunities for students to attend classes part-time, to add new skills, or to refresh skills. Classes can be taken individually or as a set for Seattle Central certification.

SHORT-TERM CERTIFICATES		
LINUX		
FALL	WINTER	SPRING
Linux and Enterprise Scripting Technologies (5) **NTI 300**	Linux Applications (5) **NTI 310**	Optimization and Monitoring of Enterprise Networks (5) **NTI 320**
Prerequisite: Linux administration experience through coursework or employment experience		
CCNP		
FALL	WINTER	SPRING
Enterprise Routing - CCNP 1 (5) **NTI 340**	Enterprise Switching - CCNP 2 (5) **NTI 350**	Enterprise Troubleshooting - CCNP 3 (5) **NTI 360**
Prerequisite: CCNA coursework		
CLOUD SPECIALIST		
FALL	WINTER	SPRING
Collaboration and Secure Content Management (5) **NTI 430**	Devices and Services Cloud Environments (5) **NTI 440**	Enterprise Virtualization and Cloud Management Capstone or Internship (5) **NTI 470**
Prerequisite: Windows Enterprise and Linux administration experience		

Linux Certificate

This three-class series of courses prepares individuals with previous Linux administration skills for implementation in enterprise computing environments, past the equivalency of Linux+ certification. Students examine and demonstrate auto-configuration, file systems, partitioning, logical volumes, firewalling, LAN/WAN support applications, Enterprise Applications, like web, mobility, email, storage, cloud virtualization, database, and troubleshooting. Students will also implement third-party applications and mixed server environments, including integration with Microsoft and Apple products.

Cisco CCNP Certificate

Students work through the Cisco CCNP curriculum to earn a college certificate and be Cisco certification ready. Applying Cisco coursework to industry, this certificate validates the ability to plan, implement, and verify local and wide-area enterprise networks. This foundational CCNP curriculum prepares administrators for additional variants that support advanced troubleshooting, provisioning for the cloud, advanced security, and voice, wireless and video solutions. The CCNP Routing and Switching certification is appropriate for those with a CCNA and/or a year of networking experience.

Cloud Specialist Certificate

This certificate is designed to provide core knowledge in Internet (cloud) technologies. Four areas of emphasis include: Solution architectures, risk and governance, mobility and applications, and service management. Cloud computing at Seattle Central focuses on new Internet-only business models and the re-ordering of traditional client server local area networking technologies in a highly distributed, mobile world. Entry into the certificate requires Linux and Windows experience. The Enterprise Virtualization and Cloud Management Capstone course requires the highest skill set.

Course Titles and Descriptions

Linux and Enterprise Scripting Technologies (5) NTI 300

Students will explore and develop command-line management skills for Internet Servers and Departmental Servers. They will invoke services at the command line interface to release/invoke extensible and secure processes for server environments using various shells. Students will also explore server programming by using a general purpose high level language, and then they will focus on management by using Perl and a database like MySQL.

Information Literacy (5) SOC 330

This course will introduce students to the organization, retrieval, and evaluation of electronic and print information. Students will be provided with an overview of college library systems, networked information systems, traditional scholarly resources, and the concepts underlying the research process. The course will focus these skills specifically in information technology disciplines by examining various specialized resources.

Enterprise Routing - CCNP1 (5) NTI 340

Students will gain the knowledge and skills needed to analyze, plan, construct, implement, and monitor a scalable routed network. Students will focus on routing protocols for both IPv4 and IPv6: EIGRP and OSPF for an enterprise and BGP for enterprise Internet connectivity and addressing for LANs and WANs. They will also learn how to redistribute routes, implement path control, and secure Cisco routers.

Linux Applications (5) NTI 310

Provides necessary tools to support applications in cloud-enabled networking: Network Management, Firewall (packet filtering), File Sharing, Network maintenance, Distributed Computing, Instant messaging, E-Commerce and Web Business, Finance Management, Financial Accounting, Enterprise Automation, Collaboration Software, Project Management, E-mail/Personal information manager/Groupware Servers, Product data/product lifecycle management (PDM/PLM), SQL Databases, Platform virtual machines, and Windows Compatibility. Implementation and configuration will focus primarily on database-centric application technologies.

Enterprise Switching - CCNP 2 (5) NTI 350

Students will gain the knowledge and skills needed to create an efficient and expandable enterprise network. Students will focus on Layer 2 and multilayer switch functions including VLANs, trunks, inter-VLAN routing, port aggregation, load balancing, spanning tree, and first hop redundancy, as well as network security and high availability features.

Optimization and Monitoring of Enterprise Networks (5) NTI 320

Students will define optimization and monitoring techniques for enterprise networks. They will analyze deployment, implementation, and configuration for availability, capacity, performance, security, reporting, storage, alerts, recovery, backup, and archival. Students will also demonstrate implementation techniques for optimizing and monitoring enterprise networks.

Enterprise Troubleshooting - CCNP3 (5) NTI 360

Students will learn and practice techniques to monitor and troubleshoot routed and switched networks through extensive hands-on lab exercises. Troubleshooting methods, approaches, procedures, and tools will also be explored. A series of different organizations are introduced for each set of troubleshooting scenarios that are presented. Students will solve many of the troubleshooting tickets and debrief and review information that will help further their understanding in the specific issues raised in the scenarios.

Collaboration and Secure Content Management (5) NTI 430

Students will explore the challenges of business case design versus best secure configuration practices. Students will distinguish and apply applications to control data loss and prevention and will investigate collaboration tool challenges in LAN\WAN architectures. Students will also apply basic deployment skills for a DRM enabled workflow environment. Extranet and Intranet collaboration tools and forms are also examined, along with Internet Services, SQL database deployment and security, with a WAN based single sign on process using claims.

Identity and Information Security for the Enterprise (5) NTI 400

Students will create an enterprise view of information security. The course will review and characterize the Information Security Landscape, Risk Management, Security Governance, Legal Frameworks, Policy and Procedure, and Business Continuity. Students will identify and evaluate differences in information technology and information security governance between civil and governmental computing environments.

Network Security for the Enterprise (5) NTI 410

Students will investigate the information enterprise security landscape and describe a design for a hypothetical enterprise. In addition, each student will be expected to operationalize in basic forms: Network security tools, secure Internet applications, application of access controls, implementation of scanning and logging, and a hybrid claims based authentication. Students will also operationalize policy and procedures, compliance, and business continuity in network security configurations for the worlds of client/server and cloud native processes, while reviewing techniques and associated tools.

Devices and Services Cloud Environments (5) NTI 440

Students will describe enterprise mobility, mobility device threats, mobility analytics, and mobility applications. In addition, they will plan and design a mobility implementation for an enterprise scenario while evaluating the limitations and value of an application on different hardware implementations. Students will discuss users, devices, applications, data, and fault tolerance for mobility implementations.

Enterprise Virtualization and Cloud Management Capstone (5) NTI 460

In this practicum course, students will explore and deploy test enterprise class applications as cloud enabled tools and survey and illustrate elements of a services-oriented architecture as compared to a client/server architecture. Students will describe the following as related to cloud computing: automation, scalability, multipath, multi-tenancy, and network virtualization. Students will explore the bandwidth challenges associated with the last mile link to the consumptive devices. Students will also describe and compare current cellular, femtocell, and emerging new Wi-Fi/cellular unification standards using bandwidth constriction points as a guide, as well as architectural and security configuration design associated with implementing a modern hybrid LAN / WAN infrastructure. Students will demonstrate basic server administration through shell scripting as the primary implementation and deployment process.

Practicum (5) NTI 470

Students will gain practical work experience and employment contacts by integrating academic studies with actual on-the-job training situations. Students will produce a major project that responds to a client problem or request. Students may work in teams or carry out an individual project as an internship or externship, while working closely with industry mentors. Emphasis will be placed on research, accuracy, technology skills, timeliness, teamwork, quality, client/customer satisfaction, and usability.

Recommended BAS General Education Courses

Along with the BAS-ITN core curriculum, students will be required to enroll in 30 general education credits (60 total general education credits are required, including 30 earned from the AAS-T degree). The following are recommendations for fulfilling the general education requirements:

- Communication Skills (10 credits required): ENGL& 101, ENGL& 102
- Quantitative/Symbolic Reasoning Skills (5 credits required): MATH& 146
- Humanities (10 credits required): CMST& 220, HUM 105
- Natural Sciences (10 credits required- one class must be a lab class): CSC 110 or Higher, and one lab science course
- Social Sciences (10 credits required): PSYCH& 100, SOC 330
- Additional coursework (15 credits required): ECON& 201, ECON& 202, PHIL& 106, POLS& 203

The BAS-ITN curriculum is rigorous, especially for those who are employed full or part-time. Courses will be offered during nights and weekends and through a variety of modalities including online and hybrid. Within the current AAS-T program, students are supported through advising and counseling, along with

tutoring and extended lab hours. In addition, Seattle Central will provide comprehensive advising along with resources for student success.

BAS-ITN Degree Requirements Summary

NETWORKING AAS-T		
Prefix	Course	Credits
ITC 140	Intro to Computer Hardware	5
NET 120	Network Essentials	5
NET 122	Network OS 1 - Windows	5
NET 124	Network OS II - Infrastructure	5
NET 126	Network OS III - Server	5
ITC 136	Intro to UNIX	5
NET 134	Network Communications	5
NET 138	UNIX for Administrators	5
NET 142	Cisco I	5
NET 144	Cisco II	5
NET 146	Cisco III	5
NET 200	Enterprise Applications	5
ITC 151	Network Security	5
CIS 197	Work Experience	3
	TOTAL	68
GENERAL EDUCATION RECOMMEDNATIONS FOR AAS-T **(A total of 30 general education credits are required for the AAS-T)**		
ENGL& 101	English Composition I	5
ENGL& 102	English Composition II	5
HUM 105	Intercultural Communications	5
MATH136 OR MATH&146	Inferential Statistics or Intro to Statistics	5
PSYC&100	General Psychology	5
CMST& 220	Public Speaking	5
	Total General Education Credits	30
	TOTAL FOR AAS-T DEGREE	98
NETWORKING BAS		
Prefix	Course	Credits
NTI 300	Linux and Enterprise Scripting	5
NTI 310	Linux Applications	5
NTI 320	Optimizing and Monitoring of Enterprise Networks	5
NTI 340	CCNP I- Enterprise Routing	5
NTI 350	CCNP II – Enterprise Switching	5

NTI 360	CCNP III – Enterprise Troubleshooting	5
NTI 400	Information Security for the Enterprise	5
NTI 410	Network Security for the Enterprise	5
NTI 430	Secure Content Management	5
NIT 440	Devices and Services Cloud Environment	5
NTI 460	Practicum	5
NTI 470	Capstone	5
	TOTAL	60

GENERAL EDUCATION RECOMMEDNATIONS FOR AAS-T (A total of 60 general education credits are required for the BAS Degree, including 30 earned during AAS-T completion)		
POLS& 203	International Relations	5
SOC 330	Information Literacy in IT	5
CSC 110 or Higher CSC	Intro to Computer Programming	5
ECON& 201 or ECON& 202	Microeconomics or Macroeconomics	5
PHIL& 106	Intro to Logic	5
Choose any (1) Lab Science		5
	Total General Education Credits	30
	TOTAL FOR BAS DEGREE	188

Students entering the BAS-ITN must have (30) equivalent general education distribution credits from an accredited educational institution.

The Curriculum Development Process

The BAS-ITN curriculum was developed by the faculty in response to the Statement of Need with support from local IT consulting firms and the TAC. Two full-time faculty, four part-time faculty, and the division Dean gathered feedback from employees from HP, Cisco, Microsoft, Amazon, Tek Systems, and independent local businesses. In addition, surveys were conducted with regional employees and vetting through technical advisory committee input.

The BAS-ITN curriculum will include six new 300-level courses during the first year of the program and seven new 400-level courses during the second year of the program. Each of these new courses will go through the college's established course approval process and the curriculum will be reviewed regularly. These courses will be taught by full-time faculty, part-time faculty, or full-time faculty moonlights.

Applied Learning Opportunities

The BAS-ITN degree includes significant applied learning opportunities. Practicums are designed to ensure real-world, practical applications of the concepts and tools learned in a business or organization of the student's choosing, with support from faculty and internship coordinators.

Based on the feedback from employers and the Networking TAC, internships are regarded as an integral part of the learning experience. The internship is a cooperative endeavor among the college's Cooperative Education Department, the BAS-ITN Student Development Specialist, program faculty, field supervisors, and students. Working together, a process will be identified to help students identify special interest areas; place students into appropriate internships that address individual strengths and weaknesses; monitor progress, provide feedback, and assist industry partners and students; and assist students in developing career plans and job placement opportunities.

Students will be required to document their learning by writing a paper or assembling a portfolio analyzing their experiences and demonstrating the ability to relate theory to practice. Internship projects must also provide evidence of key abilities to a prospective employer.

The success of the internship program rests in large part on identifying a range of appropriate placement options and a process for evaluating final projects. Industry partners will be identified by the program coordinator and faculty, who will work with the TAC and industry organizations to create work opportunities for students.

Credit for Prior Learning

Seattle Central will accept up to 25% of the credits for the BAS-ITN degree based on Prior Learning Assessment (PLA). Experiences that could be applied toward a Prior Learning Assessment include previous employment, volunteer work, or personal development. Additionally, Seattle Central follows the recommendations made by the American Council on Education when evaluating military training and education records. Students may test out of specified courses by taking the respective final examination. Students may also receive credit through Prior Experiential Learning (PEL). This method is appropriate for persons who have acquired knowledge and skills in ways that are not covered by traditional tests and transcripts. Lead faculty will evaluate PEL for match to degree outcomes and award course level-credit, or use as a mechanism to assess program readiness.

With appropriate documentation, students may request college credit for these alternative learning experiences. Credits earned through PLA will recognize obtained skills that prepare students to enter the BAS-ITN and may help students to reduce the amount of in-class time required to earn a degree. Students will analyze past experiences and determine which Seattle Central course(s) matches their prior learning.

PLA does not replace transfer academic credit that has been received in other institutions. Moreover, PLA cannot replace an existing method of obtaining credit(s) at the college, such as College Level Examination Program (CLEP), Challenge Examinations, DANTES, & Advanced Placement Programs Students seeking to transfer credits from another institution must complete the Incoming Academic Transcript Evaluation form and should contact the Transcript Evaluator.

Qualified Faculty

The Technical Advisory Committee and independent consultants analyzed the faculty and staff needs of the program, as well as their educational and professional qualifications. The number of instructors needed is based on the number of students to be enrolled and the number of courses offered per quarter during the school year. In Year 1, the college will hire at least one full-time faculty dedicated to the program.

Current full-time faculty in our AAS-T program have a combination of education and industry experience: either a Master's Degree in Information Systems, or similar degree and at least five years of industry experience; or a Bachelor's Degree in Network Administration or a related information technology field, and at least seven years of work experience in an IT networking related field. Faculty are also be expected to have any of the following industry certifications: CCNA, CCNP, CompTIA A+, MSCE, MCSA or similar. For example, faculty who teach CCNP coursework are not only required to have CCNP certification, but also Cisco instructor certification in order to teach the curriculum. Thus, a Master's Degree is not required.

Faculty teaching upper-level coursework will also possess a Master's Degree in Computer Science, Information Systems, or equivalent. Experience in teaching in higher education, preferably at a four-year institution, as well as experience in student advising will be required. Every effort will be made to find the most qualified candidate with the credentials and classroom experience to be effective.

A table of potential teaching assignments for faculty within the BAS-ITN, including those who teach lower-level AAS-T courses is listed below, along with degrees and certifications. A full-time Faculty Lead and additional full-time faculty member will be hired.

BAS-ITN FACULTY AND CREDENTIALS			
Full-Time Faculty			
NAME	DEGREES	CERTS	COURSEWORK OPTIONS
Faculty Lead (to hire)	MS- Comp Sci or Information Systems	Min: CCNA, CCNP (and equiv to MCSE)	BAS: NTI 460-470

FT Faculty (to hire)	MS- Comp Sci or Information Systems	Min: CCNA, CCNP	BAS: NTI 300, NTU, 310, NTI 330, NTI 410, NTI 430, NTI 440
Stani Meredith	MS – Comp Sci		AAS-T: ITC
Ed Messerly	MS – Comp SC; MFA	MCI, MCSE, CCNA	BAS: NTI 320, NTI 400 NTI 410; AAS-T: NET, ITC
Part-Time Faculty			
Deborah Higdon	MS – Counseling	MCSE, CCNA	AAS-T: CCNA, NET
Bob Costello	MS – Engineering	MCSE, CCNA	AAS-T: CCNA, NET, ITC
Greg Jackson*	BA- Business	MCSE, CCNA, A+, CCNP in Progress	BAS: CCNA; AAS-T: CCNP, NET
General Education			
All general education courses, including NTI 301 and NTI 330 will be taught by faculty throughout the college who possess a minimum of a Master's Degree. Every effort will be made to assign 300-level general education courses to those who possess a Ph.D.			

The same high standards will apply to part-time faculty who teach upper division courses, with the exception of the CCNP noted earlier. Part-time faculty selected to teach AAS-T level courses will have at least a Bachelor's Degree, along with real-world experience directly applicable to the course being taught. Prior college teaching experience is preferred, but not required, yet all faculty teaching professional technical courses will possess the certification requirements included in the Washington Administrative Code.

The program will utilize the experience of Central's and the District's existing faculty who have earned advanced degrees and have college teaching experience at the four-year level. Selected faculty will be a part of the advisory committees, curriculum development committees, and faculty recruitment committees and will participate in team-teaching activities and guest lectures. At the same time, general education requirements will be taught by Central's current faculty who possess Master's Degrees or higher.

The college will allocate professional development funds for all faculty to promote advancement and "back to Industry opportunities" to keep current with the rapidly changing information technology landscape, including opportunities for CCNP certification training to meet curricular needs. Funds will be made available for faculty to further increase their pedagogical skills in order to deliver curriculum that compels and reinforces student engagement. The college is in an advantageous position with several other BAS degrees across the district; moreover, existing faculty within the district can support each other by sharing successes and challenges.

The college is deeply committed to hiring diverse faculty. The college participates in recruiting fairs specifically for faculty of color and advertises with higher education journals that focus on diversity hiring. Seattle Central provides LGBTA and diversity training for all faculty, staff, and administrators and applies these principles to its hiring practices.

Selective Admissions Process

Students will go through an application process with clearly defined minimum qualifications and prerequisites. Students will be expected to have completed an AAS-T degree with a minimum 2.5 cumulative GPA and to have completed 30 general education credits and 68 credits of IT Networking courses. In addition, Seattle Central is currently revising AAS-T degrees in Programming, Web Development and Mobile Development to provide easier pathways into the BAS-ITN, while also creating better alignments for students completing degrees at other colleges. Program faculty and the Networking Technical Advisory Committee are reviewing the draft application, along with Multicultural Services. A revised draft will be completed by Early May.

In the event that the number of qualified applicants exceeds the seats available and additional classes cannot be opened, the program will admit students based on a random selection of candidates who meet minimum entrance criteria, apply by the listed closing date, and with preference given to those who have received Foundation Scholarships. A wait list will be formed for the remaining qualified candidates. This process will be evaluated every year. Key factors relevant to evaluating the process include student diversity, student retention, and academic achievement.

After the initial year of 20 FTEs, approximately 40 FTEs, including both full-time and part-time students is expected. Initial program advising and orientation, along with a Student Handbook that outlines procedures, expectations, and requirements, will be provided to all BAS-ITN students.

Seattle Community Colleges are in an excellent position to ensure diversity. The Student Development Specialist, the Faculty Lead, in collaboration with the Division Dean, will work with Multicultural Services in attempt to recruit, retain and complete underrepresented populations. Nearly 56% of Seattle Central's 11,500 State-supported students are people of color, and every effort will be made to ensure that the program will serve a diverse population. In addition to outreach within the local community, the college and Seattle Vocational Institute are currently working with several partners to increase program diversity, including: Floodgate, who seeks to partner with and invest in educational institutions that prepare underrepresented populations for technology-related fields; National Center for Women & Information Technology (NCWIT), an organization that works to increase the meaningful participation of girls and women in computing; along with local chapters of IGNITE, who inspire girls to become the future technology leaders and innovators of our world. These partnerships will provide necessary resources to prepare underrepresented populations with the necessary skills to enter the Networking AAS-T, and ultimately the BAS-ITN.

Enrollment

Seattle Central has used an initial program size of 40 FTEs for all BAS degree proposals since 2008 for the purpose of projecting budgets and planning. This requirement has served as a good starting point for new programs that are viable and affordable.

Given the results obtained from current student surveys, current employee surveys, and the steady enrollment of 50-55 students in our current Networking AAS-T degree program, as well as more than 110 AAS-T graduates from feeder colleges of Bellevue College, Green River College, and North Seattle College, the college estimates at least 40 FTEs in the BAS-ITN program each year after the initial year. The projected pool of potential BAS-ITN students is expected to be a combination of continuing students, students transferring from other institutions, and incumbent workers.

The BAS-ITN program will provide flexibility that students need. In a recent survey, 65% of students preferred classes in the afternoons and evenings, and nearly half were interested in online or hybrid modalities. By offering convenient times and instructional modes, the proposed program will enable current industry employees to upgrade their qualifications without leaving work to do so. At the same time, the college is exploring opportunities to award credits for prior leaning in order to ease the educational workload while maintaining program rigor.

Student Services Plan

The Student Services unit is in a strong position to accommodate needs associated with this degree. Key forces driving improvements in student services at the college include the Washington State Student Achievement Initiative, the new funding allocation model for high demand FTES, and new administrative leadership committed to student success. In addition, three new advisor positions have been added to provide ongoing student support, navigation, and career and completion coaching to meet the level of need of our students. These eight individuals, along with the Director of Advising and the Associate Director of Advising, have developed a cross-training program that will provide up-front advising, academic counseling and career services from a greater number of advisors. These advisors support both professional technical AAS and AAS-T programs and transfer degree programs.

Students will also have the advantage of program-specific support from a BAS-ITN dedicated Student Development Specialist assigned to the program. This specialist will provide comprehensive advising regarding credential evaluations, scheduling, academic support options, and other student services that may be needed.

The Student Development Specialist will work closely with existing Student Services departments that already support multiple BAS degrees, and who will provide overload support for the specialist. The

specialist, Student Services and program faculty will collaborate to develop a program-specific BAS-ITN Student Handbook to include the following:

- Information about college including the goals and student learning outcomes of both the college and BAS-ITN program specifically
- Procedures for getting started – admissions, advising, registration, financial aid, as well as for finishing/graduation requirements.
- Program policies – leave of absence, satisfactory progress
- Course of study information – curriculum map, internships
- Student Services – veteran's services, bookstore, disability support,
- Career Services and Cooperative Education – work-based opportunities, internships, career advice, job readiness, job placement
- Academic help – tutoring, writing center, math center, library, computer labs

During the 2012-13 academic year, Seattle Central students were awarded just over $19 Million in financial aid. The college expects that many BAS-ITN students will be eligible for and will want access to financial aid. Therefore, the Financial Aid unit will dedicate staff time to work with BAS-ITN students. Financial Aid staff will be assigned specifically to help students navigate potential VA requirements, process FAFSA paperwork in a timely manner, and assist students in completing scholarship applications offered both internally and externally. The college's Financial Aid Office has been approved to offer third- and fourth-year funding from the Department of Education and currently supports BAS Degrees in Allied Health and Applied Behavioral Science.

Another consideration for BAS-ITN students is the support from the college's Office of Workforce Education, an important conduit to financial aid. This office provides access to BFET, WorkSource and Worker Retraining funds, as well as access to numerous community-based organizations that can provide a variety of supports for retention and completion efforts. Additionally, the Seattle Central College Foundation raises funds and creates endowments for scholarships, tutoring, emergency assistance, and faculty development, and supports student programs.

In addition to program navigation duties, the specialist will work directly with the Cooperative Education Department (CED) and the Career Services Department (CSD) to create the process for work-based components of the degree. The CED will collaborate directly with faculty to set up internships and match student interests with employer needs, while the CSD will guide students on employment prospects, job requirements and salaries. The CSD will also assist students with résumé development and interviewing skills.

While meaningful upfront advising and orientation are essential to student success, the Student Development Specialist, BAS-ITN faculty and student support staff will focus on retention as well. The specialist will consult with, and provide information to program counselors who have access to an advisor dashboard, and the Faculty Lead, who will have one-third release time to help develop an early warning process. Information within the dashboard provides a mechanism for Academic Early Warnings

modeled on the program offered to associate degree students. At the same time, full-time and part-time faculty will alert the Faculty Lead, specialist and program advisors of BAS-ITN students who are experiencing difficulty.

Library Resources

The Seattle Central library will ensure that students and faculty in the baccalaureate program have the appropriate information resources, access to subject matter experts, and facilities to support the currency, depth, and breadth of the degree.

Upper-level courses require in-depth library research instruction and discipline-specific resources. The college's full-time librarians are each assigned as liaisons to specific instructional divisions. The librarians work closely with program faculty to build relevant library collections and integrate information literacy instruction into the curriculum to meet student learning outcomes. Librarians seek faculty feedback to identify research databases, journals, books, media, and other resources needed to support the curriculum. Funds will be allocated for librarian support and library materials to support the increased emphasis on research.

The college has accessible databases, periodicals, and book collections for lower-division IT courses, and additional allocated funds will allow library faculty and staff to acquire the necessary reference materials to meet the needs of junior and senior level IT students. Similarly, the periodicals and serials will be improved and upgraded to reflect the depth necessary for exploration and research. Finally, the library will maintain subscriptions to databases such as MSDN, CM Digital Library, and the IEEE Computer Society Digital Library.

Additionally, the college is engaged in a restructure of the Tutoring Unit to provide central administration, expanded hours of access and a focus on professional technical programs, with a specific focus on supporting students pursuing BAS degrees. Changes will be implemented by Fall 2016.

Administration

The division Dean has overall responsibility for this program. The Student Development Specialist will coordinate outreach, internships, administrative tasks, and navigation. The specialist will work closely with the Director of IT Programs and the division Dean. The Director of IT Programs will assist the division Dean with hiring and evaluating faculty. The Dean will ensure the academic quality, rigor, and integrity of the degree and advocate for the necessary college-wide support for the degree.

The BAS-ITN faculty will work closely with the Dean and Vice President for Instruction to deliver rigorous high-quality instruction and maintain a high level of scholarship and faculty professional development.

Moreover, the program will have part-time office support to assist the Student Development Specialist who serves as liaison to Financial Aid, Advising, and Cooperative Education. Responsibilities will include fielding student inquiries, supporting curriculum development, the BAS-ITN Technical Advisory Committee, and recruitment and admissions activities.

Commitment to Build and Sustain a High Quality Program

Funding will be allocated to Seattle Central's BAS-ITN starting in 2016 with a one-time allocation of $119,000 for pre-enrollment curriculum development, faculty professional development, and equipment purchases.

Recurring revenue sources in subsequent years include funds collected from student tuition and fees and the normal state allocation. For the 2016-2017 academic year, tuition and fees for 10 credits of upper division courses is $6,392 per year, not including S&A and building fees. This figure is used throughout the budget planning process, although tuition may increase or decrease.

Seattle Central has demonstrated the capacity and resources to build and sustain quality baccalaureate programs of study. This program will be Seattle Central's third BAS degree. The college's record of accomplishment demonstrates its commitment to providing adequate financial and human resources to make the program a success. The financial plan for the BAS-ITN program proposal is provided below, including projections of all the costs, expenditures, and revenue streams to support the proposal. Moreover, the proposed budget is sufficient to fund the necessary activities to build and sustain an outstanding program that will meet or exceed accreditation standards.

Seattle Central projects the expenses to be $119,000 for the planning year, $254,942 for the first year, $286,958 for the second year, $263,873 for the third year and $260,646 for the fourth year. Equipment replacement costs in the first year are reflected in the increased costs over subsequent years.

The first four years of operation (2016-2020) will be supplemented by tuition and fees. A conservative estimate of tuition revenues is $127,840 for the first year and $255,680 for subsequent years. This assumes a stable tuition. To account for attrition and fluctuations in enrollment, a conservative estimate of 10 credits per student per quarter is used.

Proposed Budget for BAS-ITN Degree

Expenses					
Personnel	*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*
PT - Faculty			$38,000	$28,000	$28,000
FT Lead Faculty		$56,000	$56,560	$57,125	$57,696
Faculty Curriculum Development	$36,000	$3,000	$3,000	$3,000	$3,000
Office Support (0.25)		$7,000	$7,070	$7,140	$7,212
Library Faculty (.15)		$8,400	$8,484	$8,569	$8,655
Student Development Specialist (1.0)		$50,000	$50,500	$51,005	$51,515
Financial Aid Assistant (0.25)		$11,250	$11,362	$11,476	$11,591
Contracted Services	$4,000	$4,000	$4,000		
Subtotal	$40,000	$139,650	$178,976	$166,315	$167,669
Benefits@31%	$0	$43,292	$55,482	$51,558	$51,977
Total	$40,000	$182,942	$234,458	$217,873	$219,646

Item	Year 0	Year 1	Year 2	Year 3	Year 4
Goods & Services	$1,500	$5,500	$5,500	$5,500	$5,500
Professional Development	$7,500	$10,000	$7,500	$7,500	$7,500
Equipment	$60,000	$30,000	$15,000	$10,000	$5,000
Marketing		$7,000	$5,000	$3,500	$3,500
Software		$4,500	$4,500	$4,500	$4,500
Library Materials	$10,000	$15,000	$15,000	$15,000	$15,000
Totals	$79,000	$72,000	$52,500	$46,000	$41,000

Grand Total	$119,000	$254,942	$286,958	$263,873	$260,646

Revenues					
Item	Year 0	Year 1	Year 2	Year 3	Year 4
Projected Tuition @ $6,392/yr.		$127,840	$255,680	$255,680	$255,680
Fees @ $100/qtr.		$6,000	$12,000	$12,000	$12,000
Totals		$133,840	$267,680	$267,680	$267,680

FTE Enrollments: 20, 40, 40, 40

Difference	($119,000)	($121,102)	($19,278)	$3,807	$7,034

Expenses

- $36,000 will be allocated to faculty for curriculum development, attendance at advisory committee meetings, etc. during the planning year.
  Personnel for instruction include salary and benefits for a full-time faculty in Year 1 of operation and part-time faculty beginning Year 2. Stipends for curriculum development and advisory committee coordination are included in this budget. Part-time instructors will be utilized beginning summer 2016. Once initial curriculum development in completed by the end of year 1, the full-time faculty member will begin teaching three courses and the remaining courses will be taught by part-time faculty. It is expected that students will complete many of their general education requirements by enrolling in existing courses.
- Additional library faculty (.15) will be dedicated to facilitate materials selection and acquisition associated with expansion of the library to support the baccalaureate degree as well work directly with the BAS students.
- The college will hire a full-time Student Development Specialist.
- A part-time (.25) office support person will also be hired in the first year of operation.
- A part-time (.25) Financial Aid assistant will be dedicated to the BAS students in the first year and will continue through the next three years. This funding will help support an additional hire in the department.
- Benefits are calculated at 31%. A 1% cost of living raise is expected annually.
- Goods and services include desk supplies, and teaching and learning materials for the program.
- Professional Development includes registration, hotel, and travel expenses to conferences for faculty/staff.
- Equipment includes network appliances, workstations and switches for BAS students purchased in the first year and its on-going maintenance in the next three years of operation. Some of these purchases will be supported by student fees.
- Marketing and outreach costs include brochures, college fairs, etc.
- Software includes purchasing and licensure.
- Library materials include the acquisition of databases, e-books, and journals to support the increased emphasis on research.

Revenues

The college forecasts enrollment of 20 students per year for a total of 40 students in the program for subsequent years of operation. For accuracy, however, the actual tuition and fees budget line item is based on 20 students in Year 1, and 40 students thereafter.

- Staff will work with the Seattle Central Foundation to raise additional funds for both scholarships and operations.
- The calculations for tuition and fees $6,392/student/year are based on the current 2015-16 rates for the Applied Baccalaureate degree according to the SBCTC. For planning purposes, 10 credits @ $2,131 per-quarter is being used.
- Each student will pay approximately $100 per quarter in fees.

The college realizes that if enrollment does not reach the expected targets listed here, or the attrition rate is higher than anticipated, program will be underwritten until enrollment and retention have reached sufficient numbers to support itself.

Program Specific Accreditation

In 2012, the Northwest Commission on Colleges and Universities (NWCCU) granted initial accreditation to Seattle Central at the baccalaureate level to include the BAS program in Applied Behavioral Science effective September 1, 2011; and more recently, the BAS in Allied Health was approved in 2014. The college will seek similar approval from NWCCU for the BAS-ITN program. Currently, no specialized accreditation is required for this program. If needed, the Technical Advisory Committee will help identify any specialized accrediting bodies that may apply to this program in the future.

Employment in networking related fields typically requires industry recognized certifications, including those identified by Cisco, CompTIA, and Microsoft. Additionally, new network security standards have started a dialog among industry professionals that may lead to standard Linux and security certifications. The BAS-ITN is designed to prepare students, not only for the certification content, but also certification exam preparation. BAS-ITN faculty are discussing potential test preparation courses to be offered during summer quarters in preparation for certification testing.

Pathway Options beyond the Baccalaureate Degree

Seattle Central is in collaboration with Dr. Kirstein, Vice President of Student Affairs, and Dr. Lee, Regional Director at City University on articulation agreements from the BAS-ITN into a Master's Degree

in Business Administration. Currently, North Seattle College has established a similar articulation and there have been several conversations, with positive response, on establishing a similar agreement to fit the requirements of Central's BAS-ITN. Within Dr. Kirstein's last email communication in March, he noted, it was "something we can set up fairly quickly… we will work up a draft of the articulation and get it ready for your review".

In addition, Dr. Hulbert, Interim Provost and Vice-President for Academic and Student Life at Central Washington University, has agreed to review articulation agreements from North Seattle College into CWU's Masters of Science in Information Technology and Administrative Management (MS-ITAM), with the potential to create a similar agreement with Seattle Central. We expect to finalize discussions and the agreement within 30 days.

The college has also entered into discussions with Western Governors University for potential articulation agreements into MS programs, such as Information Systems and Computer Science. Because programs at Washington State four-year universities are so competitive, articulation agreements may not be possible, but the college will work to ensure that BAS-ITN graduates from Seattle Central will be judged on the merit of their applications and strong academic preparation.

External Evaluation of the BAS-ITN

External reviewers were sought from faculty, department heads, and program coordinators of four-year universities, along with senior level industry representatives. Three individuals were chosen to review the program proposal and provide feedback on the quality of the program design. Standard review rubrics were provided to the reviewers for comment (see Appendices). A summary of the review findings are listed below. The external reviewers were:

- Timothy Foster, Instructional Designer, and Senior Support Systems Analyst, Arizona State University
- Aaron Seydlitz, Senior Network Engineer, Puget Sound Energy
- Alan Carter, Faculty Lead, Green River College

Mr. Foster commented, "this program is appropriate and very marketable. The college would provide students with a strong and sought after degree that could lead to several high tech career paths." In addition, he also noted the consistency between the BAS-ITN Program and those of other colleges and universities. However, Mr. Foster acknowledged the need for Seattle Central faculty to teach competing technologies from various vendors, while also implementing multiple modalities supported by Quality Matters (QM). The BAS-ITN administrator and faculty agree with the need to partner with various sectors of the industry, including manufacturers, vendors, and end users. An ongoing dialog will continue as both industry representatives and skills requirements change. In addition, BAS-ITN

curriculum has been designed to support place bound students by including options for online or hybrid modalities, which are reviewed and supported by our eLearning unit.

Mr. Foster noted, "Core skills in management are lacking." In response, faculty have integrated teamwork and managing multiple projects, giving students experience in both leadership and follower roles throughout the BAS-ITN degree. In addition, students will be encouraged to include managerial components into their practicum and capstone projects.

Other areas of concern included faculty qualifications, equipment and pathways for students into Master's Degrees. One reviewer noted the necessity for a Master's Degree in Information Systems as a minimum requirement to teach within the BAS-ITN's core curriculum. However, local industry professionals felt that a Bachelor's Degree and seven-ten years of experience should also be considered, especially when teaching industry standard curriculum, such as CCNP. In addition, BAS-ITN faculty are working with several four-year universities to discuss pathways into Master's Degrees, including an MS in Information Systems from the University of Washington, as suggested in the external review

Mr. Foster also made suggestions regarding the types of equipment to support the initial CCNP coursework. This need has been addressed in the Year 0 portion of the budget.

Aaron Seydlitz, a senior network engineer at Puget Sound Energy noted the necessity of the Cisco curriculum along with suggestions for the use of ITIL. According to faculty and the Networking TAC, who reviewed Mr. Seydlitz's comments, they are accurate for a BAS that is concerned with only the wire (physical media, switches, routers, appliances and load balancing) elements of networking. However, Central's BAS-ITN is oriented to networking professionals who need skills for companies transitioning or integrating a cloud devices and services environment. We envision professionals and recent AAS-T graduates to handle business processes for small to medium sized organizations using either LAN based client server technologies or Internet services architecture. As a result, our BAS is designed as a series of interconnected certificates that leads to a BAS Degree.

In addition, we considered the ITIL framework for our BAS degree and ultimately rejected it. It is a core skill set for very large well-established companies with legacy tools that require careful change management structures. The Seattle area is known as one of primary locations for the cloud IT transformation. We are home to Amazon and Microsoft, in contrast with only a few major corporations in the area with this direct ITIL need.

Mr. Seydlitz argued, "a program that is networking focused should not be aligned with any one particular server operating system… teaching the fundamentals of networking, with some consideration to the specific needs of cloud computing (such as virtualization) should be sufficient." The region is transitioning to a cloud enabled computing structure. The challenges faced by networking professionals today is that cloud computing blurs the line between computers and networks. Our program reflects that business dynamic. Faculty feels that the AAS-T adequately prepares students in networking fundamentals, but not cloud-based computing. Google, Microsoft, Amazon, Apple and Facebook all

require staff that are trained in open technologies. At the same time, faculty will continue to review curriculum and create seamless transitions based on Mr. Seydlitz's note that "Cloud networking is the vital to the future networking professional, however the unique considerations for the cloud are not as far beyond the current requirements for a successful network engineer as this course assumes."

Mr. Carter noted that the total number credits from prerequisite requirements through the BAS Degree would total 207 Credits. The current AAS-T degree is under revision from (107-117) to 98 credits. The total of 188 credits for the BAS-ITN is slightly above the 180-credit threshold. However, students are taught to the potential of earning multiple industry-based certifications, including CCNA, CCNP, and Linux+.

In addition, Mr. Carter mentions PowerShell omission. This information is taught within our AAS-T Windows Enterprise courses. At the same time, the inclusion of Python is under discussion with the Networking TAC.

In addition to the formal reviews, an informal review was conducted by systems engineers from Amazon. One noted the importance of the degree, but was leery of brand-specific certifications. In contrast, another noted the importance of certifications when working for a small business or in academia. In response, faculty argued that many graduates would be employed by small to medium businesses and not major corporations. These businesses do rely upon industry recognized, brand-specific certifications as a benchmark for assessing skills. In addition, faculty have modified the curriculum to address reviewer concerns in regard to ticketing, monitoring and disaster recovery.

Appendices

External Review – Timothy Foster, Arizona State University

External Review – Aaron Seydlitz, Puget Sound Energy

External Review – Alan Carter, Green River College

Informal Review – Amazon.com

Letter of Support – Dataworks, Consulting

The purpose of document is to capture the external review of BAS proposals. This review should be completed by an independent, third-party evaluation by a person or team with subject/discipline expertise. The goal of the review is to verify credibility, design, relevance, baccalaureate rigor, and effectiveness of BAS proposals, as well as validate congruency and consistency of program and curriculum with current research and academic thinking. This document also provides critical feedback, and an opportunity for proposers to address potential concerns/issues/criticisms prior to final submission.

College Name:	Seattle Central College	BAS Degree Title:	BAS in IT Networking
Reviewer Name/ Team Name:	Timothy Foster	Institutional or Professional Affiliation:	TEK Systems Associate
Professional License or Qualification, if any:	Instructional Designer and Technologist, former CTO and Support Systems Analyst, Sr.	Relationship to Program, if any:	None
Please evaluate the following Specific Elements			
1. Concept and overview	Overall concept, appropriateness, and placement.		
	Comment The overall concept is sound. There is a strong demand for Networking professionals. Knowledgeable and skilled graduates would be able to attain industry certification, CCNP. Microsoft SQL, SharePoint, programming languages, and security to include mobile security would provide a well-rounded background for the graduate. Critical thinking, problem solving and troubleshooting and the ability to proactively design more trouble free systems are skills that are in high demand.		

		This program is appropriate and very marketable. The College would provide students with a strong and sought after degree that could lead to several high tech career paths.
		The curriculum is similar to other respected and recognized national BAS Information Technology Networking programs.
2.	Curriculum and Learning Outcomes	Curriculum and learning outcomes for program overall and for individual courses, particularly 300-400 level/upper division.
		Comment
		The overall program outcomes are well defined and include continued learning which is necessary for success after graduation. Applied knowledge coupled with Gen-Ed requirements further provides the graduate with tools that are useful for continued career success.
		Recommendation: Highlight the summary of program experience not only the internship element of the capstone course. This capstone experience ties together the internship experience with the academic and technical skills gained and is a valuable addition to the curriculum.
3.	Curriculum Alignment	Alignment of curriculum with statement of need
		Comment
		The curriculum as provided for review aligns with the statement of need. As the program matures it may need to be reviewed and realigned to meet future hardware and software improvements. It may be necessary to include additional networking hardware and software from competing companies. Juniper, Brocade, Alcatel-Lucent, Microsoft, Check Point, Extreme, HP, and IBM.
4.	Academic Relevance	Academic relevance and alignment with upper division standards; baccalaureate rigor:
		Comment
		The provided Scope and Sequence, program outcomes, and course descriptions should provide the necessary academic rigor to allow the students to advance into an advanced degree. Depending on the needs of individual students there may need to be some additional courses for management.
5.	Graduate Preparation and	Suitability for graduate preparation and acceptance of BAS graduates into graduate programs:

	Graduate Program Acceptance	**Comment** Preparation through the suggested program paths would prepare the graduates for acceptance into graduate programs. The added benefit of CCNP certification would provide the students with both a certification to use for finding gainful employment and the ability to apply for network engineering graduate programs. This program may also provide the necessary background for the graduates to attain their CCIE or CCDE certification either through the graduate program or independently.
6.	General Education Requirements	General education requirements:
		Comment 60 credits of Gen Ed are required for the BAS. Students enter the program with an AAS-T degree and 25 credits including ENG 101, Intercultural Communications (HUM 105), Statistics (MAT 146), PSYCH 100 and an elective science or social science. The BAS students will have further communication courses and other science or social science courses as electives. 300 and 400 level Social Science, Communication, or Global Awareness courses should be required as part of the Program requirements. I would recommend at least one 300 level and one 400 level course. Some recommended courses would be Organizational Sociology or Psychology, Social Psychology, Industrial Sociology. These courses would equip the graduate with additional knowledge to move into a management position.
7.	Faculty	Qualifications of faculty:
		Comment Faculty will have minimum 5 years in the area the course they are teaching; full time faculty would need to have Master degree level in Information Systems with the 5 years of industry experience and hopefully two-years teaching experience. This standard is based on other local colleges. There are no specific networking programs at the 4-year schools, with the exception of private or for-profit. Recommendation: Explore nationally recognized IT Networking BAS programs for their faculty requirements. Implement improvements as needed to maintain competitive edge.
8.	Resources	Availability and appropriateness of resources, including library, student support, and facilities:

Comment

The Seattle Central College library has a collection of research databases, MSDN, Microsoft Academy, and periodicals, but is limited for specific IT-related content.

Recommendation: Online resources - The IEEE Xplore Digital Library which includes the IEL Online resources may be useful for academic assignments.

There are currently five (5) academic advisors. They are cross-trained on both professional technical programs and Advising from an exploratory perspective is currently provided as students self-identify and request entry into the Networking BAS, based on prior AAS-T degree.

Specific program counseling services will have to be a new budget line item for the program.

SCC Facilities:

There are currently four to five (4-5) dedicated classrooms with high-end workstations (with multiple virtual machines). We have a dedicated network to support our specific lecture content, along with hands-on labs full of older donated Cisco switches, workstations (cross-platform), and mobile devices. Because we intend to offer this program during the nights and weekends, more equipment and software is necessary.

Recommendations: Minimum Cisco Catalyst 2960 Series switches. Basic Layer 2 switch.

To provide advanced training recommend Cisco Catalyst 4500 or 4500E Series.

With more deployed wireless systems, VoIP systems, and more support for BYOD and mobility, these switches provide an ample environment to configure more up-to-date systems. 4500E switches would also provide PoE.

Cisco 4500 series routers are also recommended.

Cisco Learning Labs software version 15 supporting IOS 15 would allow for an inexpensive Routing and Switching virtual lab experience. This would complement a physical lab and provide opportunities for online activities.

A variety of Cisco Learning labs are available for use in the program:

https://learningnetworkstore.cisco.com/cisco-learning-labs

Network Simulators:

http://www.cisco.com/c/en/us/training-events/training-certifications/certifications/professional/ccnp-routing-switching.html

9. Membership and Advisory Committee	Membership and input from advisory committee:
	Comment
	The Technical Advisory Committee is a requirement for each professional technical program at SCC. The purpose of the committee is to provide feedback about local industry trends, to vet specific curriculum, have union representation (where applicable), and to promote the program in the region.
	Membership consist of non-voting faculty and staff, graduates and employees from companies such as, Microsoft, HP, F5, and recruiting firms. Meetings tend to have an agenda related to specific events, or to discuss potential ideas for courses, internships, etc.
	Recommendations: Expand the committee to include a couple of current students in the program.
10. Overall assessment and recommendations	Overall assessment
	Comment
	Overall, this is program will provide additional educational opportunities for students who are engaged in the current certificate and Associate Applied Science Transfer (AAS-T) programs for Network Design and Administration including the CCNA Certification. The high-level occupational track possibilities will provide a strong incentive for students to obtain their Bachelor's degree.
	Recommendations:
	Build a relationship and articulation agreement with the graduate program at the University of Washington to provide graduates with an established local path for an advanced degree.
	Build in a Quality Matters review process for the program and the courses.
	Continue to review and align program and course objectives with the course activities.
	Continue to work with Networking companies to provide more current hardware and software. Keep in line with industry advancements.
	Consider online and hybrid delivery of courses. Hands on labs could be software based.
	Consider including Fiber-Optic systems and connectivity.

TIMOTHY D. FOSTER
928-221-4457

5751 N Kolb Rd 13101   Tucson, Arizona 85750   tdf101@gmail.com

DIRECTOR – IT / IS

Strategic Planning / Systems Development & Integration / ERP / Project Management

Operations / Cost Control / Change Agent / CRM / Vendor Management

Identifying and executing tailored IT solutions, I lead change initiatives that transform organizations' offerings, delivery methods and customer service. My strategic plans effectively address existing and anticipated customer needs, significantly improving the bottom line, retaining current customers and attracting new business.

Skills Summary:
Strategic planning meeting business goals
Budget and inventory control
In-depth departmental and systems analysis
Spearheaded and managed several major CAPEX systems improvements
Liaison between IT department and other units
Effective server, notebook, and desktop purchasing and maintenance
End user support – All levels hardware and software
Adept with researching and applying new and emerging technologies
Thought leader in current mobile technologies
Strong multicultural and emotional intelligence orientation
Experienced with Adobe Creative Cloud, Articulate, Captivate7, Audacity, Google Apps, Web applications
User interface testing for web courses and sites
Website management
CMS system management

Professional Experience

Developed and implemented COBIT standards strategic plan for Lincoln College IT department 2010 resulting in an action plan for improvement, transformed the IT department from closet to professional operation
Combined two independent IT departments into one streamlined unit for both sites
Addressed infrastructure issues resulting in improved operations
Upgraded Exchange server
Initiated ticketing system to track issues
Hired staff to provide level one and two support
Initiated formalized inventory control process
Standardized vendors
Set minimum purchasing requirements for all equipment
Selected standardized computer manufacturer and models
Negotiated and implemented contracts with CIRBN and ICN resulting in high speed fiber-optic connection and service
Lincoln college central ICN hub for IL central region
Lincoln college CIRBN connection for 1 GB fiber connection between sites
Access to ICN emergency generator for Lincoln College systems
Upgraded network to 1 GB edge POE switches both sites
Programmed switches and established VLANs
Upgraded network core to 10 GB Extreme switches
Selected and implemented Aruba wireless system on both sites
Replaced aging digital phone systems with one VoIP system
Vendor and system selection
Reduced operations costs and utility expenses
Unified communications
E911 Compliant
Spearheaded Unitrends cross site server and data backups
Selected and purchased Nimble flash storage system
Initiated VMware for virtual server environment implementation
Upgraded ERP and streamlined business processes
Selected and negotiated a managed printer service for both sites
Cartridge replacements and inventory
Repair printers – limited down time
Replacement printers
Implemented Papercut to track printing use by user
LMS Administrator and ERP integration specialist
Website management and CMS

Instructional Designer / University of Arizona Office of Digital Learning, March 2015 to Present

Providing pedagogical consulting and design assistance to faculty and subject matter experts.
Constructing learning environments that promote interaction, social presence, and community among students, and between students and faculty
Developing online courses that fit within online programs
Developing MOOCs and non-credit course offerings
Assisting faculty with design and redesign of courses for online delivery, including the incorporation of collaborative web tools for instruction, communication and collaborative student engagement
Member of Instructional Technology Special Interest Group
Develop templates for course design
Designing effective learning activities and authentic assessments that encourage critical thinking skills and self-directed learning.
Effectively translating learning objectives into dynamic online content
Supporting VoiceThread, Purdue Digital Badging, Civitas Inspire for Faculty university-wide

Chief Technology Officer / Lincoln College Information Technology Department, September 2011 to March 2015
Providing college-wide visionary leadership for the development, deployment, management, and maintenance of information systems and resources achieving the mission and strategic goals of Lincoln College.
Provided effective strategic and operational leadership
Understand new and emerging technologies and their impact on operations
Managed Staff and revised IT department positions
Brought IT to the table on major initiatives
Provided systems standardization and integration between campuses
Managed multiple CAPEX projects encompassing systems integration and strengthening infrastructure
Worked within IT Department Budget, including budget requests and strategic plans
Managed vendor relations and streamlined purchasing
Member of leadership council and team
Mobility Centric - Mobile app and wireless initiatives
Drafted new acceptable use network, equipment, and social media policies
Managed CIRBN and ICN fiber project deployment
Deployed 10/100/1000 POE Internet edge and 10 GB core switches on both campuses
Upgraded servers, computers, thin clients, and monitors on both sites
Deployed and managed Aruba Wireless systems on both campuses
Spearheaded Mitel VoIP phone system installation and operation integrating voice mail on both campuses
Maintained College website process and integrity working with all departments
Purchased and utilized Siteimprove for quality assurance, accessibility, and analytics
Provided professional development opportunities to staff and faculty
Member of Emergency Response task force

Instructional Technologist and Designer / Lincoln College – Normal Campus – Instructional Technology Department, December 2009 to Present

Providing robust pedagogy and design for traditional, hybrid, and online instruction

Provides training and support to Lincoln College-Normal faculty and staff in designing and creating online coursework and materials, rich media, and web pages for all divisions of the College

Researches new and emerging technologies and resources to determine compliance with operational policies and procedure and incorporates these technologies into teaching and learning

Maintains and updates data to assist with tracking course and student information for web content of virtual campus component of the College

Collaborates with the Director of Technology to plan, evaluate, and recommend equipment, hardware, and software upgrades to support current instructional technologies

Assists in the development of College guidelines for online learning and pedagogy, qualifications for hiring online faculty, and appropriate assessment procedures and policies for online learning

Serve as adjunct faculty in the Liberal Arts and Traditional and Accelerated Programs.

Recent Accomplishment - Researched current IT department operations and provided a comprehensive plan to administration to improve operations

Adjunct Professor for traditional and accelerated program

Instructional Technologist / Cardinal Stritch University – Office of Information Technology, September 2008 to November 2009

Providing focus through LMS change and using Web 2.0 technologies for instruction

Assisted university wide effort for effectively utilizing teaching technologies

Conducted online surveys to poll LMS use and attitudes

Provided leadership through LMS system change and integration

System Administrator for ANGEL7.4 LMS system

Designed training sessions and materials for ANGEL LMS system

Built community of professors using web 2.0 applications

Initiated and administered universities iTunes U project

Provided leadership through digital literacy project

Participated in Library Commons project

Support Systems Analyst, Senior / Arizona Hospitality Research & Resource Center - School of Hotel & Restaurant Management (HRM), The W.A. Franke College of Business, Northern Arizona University, November 2000 to May 2008

  Instrumental in e-learning and web initiatives and successes:

Provided faculty with online expertise in course conversion for complete online program

Co-inventor and designer of on-line training/certification software platform

Coordinated and maintained on-line **Food Handler course** for three Arizona counties (Coconino, Greenlee, and Pinal)
Provided customer service through help phone line and email for online course students
Produced media rich multicultural English/Spanish version **on-line customer service training** course co-branded with American Express
Refitted courses from original NAU design to WebCT/Blackboard format
Provided ongoing technical assistance for the National Park Service concessionaires training project
Taught National Park Service concessionaires basic Excel competency using WebCT Blackboard
Provided ADA compliance for web based projects, training and advocacy
Coordinated web based, ORACLE database driven email survey tool for faculty use
Maintained on-line media rich multicultural **customer service training** courses for 8 Arizona tribes

Media Production

Created Flash and Captivate animations for marketing and web training purposes
Produced, directed, filmed and edited digital videos and DVD's for HRM, customer service, Native American tribes and prison-to-work projects – Adobe Premiere

Teaching and Learning

Part-time Distance Education Professor: Taught web, hybrid, and traditional courses - Introduction to Hospitality Technology I & II (HA 170, HA 270)
Conducted and coordinated innovative International course project between **NHTV** Imagineering students and HA 270 students - over 200 students and 3 instructors produced IT business plans for actual hotel Imagineering concepts
Researched effectiveness of WebCT Blackboard delivered HRM and federal grant projects
Assisted HRM faculty with web course planning, development, implementation and management

Technical Accomplishments

Implemented wireless network for HRM, AHRRC, and The Inn at NAU
Provided guest network and technical support for The Inn at NAU
Liaison between HRM and the University IT and Telecom division
Maintained computer hardware/software and assisted faculty with wireless device issues

Support Systems Analyst, Senior / Faculty Studio Manager / Instructional Specialist, Northern Arizona University, May 1995 to November 2000, Office for Teaching & Learning Effectiveness
Managed, designed and integrated technical programs for the Faculty Instructional Technology Studio. Identified, designed, piloted, and delivered technological workshops and seminars for NAU faculty. Wrote supporting manuals and documentation for workshops and seminars. Managed educational online web course project production. Consulted with colleges, departments and faculty regarding appropriate instructional technologies to

support specific faculty and departmental initiatives. Focused on teaching Internet applications for faculty and website instructional course development and delivery. Tested and recommended software platforms and applications. Provided web page editing and web site maintenance/recommendations to faculty. Helped walk-in faculty on demand with various technological issues and procedures. Provided assistance with NAU Online web site maintenance issues. Webmaster for Office of Teaching and Learning Effectiveness site. Specified and purchased computer hardware and software. Maintained and managed computer hardware and software. Supported computer hardware, peripherals and software through troubleshooting and consulting. Volunteer Arizona Postsecondary Access Coalition (AzPAC) Advisory Committee member, Fall 2000. Administered Windows Server and office workgroup environment.

Faculty Studio Achievements:

Provided leadership in a university wide effort to obtain feedback regarding:

Teaching and learning aspects of web courses

Technological delivery systems and environments

Communication and access issues

Student demographic information

Quantitative statistical analysis and interpretation of the findings provided to college deans, department chairs, and professors

Produced and edited CD-ROM for international conference proceedings, Role of Universities in the Future Information Society (RUFIS)

Time-series research student attitudes towards web based and enhanced courses

Transformed five web courses for statewide Interactive Instructional Television courses

Lead webmaster - NAU Online. Managed and coordinated student production and graphics workers

Program Coordinator / Technical Assistance Specialist, Northern Arizona University, March 1991 to August 1994 Arizona Center for Vocational/Technological Education (currently Institute for Future Work Force Development).

Provided technical assistance that included grant writing assistance and interpretation of Arizona Department of Education - Vocational Division regulations, initiatives including realigned curriculum development. Developed and implemented workshops and seminars to provide instructional technology information and training to educators and other community based organizations.

Achievements:

Expanded Rural Technical Assistance project from six rural Arizona school districts to 15

Doubled annual project revenues from $60,000 to $120,000

Expanded project impact from northern Arizona to a statewide technical assistance effort

Conceived, implemented, and managed AZTEC multimedia lab for rural Arizona vocational/technological educators. The lab offered local and rural educators access and exposure to a variety of instructional technologies in the lab and on site.

Conducted and evaluated research on instructional technology computer based tabulated real time voting systems (now known as clickers) in K-12 classroom applications

Education:

Master of Arts, **Northern Arizona University, Flagstaff, Arizona, Applied Sociology** - **GPA 4.0** *Focus:* Instructional technology, theories of learning, learning styles, and the social impact of technology on society through applied sociological theories. Literacy issues and program evaluation were researched through internship experience. Future studies through ethnographic research, a community based project exploring attitudes about the future of Coconino Community College in 25 years. http://jan.ucc.nau.edu/~tdf/intern.html

Featured in The National Dean's List, 1994
Member, Alpha Kappa Delta International Sociology Honor Society, 1994
Lifetime Member, **Phi Kappa Phi International Honor Society**, 1995

***Bachelor of Arts,* Arizona State University, Tempe, AZ, Sociology** Focused undergraduate education on Contemporary Social Problems, Social Psychology, Social History, Social Control, Ritual, symbol & myth, ethics, technical writing and Sociological Theories and Research.

Personal and Professional Interests:

Social research on instructional technologies and efficacy
Understanding cyber culture and social networking communities
Uses of new and planning for emerging technologies
Uses and intrinsic value of the Internet
Preparing professors to deliver course materials on the Internet using any system or media
Organic farming and sustainable agriculture

Awards and Certificates:

BlackBoard ANGEL Administrator Certification 2008
Customer Service Certified, 2005
NAU President Award for Excellence - OTLE Team, 1999
International Who's Who of Professionals, member 1996

LinkedIn Profile: http://www.linkedin.com/in/timfoster2

The purpose of document is to capture the external review of BAS proposals. This review should be completed by an independent, third-party evaluation by a person or team with subject/discipline expertise. The goal of the review is to verify credibility, design, relevance, baccalaureate rigor, and effectiveness of BAS proposals, as well as validate congruency and consistency of program and curriculum with current research and academic thinking. This document also provides critical feedback, and an opportunity for proposers to address potential concerns/issues/criticisms prior to final submission.

College Name:		BAS Degree Title:	
Reviewer Name/ Team Name:	Aaron Seydlitz	Institutional or Professional Affiliation:	Puget Sound Energy
Professional License or Qualification, if any:		Relationship to Program, if any:	

Please evaluate the following Specific Elements

11. Concept and overview	Overall concept, appropriateness, and placement.
	In offering a full degree program around network engineering, consideration must be given to the current professional development and measurement in the industry. At present, the gold standard for network engineers/architects/operators is Cisco based certification. Thus, incorporating aspects of those certification tracks into a more complete, and structured formal program is a prudent direction. However, there are more skills required to manage today's networks than what is offered in the Cisco certification track alone. So it is good to see that half of the course involves network management courses. An additional consideration for coursework is the ITIL (Information Technology Infrastructure Library) framework. This is the leading framework for network management which covers Incident Management, Problem Management, Configuration Management, etc. It has a certification track as well that could easily be incorporated into the

	program, much the same way that the CCNP certification could be. Ideally, this program should be able to create sound and competent networking professionals, as well as provide a reliable measurement demonstrating that fact (e.g. a CCNP certification). As for course placement, the CCNP Switching courses should precede the CCNP Routing courses. When teaching network fundamentals, there is a benefit to basing instruction on the layered Internet OSI model, and to teach each of those layers from the "ground up". This would mean teaching layer 2 switching fundamentals before layer 3 routing concepts. A full course should be devoted to "Virtualization and Load Balancing". The two subjects are symbiotic and both are vital to a cloud networking focus. I recommend removing Collaboration and Secure Content Management To accommodate as it is vague and its value to a networking degree debatable. In this program, there should also be a course that focuses on datacenter management. Planning power, cooling, space, rack design, and cable management are absolutely vital to the career and should not be overlooked.
12. Curriculum and Learning Outcomes	Curriculum and learning outcomes for program overall and for individual courses, particularly 300-400 level/upper division.
	Linux and Enterprise Scripting Technologies The elements of this course that involve deeper Linux administration (service start/stop, etc) should be removed. While Linux is a powerful operating system for managing networks, to fully utilize Linux in this capacity would require more instruction than this one course would provide. The course would be better served utilizing a tighter focus on scripting and deployment automation as a whole, with varying methodologies emphasized.

Specific focus should be given to Python as the preferred language, particularly as Cisco has integrated support for Python built into the Nexus operating system (their current leading datacenter class routers & switches).

Enterprise Routing - CCNP1

This routing course should also include instruction around the IS-IS protocol. While this protocol is primarily used by service providers for routing purposes (which should be reason enough for its inclusion), it is also the basis for the leading next generation, non-blocking spanning tree protocol alternatives.

Note that binary and hexadecimal math may require extensive time for instruction. Without a fluid understanding of subnetting, supernetting, and inverse masks a student will struggle in nearly all other aspects.

Linux Applications

This course is heavily misaligned.   To begin with, a program that is networking focused should not be aligned with any one particular server operating system, as the title of this course suggests.   Second, there seems to be confusion with what role network engineers play in cloud computing, such as Amazon's AWS. Networking within the cloud is not dissimilar to the standard needs of the enterprise. Thus, teaching the fundamentals of networking, with some consideration to the specific needs of cloud computing (such as virtualization) should be sufficient.

The rest of the course description appears to be a list of subjects that are in no particular order of relevance:

- "Instant Messaging" This is a layer 7 application that has no specific relevance to networking or cloud computing.

- "Platform virtual machines" This should be considered central to the effort to teach for cloud computing.

However, it should simply be referred to as "virtualization"

 - "Groupware servers" This is outside the scope of a networking degree.

- "Project Management" This should be incorporated in an overall "Network Management" course.

 - "Windows Compatibility" This is too vague to be understood in the context of a networking degree.

This whole term should be scrapped and replaced with a course comprised of only the relevant components listed, under a different title.

Enterprise Switching - CCNP 2

 Load balancing should be removed from this term, as it is not dependent on just layer 2 (Switching). Load balancing can be layer 2 or 3 based, with a heavy reliance on layer 4.

 Some focus on the newer, non-blocking, switching technologies is imperative. These technologies are fundamental to cloud networking, which is a concern of the overall program. Cisco's Fabricpath, TRILL, and Juniper's QFabric comprise a landscape of fabric switching that is central to networking in the cloud. This course should have three main focuses: Spanning Tree Protocol, fabric switching, and multilayer switching.

 Lastly, network security should not be included in this term, but as an entirely separate term on its own.

Optimization and Monitoring of Enterprise Networks

 Better titled "Monitoring and Tools for Enterprise Networks". Optimization exists across all of the technologies (such as load balancing), and can be instructed as part of learning those technologies (e.q. OSPF hello timers would

be discussed during instruction on the operation of OSPF in the Routing course).

Tools such as Wireshark, Extrahop, stack trace analysis tools, MRTG graphs, STMP MIBs, Network Time Protocol, Netflow collectors, and other market available tools should be examined in addition other the highlights listed.

Enterprise Troubleshooting - CCNP3

This course is well scoped

Collaboration and Secure Content Management

As described above, this course should be removed.

Identity and Information Security for the Enterprise

The course contents would be more accurately titled "IT Compliance", which is a worthwhile course, though maybe not enough for an entire term. It could be likely folded in with Security. The identity security falls under Network Security.

Network Security for the Enterprise

The claims based authentication thread throughout the course should be removed. It is one of many, many authentication methods that should be examined in the security course. From a networking perspective, the list of security protocols includes items like PAP/CHAP, AAA, TACACs, ISAKMP, and various VPN technologies. To maintain a level of integrity towards this being a networking degree, the security technologies and protocols inherent in the application layers should be avoided.

Network security should be very heavily focused on firewalls, intrusion prevention and detection, next generation

	firewalls, two-factor authentication, Cisco's ISE, flow based filtering, threat vectors (man in the middle attacks, brut force SSH attacks, etc), and zone based security models.
	Devices and Services Cloud Environments
	Should be simply focused on wireless and mobility networking. Wireless networking is a large subject, done correctly. Other technologies should be considered as well, such as microwave an satellite.
	Enterprise Virtualization and Cloud Management Capstone
	Cloud Management should be the sole focus of this course. Virtualization should precede it in the "Load Balancing and Virtualization" course described above. All of the unique considerations for cloud networking should easily fit within this one course. As mentioned above, sound basic networking fundamentals apply just as equally to cloud computing as they do to the older legacy environments.
	There should be no requirement for server administration via shell scripting. This is well outside the scope of the professional network engineer's role in the industry.
	Any of the cellular technologies should be discussed in a more appropriate course, such as "mobility networking".
13. Curriculum	Alignment of curriculum with statement of need

Alignment	
	The curriculum is missing some vital network engineering courses; such as datacenter management. Cloud networking is the vital to the future networking professional, however the unique considerations for the cloud are not as far beyond the current requirements for a successful network engineer as this course assumes. Other curriculum alignment comments have been covered in previous sections.
14. Academic Relevance	Academic relevance and alignment with upper division standards; baccalaureate rigor:
	Comment
15. Graduate Preparation and Graduate Program Acceptance	Suitability for graduate preparation and acceptance of BAS graduates into graduate programs**:**
	Comment
16. General Education	General education requirements:

Requirements	Comment
17. Faculty	Qualifications of faculty:
18. Resources	Availability and appropriateness of resources, including library, student support, and facilities:
	The primary concerns for the resources available will center on the lab available for hands on instruction and certification. Many networking scenarios can be virtualized, which can help to decrease cost, and increase flexibility.
19. Membership and Advisory Committee	Membership and input from advisory committee:
	Comment

20. Overall assessment and recommendations	Overall assessment
	Overall assessment and recommendations can be found in the overview.

Reviewer Bio or Resume

I have been a network engineer since 1995, when I attended the Marine Corps Computer Science School in Quantico, VA. My four years of military service exposed to me to nearly every IT related discipline at the time. From desktop support to satellite communications, from server administration and routing/switching, to fiber optic fusion splicing. My experience in the private sector since then has been primarily focused on network engineering for both small to medium sized companies as well as enterprise class environments. Within networking, I have managed operations teams, as well as worked independently as a consultant. Currently my industry experience in talent evaluation also has me holding a position of principal consultant with TekSystems, in addition to my full time role with a leading local utility.

External Review – Alan Carter, Green River College

The purpose of document is to capture the external review of BAS proposals. This review should be completed by an independent, third-party evaluation by a person or team with subject/discipline expertise. The goal of the review is to verify credibility, design, relevance, baccalaureate rigor, and effectiveness of BAS proposals, as well as validate congruency and consistency of program and curriculum with current research and academic thinking. This document also provides critical feedback, and an opportunity for proposers to address potential concerns/issues/criticisms prior to final submission.

College Name:	Seattle Central College	BAS Degree Title:	BAS in IT Networking
Reviewer Name/ Team Name:	Alan Carter	Institutional or Professional Affiliation:	Green River College IT BAS Program Director
Professional License or Qualification, if any:	MS Information Technology – Network Architecture and Design.	Relationship to Program, if any:	None

Please evaluate the following Specific Elements			

1. Concept and overview	Overall concept, appropriateness, and placement.
	Comment
	The overview is good. I like the tie-in to industry certifications. I notice that there are not any upper-division general education requirements. It might be nice to have one or two that are shared by multiple programs. I do not recommend program-specific general education requirements because they can be a problem for interdepartmental scheduling, and can become a barrier to completion if a student fails one and then has to wait a full year to retake, and is not able to get in because the single class offered is already full.
	I notice that you mention scripting in Perl, but nothing about Python, Bash, and Powershell.
2. Curriculum and Learning Outcomes	Curriculum and learning outcomes for program overall and for individual courses, particularly 300-400 level/upper division.
	Comment
	Your curriculum learning outcomes are very detailed. I recommend that you narrow down the program outcomes to 5-7 outcomes that are easily measured. This is huge for accreditation. If you have to measure student completion of all of the objectives and be able to show measurement samples to the accreditors, it becomes overwhelming with the large number of program objectives you have.
	Your prerequisites are very extensive.
	1. You list 106 credits of prerequisites. That makes a total program of at least 196, not 180.

	2. Your institution's AAS-T degree consists of 117 credits. Students who take this degree must also complete another 10 credits of general education requirements for a total of 127 credits. This makes a total BAS degree requirement for students who complete your college's AAS-T degree a total of 207 credits.

I strongly recommend that you modify your AAS-T degree and your program prerequisites so that students are able to complete a BAS degree with 180 credits of course work that can be completed within 4 years. You might want to look at other AAS-T degrees in your system to see how they match up with your program. For example, most AAS-T degrees only require 20 credits of general education requirements. You can't hide those as prerequisites. Students will choose not to come to your program if they have to complete significant additional coursework just to enter the program.

Your AAS-T degree on your web site is very confusing. I had to spend about 20 minutes with a pencil and paper to figure out what it took to complete it. I recommend a separate document that shows the path to the AAS-T degree in addition to the one for the certificate.

I recommend that you have a document that shows all required classes and credits for the BAS degree.

In regard to your short-term certificates, I think it is obvious that the three CCNP courses line up with the Cisco CCNP certification. It is not clear if there is an industry certification or certifications that line up with the Linux and Cloud certifications. For example, do your associate's classes line up with the LPIC 1 and LPIC 2 certifications? Are any of the upper division Linux courses aligned with any of the LPIC-3 certification exams (300, 303, or 304?) Many organizations have both Windows and Linux computers and the 300 exam covers the integration of Linux computers in a Windows environment very well.

The individual courses are all excellent – my concerns were for industry certification and alignment. Alignment with industry certifications is a nice to have, but not required.

You might consider modifying your scripting class to cover other platform(s) (such as windows/powershell) in addition to Linux scripting. |
| 3. Curriculum Alignment | Alignment of curriculum with statement of need |
| | **Comment**

The Alignment is excellent. |
| 4. Academic Relevance | Academic relevance and alignment with upper division standards; baccalaureate rigor: |
| | **Comment**

The coursework is very much in line with upper division course standards and baccalaureate-level rigor. |
| 5. Graduate Preparation and Graduate Program Acceptance | Suitability for graduate preparation and acceptance of BAS graduates into graduate programs**:** |
| | **Comment**

It would be nice to see a tentative agreement with one of the existing Master's programs at Capella, WGU, City University, and so on. UWT is working on one right now. The contact is Yan Bai. |

6. General Education Requirements	General education requirements:
	Comment
	The general education requirements are fine, but not clear. The title of the section says recommended courses, but then there are required courses listed. Again, a full list of everything required would be helpful.
7. Faculty	Qualifications of faculty:
	Comment
8. Resources	Availability and appropriateness of resources, including library, student support, and facilities:
	Comment
9. Membership and Advisory Committee	Membership and input from advisory committee:
	Comment
10. Overall assessment and recommendations	Overall assessment
	Comment

Informal Review from Amazon.com:

Robert, a Linux/Unix Systems Engineer who has worked in industry for about twenty years with Nicole.

Overall impressions:

This program is seriously needed in industry. Amazon itself is going through the process of assessing exactly what a Systems Engineer does and what sort of background a new hire should have. Experience tends to be key: someone who has seen many systems configurations, has a cool head in a crisis and is able to spin up on new technology quickly. At Amazon in particular, though certainly at other companies too, being able to use the right tool for the right job instead of falling back on familiar tools is highly respected. Because of this, brand-specific certifications are actually frowned on at a certain level.

When hiring a Network Engineer/ Systems Engineer a team at this level wants to know that someone understands the underlying protocols regardless of implementation. Furthermore, too many certs and buzzwords are frowned upon. They may be good keywords for a recruiter but the techs on the interview loop will assume the candidate is trying to make up for lack of experience and technique with paperwork. They want to know a person can competently solve problems they have never been faced with before because that's what being at the edge of technology is all about. To that end, my reviewer felt it was important to de-emphasize certs and teaching to certs.

In Nicole's opinion certs are quite useful when applying for jobs at small businesses, schools, etc. They provide a support network and a knowledge base for an administrator who may not have much technical support from inside their organization. So this may be an audience issue.

Some questions and observations my reviewer had:

- Do you want a person who can fill a seat or meaningfully advance technology within a department?
- Why are we teaching to certs?
- Who is the target audience/ what is the target job market?

Networking is a much narrower scope than Systems Administration. The scope described here encompasses project management, ITIL/deployment and stability, systems administration, network administration, application administration, and a few other jobs. While having someone who can perform all these tasks would be extremely valuable - 150,000 / year by one estimate - such a program might be prohibitively expensive to teach?

We both would like to see configuration management: docker, salt, puppet, etc. in the curriculum. The general IT stack in just about any organization includes ticketing, monitoring, trending, escalation path, backups, disaster recovery and SLA's so some introduction to these concepts is important. Similarly, just about any production environment where code is regularly being pushed will have rollout procedures.

●--D--A--T--A--W--O--R--K--SSM
consulting inc ◀--

February 20, 2016

Director, Program Review Committee
State Board for Community and Technical Colleges
1300 Quince St SE, 4th floor
Olympia, WA 98504-2495

Dear Director,

After the approval of the Statement of Need for the BAS in Networking at Seattle Central College, I was asked to review program necessity, the program scope and sequence, and program rigor to assess relevance to the needs of local industry. As the owner and president of Dataworks Consulting, Inc., I am qualified to provide the necessary support for the program at Seattle Central.

At Dataworks Consulting, Inc., we consistently are in need of qualified network administrators. With the addition of the Applied Baccalaureate Degree in Networking at Seattle Central, we are confident that the curriculum and the scope and sequence will help fill skills gap with qualified employees.

I am in support of the material presented within the Program Proposal and I am looking forward to working with Seattle Central as they build and expand the Networking Program.

Caroline Smith

Owner and President