



RENTON
TECHNICAL
COLLEGE®

Applied Baccalaureate Degree Program

Program Proposal

Renton Technical College

BAS IT Networking - Network Architecture

**COVER SHEET
NEW DEGREE PROGRAM PROPOSAL**

Program Information

Institution Name: Renton Technical College

Degree: BAS IT Networking - Network Architecture CIP Code: 11.1002

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

Degree: Computer Network Technology AAS CIP Code: 11.0901 Year Began: 1999

Degree: Computer Network Technology
AAS-T CIP Code: 11.0901 Year Began: 2016

Planned Implementation Date (i.e. Fall 2014): Winter 2018

Proposal Criteria: *Please respond to all eight (8) areas listed in proposal criteria FORM D.
Page Limit: 30 pages*

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APPLIED BACHELOR DEGREE PROGRAM PROPOSAL

Introduction

Renton Technical College (RTC) proposes to develop a Bachelor of Applied Science (BAS) degree in IT Networking – Computer Network Architecture, a rapidly evolving discipline in computer network architecture and system administration. This science, technology, engineering and mathematics (STEM) discipline has consistently shown high demand for qualified workers. The proposed program is a 90 credit-hour degree designed to meet the educational goals of students and builds on RTC’s AAS in Computer Network Technology program and similar programs at other regionally accredited institutions. RTC has also created an AAS-T degree option that was effective in fall 2016 to feed into this program.

During the development phase of our BAS IT Networking – Computer Network Architecture (BAS in CNA) program, RTC worked with Green River College and Highline College faculty to outline programmatic outcomes and create articulation agreements that will allow both colleges’ respective AAS graduates to enroll in either BAS program. In addition, RTC solicited lead faculty from the University of Washington - Tacoma and St. Martin’s University as external academic reviewers of the proposed BAS curriculum.

The creation of this BAS degree will enable RTC to meet the demand for trained professionals in the networking field, to expand its connections with the school districts within its service area and to provide a seamless transition from their STEM computing programs into our AAS and proposed BAS. This proposed BAS degree will provide graduates with a deep technical foundation in designing and implementing computer and information networks; performing network modeling, analysis and planning; and implementing advanced cloud and virtualization technologies at the enterprise level. In addition to a strong technical foundation, graduates will receive instruction in general education topics in science, communications, and quantitative reasoning; and will gain extensive experience working in teams, making presentations, and participating in on-the-job training. The degree will prepare a graduate to work as computer network architects, engineers and network managers, in a wide range of organizations and industries including corporations, nonprofit organizations, IT companies, and medical and research institutions. Traditional course delivery and online-hybrid learning formats will be used in this degree. RTC is prepared to enroll junior level students beginning in winter 2018.

As our economy continues to become more global and technology-driven, more and more organizations will need educated and qualified individuals to fill these technical positions. RTC’s BAS degree in CNA responds to the growing demand for computer network professionals not only in our region but nationally. National data indicates a “faster than average” projected growth (17%) in the number of jobs available between 2014 and 2024.¹ Table 1 below outlines the expected job growth in King, Pierce and Snohomish Counties from 2014-2024. From the 2013 to 2014 job data, these five SOC fields increased the number of actual positions regionally by 2,722 or 11% growth in just one year.²

¹ Bureau of Labor Statistics. *Occupational Outlook Handbook*. Retrieved from <http://www.bls.gov/ooh/computer-and-information-technology/>.

² Washington State Employment Service Department’s “Learn about an Occupation.” Retrieved from: <https://fortress.wa.gov/esd/employmentdata/reports-publications/occupational-reports/occupations-in-demand>.

Table 1: 10 Year Job Growth Projections in Computer Network Fields³

| Occupation | 2014 Jobs | 2024 Jobs | Job Growth | Growth % over 2014 |
|--|-----------|-----------|------------|--------------------|
| Computer Network Architect (SOC# 151143) | 4,161 | 7,271 | 3,110 | 75% |
| Computer Network Support Specialist (SOC# 151152) | 2,498 | 4,968 | 2,470 | 99% |
| Network and Computer Systems Administrator (SOC# 151142) | 5,857 | 11,407 | 5,550 | 95% |
| Information Security Analyst (SOC# 151122) | 1,630 | 3,230 | 1,600 | 98% |
| Computer and Information Systems Manager (SOC# 113021) | 8,309 | 18,539 | 10,230 | 123% |
| Total Regional for all Computer Network SOCs | 27,280 | 55,120 | 27,840 | 102% |
| National Totals for these SOCs | 1,715,100 | 2,007,600 | 292,500 | 17% |

1. Baccalaureate Level Rigor

Student Learning Outcomes

RTC has thoughtfully designed the overall curriculum scope as well as individual courses to assist students in gaining the knowledge, skills and abilities needed for professional success. Students in the program will meet all course and program learning outcomes upon completion of the degree program. Upon completion, graduates from the BAS IT Network – Computer Network Architecture program will demonstrate skill and ability in four main areas: Infrastructure Maintenance and Troubleshooting, Computer Network Architecture, Project Management, and Professionalism. Table 2 outlines the program learning outcomes for this degree program.

Table 2: Program Learning Outcomes

| Area of Concentration | Expected Learning Outcomes |
|---|--|
| Infrastructure Maintenance and Troubleshooting | <input type="checkbox"/> Utilize computer network engineering and architecting best practices, network testing principles, and quality assurance techniques. |
| | <input type="checkbox"/> Create an end-to-end project-level vision in planning Computer Network Architecture, server and client scripting, and security. |
| | <input type="checkbox"/> Develop and deploy applications in a variety of platforms, including distributed computing and mobile applications. |
| | <input type="checkbox"/> Monitor, log, and troubleshoot network issues and effect appropriate corrective measures. |
| Computer Network Architecture | <input type="checkbox"/> Exhibit mastery of advanced computer network architecture planning and design. |
| | <input type="checkbox"/> Plan and implement end-to-end physical and virtual network infrastructures using techniques as applied to the field of computer networking. |

³ Washington State Employment Service Department’s “Learn about an Occupation.” Retrieved from: <https://fortress.wa.gov/esd/employmentdata/reports-publications/occupational-reports/occupations-in-demand>.

| | |
|---------------------------|--|
| | <input type="checkbox"/> Evaluate new networking technologies to determine what would best support their organization in the future. |
| Project Management | <input type="checkbox"/> Work on team projects and demonstrate critical thinking, teamwork, oral communications, inter-cultural appreciation, and technical and information literacy skills. <input type="checkbox"/> Obtain and confirm business requirements for a network infrastructure project, translate these into technical specifications, assess the resource requirements, and create the documentation to define scope, schedule, and budget. |
| Professionalism | <input type="checkbox"/> Conduct himself/herself in a professional and ethical manner in all situations, while working in person, remotely, individually, and/or in teams. <input type="checkbox"/> Communicate technical information to both technical and non-technical audiences in written and oral form. <input type="checkbox"/> Exhibit a professional level of competence in documenting project and Computer Network Architecture work, writing clearly and appropriately in an information technology context. |

Course Preparation for Students Transferring with a Technical Associate's Degree

Students with associate technical degrees in Network and System Administration, Computer Systems Networking and Telecommunications, Information Technology, Cyber Security, and related areas will be good candidates for RTC's BAS in Computer Network Architecture. In order to benefit from the technical upper-division courses, incoming students should have a solid foundation in Computer Hardware, Desktop Operating Systems, Networking Fundamentals, Windows Server, and Linux. These topics are standard for most IT networking-related associate degrees and many of the technical degrees mentioned above contain the required foundational courses. Table 3 provides a summary of the subjects and credits required prior to enrolling in the BAS program.

Table 3: Entry Requirements for Computer Network Architecture BAS Degree

| Prerequisites | Credits |
|--|---------|
| Computer Hardware, Desktop Operating Systems | 5 |
| Networking Fundamentals | 5 |
| Windows Server (Installation and Administration) | 5 |
| Linux (Installation and Administration) | 5 |
| General education courses as listed below in Table 4 | 30 |

General Education Components of the Degree

RTC has planned accordingly in order to ensure that general education credits and courses meet state guidelines for applied baccalaureate degrees.⁴ Over the course of a BAS degree program, the SBCTC requires that general education credits include a minimum of the following:

⁴<http://www.sbctc.edu/resources/documents/colleges-staff/programs-services/applied-baccalaureate/RecommendationforGenEdRequirementsforBASJuly2015.pdf>. July 2015.

- Communication Skills (10 credits): Must include at least one English Composition course, plus an additional composition course or designated writing-intensive course or course in basic speaking skills (e.g., speech, rhetoric, or debate);
- Quantitative/Symbolic Reasoning Skills (5 credits): Either symbolic reasoning or quantitative reasoning in computer science, statistics or mathematics;
- Humanities (10 credits);
- Social Sciences (10 credits);
- Natural Sciences (10 credits): Must include at least one laboratory course and one Physical, Biological and/or Earth Sciences course; and
- Additional general education courses (15 credits): Any remaining general education courses to achieve the required 60 credits may be selected from any of the aforementioned areas.

All BAS in Computer Network Architecture students will be required to take 60 credits of general education. At RTC, students who earn a technical associate degree will have completed all requirements for the certificate program (74 credits) plus 30 credits of general education. The remaining 30 credits of general education will be satisfied over the course of the two-year BAS program. Additionally, students with earned general education credits who transfer from other colleges will be evaluated on an individual basis to determine transfer credits. RTC will make every effort to transfer as many general education credits as possible for prospective transfer students. RTC’s advisors and the registrar’s office assess prior learning of students with work history and/or military experience, giving them the opportunity to receive credit for their prior accomplishments.

General education requirements in the Network Architecture program are outlined below. Course numbers with an ampersand symbol (&) are common course numbers at all Washington State community and technical colleges. Course numbers without an ampersand refer to RTC courses.

Table 4: General Education Requirements in Computer Network Architecture BAS

| Subject | Credits | Met by Prerequisite | Met by Baccalaureate |
|---|---------|---|---|
| Communication Skills (Eng. Comp. required) | 10 | ENGL& 101 English Composition | ENGL& 235 Technical Writing |
| Quantitative Skills (college level math) | 5 | MATH& 141 Pre-Calculus I OR MATH& 146 Statistics OR higher | |
| Humanities | 10 | CMST& 101 Speech Communication | PHIL 481 Legal and Ethical Aspects of IT |
| Social Sciences | 10 | PSYC&100 General Psychology | ECON& 201 Micro Economics |
| Natural Sciences | 10 | | PHYS& 114 Physics I GEOL& 101 Intro to Geology |
| Other General Education courses (Remaining general education courses needed to achieve the required 60 credits shall be selected from the areas above) | 15 | 10 credits from the distribution areas of communication, quantitative, humanities, social sciences or natural sciences | POLS& 202 American Government OR SOC& 101 Intro to Sociology OR PSYC& 200 Developmental Psychology |
| Total Credits Required | 60 | 30 | 30 |

Junior/Senior Level Coursework

RTC’s BAS in Computer Network Architecture program takes into consideration the needs of working students, offering full-time and part-time enrollment options. The majority of courses shown in Table 5 will be taught through a hybrid model in which degree candidates have face-to-face as well as online class time. Based on our success with the cohort model in our professional-technical programs, we will use the cohort approach for this program as well. The program will have a planned entry point every winter quarter. Each cohort of students will take the same technical and general education courses simultaneously in a pre-established sequence over the course of two years. The total number of program credits for the degree is 90.

Several of the technical classes delivered in the BAS could map to specific industry/vendor certifications. In cases where there is a good match, the faculty and the Program Chair will incorporate the related certification exam as part of the final course assessment. Examples that will be researched include Microsoft Technology Associate, EMC Cloud Infrastructure, EMC Storage Administration, and Cisco Certified Network Professional (CCNP).

Table 5: Renton Technical College Computer Network Architecture Junior/Senior Coursework

| Baccalaureate Courses | Credits |
|--|-----------|
| Core Technical Courses | |
| CNT 3XX Databases and Structured Query Language (SQL) | 5 |
| CNT 3XX Network Programming and Scripting for Network Management | 5 |
| CNT 3XX Network Programming in Python | 5 |
| CNT 3XX Network Programming in Java | 5 |
| CNT 3XX IT Project Management | 5 |
| CNT 3XX Software Defined Networks I – Private Cloud | 5 |
| CNT 4XX Cloud Services Architecting – Public Cloud | 5 |
| CNT 4XX Network Infrastructure Planning and Deployment | 5 |
| CNT 4XX Software Defined Networks II – Cloud Migration | 5 |
| CNT 4XX Virtual Infrastructure and Cloud Security | 5 |
| CNT 4XX Troubleshooting Physical and Virtual Network Infrastructures | 5 |
| CNT 4XX Network Architecting Capstone Project (Option A) | 5 |
| OR | |
| CNT 4XX Cooperative Education/Internship (Option B) | 5 |
| Total Core Technical Requirements | 60 |
| General Education Courses | |
| ENGL& 235 Technical Writing | 5 |
| PHIL 481 Legal and Ethical Aspects of IT | 5 |
| ECON& 201 Microeconomics | 5 |
| PHYS& 114 General Physics I | 5 |
| GEOL& 101 Intro to Geology | 5 |
| POLS& 202 American Government OR SOC& 101 Intro to Sociology OR PSYC& 200 Developmental Psychology | 5 |
| Total General Education Requirements | 30 |
| Total BAS in Computer Network Architecture Requirements | 90 |

Students who study full-time (based on three courses or 15 credits per quarter) will complete the program in six quarters. Students who study part-time will complete the program in nine quarters or more, depending on the number of credits they carry. Table 6 gives a sample schedule for full-time students enrolled in the program.

Table 6: Sample Full-Time Computer Network Architecture Student Schedule

| First (Junior) Year | | | |
|--|--|---------------|---|
| Winter | Spring | Summer | Fall |
| CNA 3XX Databases and SQL | CNA 3XX Programming & Scripting for Network Management | | CNA 3XX Programming in Python |
| CNA 3XX IT Project Management | CNA 3XX Software Defined Networks I | | CNA 3XX Programming in Java |
| ENG& 235 Technical Writing | ECON& 201 Microeconomics | | GEOL& 101 Intro to Geology |
| Second (Senior) Year | | | |
| Winter | Spring | Summer | Fall |
| CNA 4XX Network Infrastructure Planning and Deployment | CNA 4XX Software Defined Networks II | | CNA 4XX Troubleshooting Physical and Virtual Network Infrastructure |
| CNA 4XX Cloud Services Architecting– Public Cloud | CNA 4XX Virtual Infrastructure and Cloud Security | | CNA 4XX Network Architecting Capstone Project or CNT 4XX Cooperative Education/Internship |
| PHYS& 114 General Physics I | Choice of POLS&202 American Government OR SOC& 101 Intro to Sociology OR PSYC& 200 Developmental Psychology | | PHIL 481 Legal and Ethical Aspects of IT |

RTC's BAS in Computer Network Architecture program will capitalize on the College's efforts to create deliberate career pathways linked to wage progression. Pathways connect education attainment to occupation and earning potential. Table 7 outlines a viable pathway in Computer Network Architecture occupations, starting with an associate's degree up through a doctoral degree.

Table 7: Viable Pathways to Computer Network Architecture Occupations⁵

| Degree | Occupation(s) | Earning Potential |
|--------------------|--|-----------------------------|
| Associate's Degree | Computer Network Support Specialist | \$51,470 |
| Bachelor's Degree | Computer Network Architects | \$100,240 (50% median wage) |

⁵ Bureau of Labor Statistics Occupational Handbook. The data was published on December 17, 2015. (<http://www.bls.gov/ooh/computer-and-informationtechnology/home.htm>).

| | | |
|---|--|-----------------------------|
| | Network and Computer Systems Administrators | \$77,810 (50% median wage) |
| | Information Security Analysts | \$90,120 (50% median wage) |
| | Computer and Information Systems Managers | \$131,600 (50% median wage) |
| Master's, Doctoral and Professional Degrees | Computer and Information Research Scientists | \$110,620 |

Program Evaluation Criteria and Process

Assessment for the proposed degree program will be based on RTC's comprehensive student achievement and program assessment processes. The processes used to review programs are defined in the RTC Program Enhancement Plan (PEP), which drives instructional decisions and focuses on programmatic mapping driven by clear program learning outcomes that are aligned with the College's Core Themes and supported by data. In accordance to college policy, all certificate and degree programs are reviewed annually on a three-year cycle, with specific tasks assigned each year. Year 1 is the primary review. It is a time when data are collected, discussed, an initial plan for assessment and growth is developed, and information is presented to a program review committee for feedback and action plan input. Faculty members and the dean also choose one program outcome, relevant course outcomes, and three to five assessments that align with these course outcomes to assess during Year 2. If program enhancement or intensive review was recommended at the end of Year 1, the individuals and/or departments asked to review initial data and work together on program improvement continue to meet. This helps the College as a whole to evaluate our progress in supporting program growth, restoration, or active status.

This process may lead to a revision of a course outcome and/or assessment to determine if outcomes improve as well as continued data collection through Year 3. Also, the faculty and dean review the initial action plan to determine if tasks identified in Year 1 have been completed. In Year 3, the faculty and dean close the loop on assessing course outcome measurements, review the work accomplished over the past three years, and create a plan for the future.

Program Evaluation Timeline

Year 1

| Data Collection | Step 1-2 | Step 3 | Step 4-5 | Step 6 |
|---|--|---|--|---|
| Methods: Course evaluations by students, surveys of industry advisory committee, student surveys mid-point through the program, mid-point and post-course surveys of BAS CNA program faculty | Institutional Research sends data to Dean – data includes student course evaluations, program statistics, and student surveys. | Dean meets with faculty to review data and complete the Program Review Report, including identification of learning outcomes. | Program review committee meets and reviews the Program Review Report. Committee members complete the Review Rubric within one week of convening. | Submit final report to the Office of Instruction. |
| <ul style="list-style-type: none"> • Adequate balance of knowledge and skills, theory and practice • Effectiveness of curriculum and teaching methodology within courses • Preparedness of faculty • Preparedness to teach the curriculum • Preparedness of students upon entering the program | Fall 2019 | Fall 2019 – Winter 2020 | Winter 2020 – Spring 2020 | Next day following committee review |

Year 2

| Data Collection | Step 1-2 | Step 3 | Step 4-5 | Step 6 |
|---|---|---|--|---|
| Methods: Course evaluations by students, surveys of industry advisory committee, student surveys mid-point and at graduation, program statistics, mid-point and post-course surveys of BAS CNA program faculty | Collect learning outcomes data throughout the year. | Faculty and Dean review learning outcomes data from Year 2. | Committee designs program changes, including student and faculty surveys mid-program and at graduation. Changes are documented in the Program Review Report. | Faculty and Dean review and update action items and complete Year 2 of the Program Review Report. |
| <ul style="list-style-type: none"> • Effectiveness of program in meeting course learning outcomes • Effectiveness of program in skills and knowledge progression • Effectiveness of program in meeting students' expectations • Effectiveness of program in meeting employer expectations • Student retention • Student course success • Student progression through program | Fall 2020 – Spring 2021 | Winter 2021 | Winter 2021 – Spring 2021 | Spring 2021 |

Year 3

| Data Collection | Step 1-2 | Step 3 | Step 4-5 | Step 6 |
|---|---|---|--|--|
| Methods: Course evaluations by students, surveys of industry advisory committee, student surveys mid-point and at graduation, program statistics, surveys of BAS CNA program faculty, surveys of program graduates and employers six months after graduation | Faculty and Dean review learning outcomes data from Year 3. | Faculty and Dean review the Program Action Plan and complete Year 3 of the Program Review Report. | Faculty Lead conducts survey of program graduates and employers six months after graduation. Also conducts survey of BAS program faculty. Faculty continually meet with program advisory committee for surveys and feedback. | Program Faculty Lead continues to collect data and make changes as necessary to inform evaluation process for next time. |
| <ul style="list-style-type: none"> • Effectiveness of program in meeting course learning outcomes • Effect of program completion on career • Effectiveness of program in meeting job expectations • Wage and career progression • Effectiveness of program in meeting job expectations • Observed increased skills and performance • Perceived strengths and weaknesses of current program | Fall 2021 | Fall 2021 – Winter 2022 | Spring 2022 | Ongoing |

Advisory Committee Membership

The advisory committee for the BAS in Computer Network Architecture program was created through referrals from the Center of Excellence for Information Technology and members from our advisory committees from the Computer Network Technology AAS program. The Committee is comprised of members from the Seattle Metro area that are both national and local in scope. Members include industry

representatives who are active practitioners working in datacenter hosting, cloud services, and data communications in a wide range of companies. A membership roster is included in Appendix IV.

The first CNA Advisory Committee meeting was held on May 31, 2016 and members completed a Knowledge, Skills, and Assessment (KSA) process originally developed by the national Convergence College Network in partnership with a National Business-Industry Leadership Team (BILT). Minutes from the May 31st meeting are included in Appendix V. Upon approval of a broad set of KSAs, advisory committee members worked directly with Dr. Sanderson to identify and describe a sequential listing of student coursework (See Tables 5 and 6). In July 2016, the CNA Advisory Committee was provided a final report of sequential coursework and descriptions.

On an ongoing basis, advisory committee membership duties are as follows:

- Conduct reviews and provide recommendations on curriculum design and other program elements;
- Attend regular conference calls with the lead instructor for the BAS in Computer Network Architecture, Dr. William Sanderson, and commit to participate throughout the entire BAS curriculum development phase as well as the implementation process;
- Ensure academic rigor of course content and learning methodologies;
- Serve as subject matter experts in one or more of the following areas: computer network, information technology, cloud infrastructure, storage and network virtualization instruction, and/or higher education; and
- Assess and provide constructive feedback to the overall curriculum and courses to ensure rigor, consistency and quality.

Following full implementation of the program, the committee will hold scheduled meetings each quarter (three times a year – the committee will not meet during the summer). The primary responsibilities of the advisory committee will then be to advise the program on recommended curriculum improvements; assist in ensuring the program remains abreast of changes in the field; assist in student recruitment and job placement; and recommend other changes that will keep the program current and relevant.

2. Qualified Faculty

Renton Technical College anticipates at least 5.4 FTE annual enrollments in Year 1, with full capacity achieved by 2020 with annual FTEs of 29.7. Each cohort of the program requires two technical courses and one general education course each quarter. We will use a combination of adjunct and full-time faculty to deliver this course-load. The BAS in Computer Network Architecture program will have a full-time faculty lead at 25% release time who will teach one technical class each year and manage the curriculum and teaching assignments as part of the administrative duties. Other adjunct positions will be covered by experienced industry practitioners.

Faculty teaching 300/400 level courses in the program will be required to hold a master’s degree with a doctorate preferred and maintain appropriate certifications. All faculty teaching technical courses, as well as administrators, will meet the certification requirements outlined in the Washington Administrative Code WAC 131-16-091. Table 8 indicates the qualifications of proposed faculty leads.

Table 8: Faculty Profiles

| Faculty Name | Credentials | Status | Area of Expertise |
|-------------------|---|--------|---|
| William Sanderson | Ph.D. Information Systems and Education | FT | Virtualization, cloud computing, storage networks |

| | | | |
|------------------|--------------------------------------|----|---|
| Scott Moody | MS CSI | PT | Service-oriented architectures, content routing technologies |
| Antti Raty | MBA | PT | IT Project Management, ITIL (Information Technology Infrastructure Library) |
| Kathleen Higgins | MA English | FT | ENG& 235 Technical Writing |
| Martin Cooksey | MS Applied Math | FT | MATH& 141 Pre-Calculus, MATH & 146 Statistics |
| Clifton DeWitt | MS Applied Economics | PT | ECON& 201 Micro Economics |
| Peter Richardson | Ph.D. Interdisciplinary Liberal Arts | PT | PHIL 481 Legal and Ethical Aspects of IT |
| Sallie Shortt | MA History | PT | POLS& 202 American Government |
| Der-Ming Hsieh | Ph.D. Physics | PT | PHYS& 114 General Physics I |
| Mikolai Lewicki | Ph.D. Hydrology & Geomorphology | PT | GEOL& 101 Intro to Geology |
| Brooke Miller | MA Sociology | PT | SOC& 101 Intro to Sociology |
| Leta Berkshire | MA Mental Health Counseling | PT | PSYC& 200 Developmental Psychology |
| Amanda Fetters | MA Psychology | PT | PSYC& 101 Intro to Psychology |

3. Selective Admissions Consistent with Open Door Institution

Admission into the BAS in Computer Network Architecture program will be selective. Students with sufficient academic preparation at the associate degree level will be admitted on a first-come, first-served basis, with additional procedures in place for those who do not automatically meet all admissions requirements. Students interested in enrolling in the program will be required to meet the minimum admissions requirements as outlined below. No additional specialized testing will be required. Students who intend to enroll in the program full-time will also receive first consideration, as well as those with associate technical degrees in Network and System Administration, Computer Systems Networking and Telecommunications, Information Technology, Cyber Security and other related areas. Based on the number of additional slots available, students who intend to study part-time as well as those who missed the priority deadline will also be considered.

Program Admission Requirements

Admission into the BAS program is selective. Meeting the minimum entrance requirements does not guarantee admission as the number of qualified applicants may exceed the number of available enrollment spaces. Students are admitted in a first-come, first-serve basis with priority given to full time students. In order to be placed into the admissions pool, applicants must meet the following requirements:

1. An earned associate degree (or 90 equivalent credits) in Information Technology or related area from a regionally accredited institution.
2. Minimum cumulative 2.5 GPA across all college coursework and a minimum 2.5 GPA in the following IT courses:
 - Computer Hardware, Desktop Operating Systems – 5 credits
 - Networking Fundamentals – 5 credits

- Windows Server (Installation and Administration) – 5 credits
 - Linux (Installation and Administration) – 5 credits
3. Completion of at least 30 credits of college-level General Education coursework with a minimum 2.5 GPA in each class as follows:
 - a. Pre-Calculus (MATH& 141) or Statistics (MATH& 146) or higher – 5 credits
 - b. English Composition (ENGL&101) or equivalent – 5 credits
 - c. Social Sciences – 10 credits
 - d. Humanities – 10 credits
 4. Personal statement – Applicants are required to write a **500 word maximum** personal statement that describes how the BAS program will advance their professional goals. Example topics include previous career experience, unique attributes that the applicant will bring to the program, hardships the applicant has overcome in pursuing his/her educational or work goals, and other special considerations that the applicant believes will make them a good candidate for the program. The essay should be typewritten and in a legible font size.

Selection Criteria

Complete applications will be reviewed by an admissions committee chaired by the BAS Program Manager. The admissions committee will also include the Dean of General Education and Transfer, an academic/career counselor for technology programs, and program faculty. Applicants will be scored based on the criteria listed above and using the rubric outlined in Table 9. This rubric will ensure that applicants have met all admissions criteria. Applications will be scored and considered in the order they are received (date received). Any applicant who does not meet the admissions requirements or does not meet the advertised admissions deadline will be considered on a case-by-case basis, per available space in the program.

Table 9: Admissions Criteria

| Admissions Requirements | Completed | Points | Notes |
|---|-----------|------------|---|
| Associate’s Degree or 90 equivalent credits in Computer Networking or related field of study from a regionally accredited | | 30 | |
| Minimum 2.5 cumulative GPA across all college coursework | | 20 | |
| Coursework in Computer Networking – 20 credits | | 20 | Minimum of a 2.5 GPA |
| Math& 141, Math& 146 or equivalent – 5 credits | | 5 | |
| ENGL& 101 (or equivalent) – 5 credits | | 5 | |
| Social Science courses – 10 credits | | 5 | |
| Humanities courses – 10 credits | | 5 | |
| Personal Statement (500 word max) | | 10 | Describes how the program will advance professional goals |
| TOTAL | | 100 | |

Should there be more qualified applicants than there are slots in the program, RTC will first consider opening additional slots, if feasible. If 30 students are deemed qualified, for example, and there are only 15 openings, the College will consider running a second cohort (if faculty staffing permits) in order to meet student demand. However, if the number of qualified applicants exceeds the number of slots but

there are not enough applicants to run an additional cohort, RTC will make every effort to admit as many additional students as possible and place the remainder on a waiting list. Additional slots will be awarded to those on the waitlist in order (date) that their application was received with full-time students receiving priority.

Annually, BAS staff and the BAS Advisory Committee will assess this process and revise it as needed.

To ensure the BAS in Computer Network Architecture program serves as diverse of a student population as possible, we will consider the following:

- Look to the College’s current and recent computer network graduates as a feeder into the BAS program. RTC’s three-year degree and certificate completion rates for underrepresented student populations in this program remain consistently high. Based on a three-year average, the rates are African Americans 80%, Asian 83%, Hispanic/Latino 100%, Native American 100%, 83% multi-racial and White 77%.
- Engage with the RTC Student Leadership office to collaborate and plan events with student led clubs, such as the Women in Trades and Technology and the Black Student Union clubs.
- Work in collaboration with the Communications and Marketing Department to engage in target marketing that encourages and shows diversity.
- Coordinate program diversity efforts with the Student Success Center as well as the Director of Student Programs and Engagement.
- Apply a best practice model for future faculty recruitment that includes persons from diverse racial and ethnic backgrounds.
- Collaborate with the BAS Advisory Committee to develop and implement additional strategies.
- Regularly evaluate recruitment and retention efforts and continually monitor and cultivate awareness for developing a culture of appreciation and respect toward diversity.

Student Enrollment

It is expected that most students enrolled in the program will attend full-time. However, students choosing to enroll part-time will be considered based on the number of seats available in that particular quarter as well as the student’s ability to meet the minimum admissions requirements outlined above. The table below indicates enrollment projections for the program over a five-year period. Note that the head counts and FTE counts are numerically close because in RTC’s cohort model the majority of students will be full-time (15 credits per quarter), with a small percentage of part-time students.

Table 10: BAS in Computer Network Architecture Enrollment Projections

| Year | 1 (2018-19) | 2 (2019-20) | 3 (2020-21) | 4 (2021-22) | 5 (2022-23) |
|------------------|-------------|-------------|-------------|-------------|-------------|
| Headcount | 10 | 27 | 36 | 36 | 36 |
| FTEs | 5.4 | 17.4 | 27 | 29.7 | 29.7 |
| Graduates | 0 | 7 | 14 | 14 | 14 |

Serving Place-Bound Working Adults

To address the scheduling needs of working adults and other “place-bound” individuals, the BAS in Computer Network Architecture program will be a hybrid program with evening face-to-face meetings and significant online components. This approach has worked well with the BAS in Application Development and provides the student with the flexibility of doing a large part of their work online when convenient to students. This program will use the existing lab facilities of the Computer Network program where virtualized environments have been implemented. Virtual servers give the students the ability to access their lab remotely and work from any location with a reliable Internet connection. As the

enrollment and revenue increase, the BAS in Computer Network Architecture program will have a set of servers dedicated to the BAS students for remote work.

Recruitment and Facilitation of Articulation Requirements

Over the years, we have built intentional strategies that link students who might not otherwise have access to post-secondary education to exceptional career and technical programs that offer distinct career pathway options. Students with an earned associate's degree in computer networking from an accredited institution will be eligible for this program if they meet the technical course requirements outlined at the beginning of this section, and also have the required general education credits in the areas listed therein. RTC has articulation agreements with high schools in the Puget Sound Dual Credit Career Consortium (PSDCCC) (formerly South King County Tech Prep Consortium). These agreements allow students to get direct RTC credit for specific skills they have learned while in high school. Computer science and computer network technology are just two of several articulated programs offered at RTC.

This STEM-based BAS program has an additional component, which is to develop a seamless 2+2+2 pathway from high school to the BAS degree. In order to reach this goal, we have received funding from the National Science Foundation to complete closer curricular alignment with the seven school district members of the PSDCCC to align their corresponding IT and computer network classes with the courses within our AAS degree in Computer Network Technology. Our faculty will host two teacher workshops to engage high school teachers and CN faculty on curriculum alignment and to update teachers on industry insights from the BAS curriculum development process. Our aim is to articulate at least one full quarter of technical courses between those high schools and our AAS-T degree. We will continue working with this group to develop an articulation document that maps the path from high school to the AAS-T degree and ultimately the BAS degree. In addition to the articulation of technical courses, we will also examine Advanced Placement, Running Start, and International Baccalaureate classes offered by our partner high schools with the goal of maximizing transferability towards our AAS and BAS programs.

In addition to working with area high schools, we will also develop articulation agreements with neighboring feeder community and technical colleges. We have extensive experience in this area through our first BAS in Application Development program, through which we have implemented a record number of articulation agreements. Specifically, we currently have agreements with Bates Technical College, Clover Park Technical College, Highline College, Lake Washington Institute of Technology, Seattle Central College, and South Seattle College. These agreements allow students the ability to seamlessly transition from their associate level program into our BAS program. We will continue to follow the same best practices with this new BAS in Computer Network Architecture.

4. Student Services Plan

RTC anticipates the majority of students in the Computer Network Architecture program will be working full or part-time. To ensure access to program advising that meets the scheduling needs to these students, the BAS Program Manager will be available for appointments at times that align with class times, as well as via email. In the case of evening classes, the BAS Program Manager will be available by appointment to meet with students before evening classes. In addition, the Program Manager will serve as the point-of-contact for all students enrolled or interested in enrolling in the Computer Network Architecture program. The Program Manager will assist students before admission into the program, throughout their enrollment in the program, and during their transition into the workforce and/or graduate school.

RTC has a robust variety of student support services located on campus to assist students in navigating the education system as well as providing linkages to additional resources and services off campus. Our student services staff provides high-quality, one-on-one support to all students; ensuring students achieve

personal and academic success. Students enrolled in the BAS in Computer Network Architecture program will have access to the following services:

- Advising and Counseling
- Learning Resource and Career Center
- Credential Evaluation and Assessment
- Disability Resource Services Office
- Financial Aid Office
- RTC Library
- Veteran's Services
- Student Leadership (including LGBTQ resources, student-led clubs, etc.)

Jessica Gilmore English, M.A. in Educational Leadership and Vice President for Student Services, and Scott Latiolais, M.S. and Dean of Student Success, are responsible for all services listed above. They are experienced with and poised to guide their teams to offer services specifically for incoming BAS students.

General Services

Students in the BAS in Computer Network Architecture program will have access to all support, advising and counseling services generally available to students at RTC. General services include all of the following:

Access and Disabilities Accommodations

RTC is committed to providing appropriate accommodations for students of all abilities. Appropriate adjustments and assistive services or technologies will be provided to qualified students with disabilities during recruitment, the application process, enrollment, registration, financial aid, course/module work, counseling, and program fulfillment.

Admissions and Enrollment

RTC is dedicated to making the admissions experience as simple and intuitive as possible for new students. The general RTC application for admission can be completed online at <http://www.ctc.edu/~renton/wts/kiosk/index.html>, in-person at the Enrollment Services office, or by mail. The registration process is also available online at <http://rtc.edu/registration, in-person> at the Enrollment Services office, or by mail.

Entry Advisers and Career Counselors are available Monday through Friday, 7:30am – 6:00pm to discuss program offerings, review transcripts, answer general RTC and program-specific questions, and refer prospective students to Financial Aid and other campus resources as needed.

Prior Learning Assessment

The management of Prior Learning Assessment will continue to be the responsibility of the Director of Enrollment Services, Patrick Brown. The Director of Enrollment Services reports to the Vice President of Student Services. Assessment of work submitted to obtain credit for prior learning will be the responsibility of RTC's qualified program faculty.

Advising and Counseling Services

RTC offers a wide range of advising and counseling services, including entry advising, high school and international student services, information on rights and responsibilities, testing services, veteran's services, workforce programs, career counseling, job placement assistance, and linkages to social and health resources. While mental health counseling is not directly offered on campus, RTC counselors triage students in crisis and utilize a robust community referral list for students needing or requesting mental health services.

Advising, Retention and Success

RTC's intrusive, developmental advising model includes an advisor dashboard system with web application tools that provide customized and timely information for advisors to communicate student intervention needs with faculty and staff. Intentional student career and academic planning services include career counseling, peer and professional tutoring, and student ambassador mentoring. An early warning system is used as an intervention tool for identifying students who are struggling academically. Our advising model includes mandatory entry advising for new degree seeking students, a comprehensive intake form, advising software that allows us to track student achievement and success as students move through their programs, and an early alert system.

Financial Aid

The Financial Aid Office assists students and their parents in meeting basic educational costs. All financial aid programs at RTC are administered in accordance with established state and federal regulations and policies. Our financial aid staff works with students individually to assess monthly educational and personal expenses. If a student has unmet need that is not covered by state and/or federal funding, RTC staff works with the student to explore options for covering those needs.

Learning Resource and Career Center

The Learning Resource and Career Center (LRCC) helps students explore and choose professions and training programs, as well as provide students with the opportunities and resources to learn the skills needed for success in their programs and in the workplace. The Center is run by a highly educated and qualified staff who develop workshops, share information and provide resources that prepare students, alumni, and the community for a successful job search. Staff also gives employers the opportunity to meet their human resource needs through internships, the hiring of graduates and by participating on advisory committees to ensure that industry trends and needs are reflected in the curriculum.

LGBTQ Resources

RTC is committed to promoting a safe and inclusive learning environment for LGBTQ students. There are a number of resources and programs on campus specifically supporting LGBTQ students, staff and faculty and their allies. These services include:

- LGBTQ Terminology and FAQs
- RTC "Just Be" LGBTQ Club
- Information about gender/sexual orientation questions on registration forms
- LGBTQ Local Web Resources
- SafeZones Program
- RTC Allies and Advocates

The SafeZone Program identifies, trains and supports advocates of the LGBTQ community at RTC. Advocates for the LGBTQ community at RTC require a support system, knowledge about the issues and a deep respect for diversity.

Veteran Services Office

The Veteran Services Office guides veterans to resources in the community and at RTC, serving as a one-stop shop for veteran students. The office provides information and assistance on RTC's program that are eligible for benefits under a variety of Veteran's Administration regulations. Staff offers assistance to veterans when choosing educational and technical goals, building community, and maximizing their potential. A wide range of support services and resources are offered, increasing the potential of individuals to complete their academic goals successfully, and on time. All veteran students receive a copy of RTC's New Student Veteran Resource Guide upon enrollment. This guide includes a plethora of

resources such as information and linkages to: affordable housing, mental health services, medical services, financial resources, disability services, etc.

Program Specific Services

Below are several additional services offered to BAS students, in addition to the general services above:

Additional BAS Resources

The financial plan outlined below in Section 5 (Building and Sustaining a High Quality Program) indicates the following additional resources to provide specialized support to BAS in Computer Network Architecture students: .5 FTE Financial Aid Specialist, .5 BAS Outreach Coordinator, and 1.0 FTE BAS Program Manager. The Financial Aid Specialist and Outreach Coordinator will be new positions, while the BAS Program Manager will go from .75 to 1.0 FTE. The three positions will split time between this BAS in Computer Network Architecture program and RTC's first BAS degree in Application Development. The Program Manager has experience developing formal processes for recruiting and enrolling students so she will be able to manage this second BAS quite effectively.

Program Specific Admissions and Enrollment Support

Admission to RTC and the BAS program is a two-tier process. First, prospective students meet with an Entry Advisor in the Student Success Advising/Counseling office to answer general questions and review transcripts. Once a program of study is chosen, the student is then assigned to a Career Counselor who is responsible for assisting the student with the general RTC application (if not already a current student) and BAS program specific application. Due to the nature of the varying types of students entering the BAS program – current students, new students, transfer students, etc. – at times the BAS Program Manager also assists students with entry advising and the BAS program specific application.

Program specific applications are then forwarded to the BAS Program Manager for initial review. The Program Manager contacts students to let them know that their application was received and the timeline for an admissions decision. As needed, the Program Manager also consults with the student and Career Counselor to discuss any additional courses the student may need to meet all minimum admissions requirements.

Once the application deadline has passed, the BAS Program Manager convenes the BAS Admissions Committee where admissions decisions are made based on the Admissions Criteria outlined in Table 9.

After acceptance to the program, students are allowed to register for classes. The registration process is available via mail, in-person at the Enrollment Services office, and online at <http://rtc.edu/registration>. Credit evaluation and transfer review are handled by RTC's Credentials Evaluator in the Registrar's Office.

The additional advising and admissions workload will be primarily shared by the current Enrollment Services department and the BAS Program Manager. The new part-time .5 FTE Outreach Coordinator will relieve the Program Manager of many of the external relations duties previously performed by the Program Manager, allowing the Program Manager to focus more time on internal student relations such as advising and counseling.

Program Specific Financial Aid Support

Since the specific financial aid needs of students in the BAS program may differ from the needs of students in traditional associate's degree programs, we plan to add a .5 FTE Financial Aid Specialist who will specialize in bachelor's level financial aid. This specialist will work in the afternoons and evenings to ensure availability to meet with students before BAS courses start each evening. In addition, existing

Financial Aid staff will be trained as needed to understand and work through differences that may arise. The Financial Aid Specialist assigned to the BAS in Computer Network Architecture program will serve as a liaison between baccalaureate students and the financial aid office.

Program Specific Advising

Advising at RTC is the responsibility of our student services staff. Therefore, RTC's Vice President of Student Services, Jessica Gilmore English, is ultimately responsible for program advising and other student support services and staff. It is however expected that questions will arise that require the expertise and knowledge of BAS faculty members. In these cases, student services staff will work closely with the BAS Faculty Lead and BAS Program Manager to ensure students receive the support needed. BAS Program Manager duties include student advising pertaining to course choice, discussing academic progress, linking students to additional resources, and assisting with other program-related issues.

Extension of Student Services Hours

The availability of campus services tend to fall into general campus hours of 7am – 5pm. We understand that BAS students may not be able to get to campus during traditional hours and therefore, the BAS Faculty Lead, Program Manager, Financial Aid Specialist and Outreach Coordinator will hold flexible work hours that include availability in the evenings.

Our student services division currently offers access to advising and counseling, student records, and assessment in the evenings once per month. As evening program offerings increase, the College will modify and make available student services support for students attending evening courses as needed.

Program Specific Job Opportunities and Placement

Job placement and career advancement assistance are a high priority at RTC. Heavy emphasis on job placement and career advancement will also be present for the BAS in Computer Network Architecture program. The advisory committee, comprised of regional computer network professionals, will assist in identifying current and upcoming job openings. The BAS Program Manager and the Outreach Coordinator, in conjunction with the BAS Faculty Lead, will work to generate cooperative education and internship opportunities for students. In addition, through the Network Architecting Capstone Project course, students will have the opportunity to build their professional network – real work components will be an integral part of the project. The Learning Resource and Career Center (LRCC) has a successful track record in helping students secure jobs by providing career planning and hosting career fairs.

Expanded Tutoring Options through the Learning Resource and Career Center

In addition to the regular tutoring schedule for the associate degree programs, the LRCC also provides BAS-level students with one-on-one and small-group tutoring sessions, as well as peer-to-peer and e-tutoring options. LRCC staff work closely with BAS instructors to ensure that tutoring services complement what is being taught in the 300/400 level classroom. In addition to expanded evening and weekend hours, the LRCC also provides students with specialized BAS software on dedicated computers, free printing, and a comfortable place to study. Costs associated with these expanded services will be covered by Student & Activities fees, which associate and BAS students pay as part of tuition.

Program Specific Support through the Renton Technical College Library

The RTC Library has sufficient physical space to support the BAS in Computer Network Architecture. Seating for more than 130 library users is available at individual carrels, study tables and on lounge furniture. In addition, 11 study group rooms have the capacity to accommodate anywhere from four to 10 people per room. The library contains more than 40 public use computers, several public use scanners, printers, photocopiers and audio-visual viewing stations for videotapes, CDs and DVDs.

A part-time Librarian (.5 FTE), with subject matter expertise in Computer Network Architecture or similar disciplines, will be hired to deliver the upper level research instruction to support 300/400 level courses as well as to curate the collections in a dedicated way that is responsive to the needs of faculty, students and industry.

The Library will also add a new specialized e-book collection, an information technology online journal collection, and selected print/media resources to help foster learning while addressing equity issues surrounding access to information. The e-book and journal databases are subscription based models that will need continuous/annual funding to ensure renewal of the resources. The print items are one-time purchases that will not require annually renewed funds.

- The proposed e-book collection is the **IT Core Collection**, an Ebsco product. This collection would add 2,740 digital books to the library collection, all under a multi-user license which affords any student access to the digital book for reading or downloading anytime/anywhere. This collection specializes in computer applications and training manuals and includes well-known publishers such as MIT Press, World Scientific Publishing, Watsonia Publishing, SAS Institute, Sage Publications, RAND Corporation, Princeton University Press, Packt Publishing, No Starch Press, John Wiley & Sons, IT Governance Ltd, IOS Press, Elsevier, Course Technology PTR, and Cambridge University Press.
- In addition, ProQuest will also provide an online journal collection to support the BAS in Computer Network Architecture program. The ProQuest Advanced Technologies & Aerospace Collection is a database of more than 2,250 full text journals including more than two million tables and figures. The database provides extensive coverage of the literature in aeronautics, astronautics, communications, computer and information technology, electronics, lasers, solid-state materials and devices, space sciences, and telecommunications.

Additional print resources will be selected by the librarian, after consultation with BAS faculty members, to supplement the online resources listed above. During Year 1, the RTC Library recommends purchasing approximately 30 print items to support areas of emphasis in the program. In Years 2 and 3, as curriculum expands and faculty have a better understanding of program needs, the RTC Library recommends purchasing approximately 15 items per year. Building on that base of targeted print resources and coordinating with the changing collection of e-resources, the library recommends purchasing 15 additional print resources annually to meet the basic needs of the program’s faculty and students.

5. Building and Sustaining a High Quality Program

The main source of revenue for the BAS in Computer Network Architecture program will be tuition. The program will be state-supported, allowing RTC to count state-support FTEs towards our overall FTE target. Other than tuition, there will be no other type of lab or program-specific fees collected. The table below shows a five year projection of costs. Starting with a first cohort in winter 2018, the BAS program will show a loss in FY2017-18 and FY 2018-19. RTC is committed to funding many of these expenses through a National Science Foundation grant and will cover initial expenses in the program until it reaches self-sufficiency. For subsequent years, the program will rely on its own revenue to cover its expenses.

Table 11: BAS in CNA: Estimated Program Expenses, Income and Reinvestment

| | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 |
|-------------|----------|-----------|-----------|-----------|-----------|
| Enrollment | 10 | 27 | 36 | 36 | 36 |
| Annual FTEs | 5.4 | 17.4 | 27 | 29.7 | 29.7 |
| Tuition | \$22,242 | \$109,653 | \$170,152 | \$190,910 | \$190,910 |

| | | | | | |
|--|------------|------------|------------|-----------|-----------|
| Revenue | \$22,242 | \$109,653 | \$170,152 | \$190,837 | \$190,837 |
| Instructor MS P/T | \$11,054 | \$28,463 | \$34,156 | \$35,181 | \$36,236 |
| Instructor (moonlight F/T) | \$3,255 | \$6,706 | \$6,907 | \$7,114 | \$7,327 |
| Course development | \$6,000 | \$9,000 | \$3,000 | \$0 | \$0 |
| Benefits instructors (10% of salary) | \$2,031 | \$4,417 | \$4,406 | \$4,229 | \$4,356 |
| Instructional Salaries & Benefits | \$22,340 | \$48,586 | \$48,469 | \$46,524 | \$47,920 |
| Outreach Coordinator BAS | \$10,000 | \$10,300 | \$10,609 | \$10,927 | \$11,255 |
| Financial Aid Clerk BAS | \$8,438 | \$11,588 | \$11,935 | \$12,293 | \$12,662 |
| Librarian (2 quarters in first year, 4 quarters in subsequent years) | \$7,034 | \$14,490 | \$14,925 | \$15,372 | \$15,834 |
| Benefits Support Staff (38% of salary) | \$9,679 | \$13,823 | \$14,238 | \$14,665 | \$15,105 |
| Support Salaries & Benefits | \$35,151 | \$50,201 | \$51,707 | \$53,258 | \$54,856 |
| BAS Program Manager ⁶ (1) | \$17,550 | \$18,076 | \$18,619 | \$19,177 | \$19,753 |
| Faculty Lead (2) | \$17,702 | \$18,233 | \$18,780 | \$19,343 | \$19,924 |
| Benefits Administration (38%) | \$13,396 | \$13,798 | \$14,212 | \$14,638 | \$15,077 |
| Administration Salaries & Benefits | \$48,648 | \$50,107 | \$51,611 | \$53,159 | \$54,753 |
| Supplies & materials (3) | \$5,950 | \$5,400 | \$5,000 | \$4,000 | \$3,000 |
| Reserve computer hardware/software | \$9,000 | \$8,000 | \$8,000 | \$5,000 | \$5,000 |
| Library purchases | \$9,000 | \$9,000 | \$9,000 | \$9,000 | \$9,000 |
| Professional development | \$3,000 | \$4,000 | \$4,000 | \$4,000 | \$4,000 |
| Marketing (4) | \$10,000 | \$8,000 | \$8,000 | \$5,000 | \$5,000 |
| Miscellaneous Total | \$36,950 | \$34,400 | \$34,000 | \$27,000 | \$26,000 |
| Total Expenses | \$143,088 | \$183,294 | \$185,786 | \$179,941 | \$183,529 |
| NSF Contribution | \$36,968 | \$38,010 | \$0 | \$0 | \$0 |
| Net | (\$83,878) | (\$35,631) | (\$15,634) | \$10,970 | \$7,381 |

Below is an explanation of the main budget items.

Revenue

Tuition is calculated based on a 15 credit per quarter course load, three quarters per academic year. This approach is consistent with our plan to run the program using a cohort model where all students follow a prescribed course sequence and workload. During the first year, we only expect two quarters of tuition revenue as we are starting the first cohort in winter. Subsequent years will generate three quarters of revenue with two cohorts. In general, a full-time student will generate 1 FTE at a rate of 15 credits - \$2,059.45/quarter for three quarters or \$6,178.35 per year, with a built in increase in tuition of 2% every other year after year one. The program will start with 5.4 FTEs and increase to 29.7 in years four and five.

⁶ Table footnotes: (1) NSF grant to cover the full 25% of the BAS Program Manager salary in 2017-18 and 2018-19; (2) NSF grant to cover 10% of Faculty Program Chair salary in 2017-18 and 2018-19; (3) NSF grant contributing \$300 in 2017-18 and 2018-19; and (4) NSF grant contributing \$2,000 in 2017-18 and 2018-19.

Enrollment headcount is conservative in years one and two, based on experience with the College's first BAS in Application Development. We expect most students to attend full-time with a small percentage of part-time students. In year one, we expect about 10 new students, with retention at or over 70%. In year two, we expect to add a second cohort of about 20 students, again with a 70% or better retention rate. Subsequent years we expect to add about 22 students per cohort with the same retention. Again, these estimates are based on what we have learned and experienced from our first BAS program.

Instructional Salaries & Benefits

Based on our experience with our first BAS program, each cohort of BAS students requires the employment of two part-time instructors and one full-time instructor at a moonlight rate to teach 12 courses. The winter quarter start will mean a reduced number of faculty needed to teach (four courses in year one, 10 in year two) in the initial years until the cohorts are fully running. We are following this assumption to calculate the instructional salaries and benefits line items. For part-time faculty and moonlighting faculty, 10% is our standard benefits rate.

Support Salaries & Benefits

A part-time Outreach Coordinator (.5 FTE) will be hired to concentrate on recruitment efforts for both BAS programs. The funding will come from this proposed BAS at .25 FTE plus the existing BAS in Application Development at .25 FTE for a total of .5 FTE of staff time. Since the entry point for the BAS in Application Development is fall quarter and this proposed BAS will be winter quarter, this individual will dedicate his/her efforts primarily to one cohort at a time. This will provide sufficient support to generate recruitment leads and increase awareness of both BAS degrees in our service area. For this and all support salaries, a 38% benefits rate is included.

A part-time (.5 FTE) financial aid specialist will be hired to serve as a liaison between baccalaureate students and the financial aid office. The financial aid specialist will provide support to BAS financial aid packaging and processing as well as meet with BAS students in the evenings to provide financial counseling. The funding will come from this proposed BAS at .25 FTE plus the existing BAS in Application Development at .25 FTE for a total of .5 FTE.

A part-time librarian (.5 FTE) will also be added to work specifically with both BAS program students and faculty to enhance the library collections, provide customized information literacy instruction, and support the higher level research needs of the program. Funding for this will be split between the two BAS program budgets as well.

Administration Salaries & Benefits

The Program Manager (.25 FTE) will serve as the primary administrative contact for the program. This position will provide administrative oversight and will work closely with RTC's student services staff to ensure that program advising aligns with the College's advising model. This individual will also oversee the recruitment efforts of the Outreach Coordinator. For this and all administration salaries, a 38% benefits rate is included.

Responsibilities of the Program Manager include, but are not limited to the following:

- Disseminating program information to current and prospective students;
- Monitoring student progress and success;
- Assisting students in accessing additional student services and resources available on campus;
- Linking students to social services and other resources as needed;
- Working with students to troubleshoot course and programmatic issues;
- Internally and externally marketing programmatic offerings;

- Overseeing the admissions process;
- Conducting program assessment in collaboration with the Faculty Lead;
- Overseeing the program budget;
- Working with the Communications and Marketing Department to design and vet marketing materials;
- Building and strengthening relationships with local businesses, government agencies and nonprofit organizations;
- Linking students to local employers for internship and job opportunities; and
- Coordinating the application and approval processes for BAS programs at RTC.

The BAS Program Faculty Lead (.25 FTE) responsibilities will be filled by a full-time faculty member who may be a current tenured faculty in the computer network program or a future hire. In addition to helping oversee the program, the BAS in Computer Network Architecture Chairperson will teach at least one course every year, creating a valuable connection to and insight into many aspects of the program.

Administrative responsibilities of the Lead include, but are not limited to the following:

- Curriculum development, revision and implementation;
- BAS quarterly course scheduling and teaching assignments;
- Articulation discussions with both two-year and graduate degree programs;
- Close collaboration with RTC's high school partners to develop a seamless 2+2+2 pathway for participating students;
- Participation in college governance;
- Organization, scheduling and maintenance of CNA advisory committee;
- Engagement in ongoing program assessment in order to maintain program currency and relevancy; and
- Employer and partner outreach.

Other Expenditures

Supplies and Materials includes general office supplies for all full time and part time BAS faculty and staff, new office equipment for new staff as well as reserves for updated equipment for current staff as needed, and other miscellaneous items as appropriate for BAS program administrative support.

RTC has set aside reserves in the amount of \$9,000 in year one, \$8,000 in years two and three and \$5,000 in years four and five per year to fund BAS specific hardware/software. This is in addition to the existing infrastructure from the full-time Computer Network AAS day program, which will be used by the BAS program. Since the BAS will run on an evening/hybrid model, there will be no scheduling or equipment/classroom space overlap between the two programs. RTC facilities for computer networking will suffice for both programs and include three computer labs with work-station class computers of the latest generation, multimedia projectors, wireless access, and dedicated servers.

Likewise, the Faculty Lead and Program Manager will continue to use their current administrative work space. Additional work space will be set aside for the adjunct faculty and the outreach coordinator in the computer network department. The part-time financial aid counselor will have dedicated space in the Financial Aid office, as will the part-time Librarian in the library.

Library charges cover licensing and subscription fees for specialized e-book collections, information technology online journal collection, and funds for selected additional print resources that will support the research needs of BAS students.

The professional development line item covers training, seminars, and conferences for BAS faculty and staff as well as curriculum development expenses.

The marketing budget is higher in the initial years to support focused outreach and advertising to drive enrollment in the program.

6. Program Specific Accreditation

At this time, Renton Technical College does not plan to seek specialized accreditation for the BAS in Computer Network Architecture program. Because Computer Network Architecture is a fairly new degree, there are currently no accreditation forums specific to this degree. If at some point an appropriate program-specific accreditation is identified and would serve as an advantage for the program and the students, RTC will assess the benefits and determine if program-specific accreditation is advantageous.

In addition to program-specific accreditation, RTC will submit a substantive change proposal to its accrediting body, the Northwest Commission on Colleges and Universities (NWCCU). The purpose of the proposal is to enable the College to set forth the activities constituting the change and expected impact on the College as a whole. This proposal will be submitted to the NWCCU immediately following approval from the SBCTC. RTC is already approved to offer financial aid for bachelor's level degrees. Approval from the NWCCU was factored into our timeline for commencement of the program's first cohort in winter 2018.

Industry Credentialing for Individuals

Individual credentialing possibilities for immediate graduates of the program are the EMC Cloud Engineer (EMCCE), EMC Information Storage and Management (EMCISA), Amazon Web Services Architecting, and/or Cisco CCNP Data Center. Credential options will be further explored with the start of the program.

7. Pathway Options beyond Baccalaureate Degree

Graduates of the Computer Network Architecture program interested in obtaining a graduate degree will be well prepared for master's level work in information technology and management of technology disciplines. Students who choose to enroll in a Master's degree in computer networking may need to take specific pre-requisite courses prior to admissions, either at RTC (if offered) or at the master's granting university. There are several options for place-bound students who want to pursue a master's degree after completing a BAS in Computer Network Architecture at RTC.

Universities in or near RTC's service area that offer Master's degrees include:

Central Washington University

M.S. Information Technology and Administrative Management (MS-ITAM, online)

- Contact Information: Dr. Laura Portolese; laurap@cwu.edu (509) 963-1019
- No course pre-requisites required

City University of Seattle

M.S. Computer Systems (online only)

M.S. Information Security (online only)

- Contact Information: (206) 239-4500
- Accepts any degree from a regionally accredited institution
- No course pre-requisites required

Seattle Pacific University

M.S. Information Systems Management (MS-ISM)

- Contact Information: Jacqueline Miller, Associate Graduate Director; drj@spu.edu; (206) 281-2753
- Accept any degree from a regionally accredited institution
- No course pre-requisites required
- One year of post bachelor's degree professional experience preferred
- Copy of resume, official transcripts, GRE scores, two professional letters of recommendation, and a 3-4 page personal statement

University of Phoenix

M.S. Information Systems (online only)

- Accepts any degree from a regionally accredited institution
- Must have a cumulative GPA of 2.5 or higher
- No course pre-requisites are required

University of Washington, Tacoma

- M.S. Cybersecurity and Leadership (MCL)
- Contact Information: Dr. Yan Bai., Graduate Program Director; Yanb@uw.edu (253) 692-5963 or Professor, Tracy Thompson, Ph.D., Co-Director, (253) 692-5636
- Pre-requisites include basic networking and programming courses

Western Governor's University

MBA Information Technology Management (online only)

M.S. Information Security and Assurance (online only)

- Contact Information: 1-866-225-5948
- Three years of professional experience in the field required
- Accepts any degree from a regionally accredited institution
- No course pre-requisites required

Currently, RTC is in the early stages of discussion with some of these institutions to determine the potential for articulation agreements for master's degree programs. For example, in December 2016 the BAS Program Manager met with WGU representatives to discuss a formal articulation agreement. Prior to the meeting, WGU Community Relations Manager Jeanie Belcher stated: "I received confirmation today that WGU does in fact consider a BAS degree equivalent to a Bachelor's degree in regards to transfer credit and eligibility requirements based on the content taken with these degrees. I'd love to set some time to discuss visits with faculty and your students considering an MBA or IT graduate program." After the meeting, feedback from WGU remains very positive and several information sessions/class visits have been scheduled for February 2017. A formal articulation agreement is expected in early 2017.

8. Expert Evaluation of Program

Renton Technical College has selected two experts to provide external review, Dr. Yan Bai, Associate Professor and Co-Director of Master of Cybersecurity and Leadership in the Institute of Technology at University of Washington Tacoma (UWT), and Dr. J. Richard Beer, Professor in Computer Science and Dean of the School of Business at Saint Martin's University. Both provided important feedback on the proposed BAS degree.

Dr. Bai believes that our curriculum design plans and career assistance efforts will lead to good job placement for students. For the most part, her comments were supportive of the degree. She recommended some refinement with our learning outcomes in the area of Infrastructure Maintenance and Troubleshooting, which we have since added. Other concerns she expressed (budget and advisory committee input) stemmed from the fact that she reviewed a draft of our proposal where those items were in the process of being added. They have been incorporated and are now easy to understand.

The second reviewer, Dr. Beer, also had many positive things to say about the proposed degree. His primary concerns were with ensuring that next steps include curriculum mapping to align course goals to program outcomes. This will be an important consideration moving forward with this degree. He also asked for clarification of the advisory committee role, which we added. And finally, Dr. Beer expressed concern about the level of math required to complete the degree. While it is understood that higher math proficiency may be necessary for graduate work at colleges offering Master's level coursework, we hesitate to add an additional requirement for all BAS students that would likely create an additional barrier to entry and completion of the proposed Bachelor's degree. RTC will advise students interested in graduate school about the potential need for additional math courses, rather than make this a graduation requirement.

Appendix I: Course Descriptions

CNA 3XX: Network Databases and Structured Query Language – 5 credits

This course on Databases and Structured Query Language (SQL) acquaints the student with the concept of databases and queries using SQL. Some of the skills students learn are: how to create a table and database; be proficient with SQL to create and use queries that are related to dates, strings, numbers, data aggregation, etc.

CNA 3XX: Programming and Scripting for Network Management – 5 credits

This course uses Windows PowerShell and the Integrated Scripting Environment (ISE) as a means to control and administer Windows-based computers, Specifically Windows Server 2012 R2/2016. Students learn the basics of scripting in PowerShell and apply it to automate tasks such as creating user accounts; connecting to other servers; create virtual machines; navigate the PowerShell Help system; manage computer services and roles, etc.

CNA 3XX: Network Programming in Python – 5 credits

This course teaches students how to program computers using Python. Students learn how to construct a program; variables and expressions; conditional code; functions; loops and iterations.

CNA 3XX: Network Programming in JAVA – 5 credits

This course teaches students how to program computers using JAVA. Students learn how to construct a program; start working with variables, data types, keywords, and other critical language components. Student also learn about program flow; how JAVA implements object-oriented principles such as inheritance and polymorphism.

CNA 3XX: Project Management – 5 credits

This course teaches students the principles and concepts involved with project management. Generally, the aspects of defining a problem, establishing project objectives; building a project plan to meet deadlines; manage a team; close a project, etc.

CNA 3XX: Software Designed Networks I – Private Cloud – 5 credits

This course teaches students about the separation of the control planes in a physical network using programmable network controllers. The OpenFlow standard for remote modification of network devices is covered. Students should be familiar with Linux, basic networking concepts such as TCP/IP, routing, and have worked with scripting languages such as Python and Java Script.

CNA 4XX: Cloud Services Architecting – Public Cloud– 5 credits

This course provides the fundamentals of building an IT infrastructure in the Public Cloud. The course is designed to teach solutions architects how to optimize the use of the Amazon Web Services (AWS) cloud by understanding AWS services and how these services fit into cloud-based solutions. Because architectural solutions may differ depending on industry, type of applications, and size of business, this course emphasizes AWS cloud best practices and recommended design patterns to help students think through the process of architecting optimal IT solutions on AWS. It also presents case studies throughout the course that showcase how some AWS customers have designed their infrastructures and the strategies and services they implemented. Opportunities to build a variety of infrastructures via a guided, hands-on approach are also provided.

CNA 4XX: Network Infrastructure Planning and Deployment – 5 credits

This course is a lab-based experience for students to apply their project management and networking knowledge to a real-world business case. Students integrate computer and networking hardware and

software into a robust, secure, redundant and resilient infrastructure. Students will research and present findings related to enterprise projects in computer networking design.

CNA 4XX: Software Designed Networks II – Cloud Migration– 5 credits

This course will equip students as administrators with the knowledge, skills, and abilities to build and run a VMware vSphere environment. This course focuses on the installation and configuration of VMware ESXi hosts and VMware vCenter Server. This course also focuses on the management of ESXi hosts and virtual machines with vCenter Server. The student will be prepared as an IT professional to achieve the VMware Certified Professional on Data Center Virtualization (VCP5-DCV) certification.

CNA 4XX: Virtual Infrastructure and Cloud Security – 5 credits

Students will learn the principles of advanced application design for mobile devices. The Focus is on the application's user experience (Human Computer Interaction) specific to mobile devices, and providing value to the user. Includes design principles for applications that are intended to run on multiple mobile device platforms, and which adapt to the different screen sizes and capabilities that mobile devices offer, and how to optimize media for mobile and desktop.

CNA 4XX: Troubleshooting Physical and Virtual Network Infrastructure – 5 credits

In this course the students will learn how to employ the use of monitoring and troubleshooting tools on physical and virtual network infrastructures. Students will learn through the use of hands-on lab scenarios the necessary troubleshooting skills needed to utilize both commercial and open source tools such as FCAPS, NAGIOS, NGS3, LogZilla, etc.

CNA 4XX Network Architecting Capstone Project – 5 credits

Students are given various scenarios in computer networking design, security, infrastructure, servers, unified telephony, video and wireless in an enterprise model. Student's research, plan, design and implement the scenario. Students document and present their findings to a College-Business professional team in a concise and professional manner consistent with current IT business practices.

OR

CNA 4XX: Cooperative Education/Internship – Optional (5 credits maximum)

This course provides the option of cooperative education/internship training in the BAS in Computer Network Architecture program. Instructor approval is required. The experience may be paid or unpaid – up to 330 hours and 5-credit maximum.

Appendix II: External Expert Review of Applied Baccalaureate Degree

(see RTC response in italics and bold at the end of comment when improvements have been suggested)

| | | | |
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| College Name: | Renton Technical College | BAS Degree Title: | Applied Baccalaureate Degree in IT Networking-Network Architecture |
| Reviewer Name: | Yan Bai | Institutional or Professional Affiliation: | University of Washington Tacoma |
| Professional License or Qualification: | Ph.D. | Relationship to Program, if any: | External Reviewer |
| Please evaluate the following Specific Elements | | | |
| a) Concept and overview | <p>Is the overall concept of the degree program relevant and appropriate to current employer demands as well as to accepted academic standards? Will the program lead to job placement?</p> <p>Comment National statistics data have shown a strong demand for computer network architecture professionals.</p> <p>The BAS degree in IT networking— Network Architecture addresses the workforce need in the area.</p> <p>Many top-ranked high-tech businesses, for example, Microsoft, Boeing, and Amazon, are located in the Seattle metropolitan area. There is a fairly large array of computer network architecture job opportunities in the region. Table 1 shall be completed to show the job market and trends in computer network architecture.</p> <p>The curriculum design and career assistance efforts in place will lead to good job placement for students.</p> | | |
| b) Degree Learning Outcomes | <p>Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?</p> <p>Comment The degree learning outcomes in the four areas, Infrastructure Maintenance and Troubleshooting, Computer Network Architecture, Project Management, and Professionalism, are described. The Two learning outcomes in Infrastructure Maintenance and Troubleshooting, and Computer Network Architecture are identical, e.g.,</p> <ol style="list-style-type: none"> 1) Demonstrate an end to end project-level vision in planning Computer Network Architecture, server and client scripting, and security. 2) Demonstrate ability to develop and deploy applications in a variety of platforms, including distributed computing and mobile applications. <p>The above two learning outcomes seems appropriate for the area of Computer Network Architecture.</p> <p>It would be helpful to develop another learning outcome for the area of Infrastructure Maintenance and Troubleshooting.</p> | | |

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| | <p><i>RTC Response: Upon review of Dr. Bai’s comments, it is acknowledged that the two learning outcomes are identical. These have been corrected in the final version of the proposal (see Table 2).</i></p> |
| c) Curriculum Alignment | <p>Does the curriculum align with the program’s Statement of Needs Document?</p> <p>Comment</p> <p>The degree targets preparing graduates to work as computer network architects, engineers, and network managers in industries and different organizations. The curriculum provides students with knowledge and skills in both general education and their specialized field — computer network architecture.</p> <p>Graduates from this degree program will have a good understanding and experience of traditional network operations and management, as well as emerging computer network technologies, such as software defined networks and cloud computing.</p> |
| d) Academic Relevance and Rigor | <p>Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?</p> <p>Comment</p> <ol style="list-style-type: none"> 1) The 60 credits of core technical courses in computer network architecture are in line with emerging computer networking technology, including Cloud Computing, and Software Defined Networking. It will be a big help for students when searching for a job. 2) As stated in the degree proposal draft, “BAS could map to specific industry/vendor certifications. In cases where there is a good match, the faculty and the Program Chair will incorporate the related certification exam as part of the final course assessment. Examples that will be researched include Microsoft Technology Associate, EMC Cloud Infrastructure, EMC Storage Administration, and CCNP Cisco Certified Network Professional.”. Clearly, certs will be a plus to job placement. 3) Wireless networking is an important part of computer networking in general. Local companies, such as Boeing, are in big need for experts in the area. It would be useful to add/integrate wireless into the curriculum. 4) Are there any dependencies/pre-requisites for the Computer Network Architecture Junior/Senior coursework? 5) Is there a GPA requirement for graduation? <p><i>RTC Response:</i></p> <p><i>Item #4: There are dependencies/pre-requisites for the Computer Network Architecture Junior/Senior coursework. These are established in two ways: course sequencing and course design.</i></p> <p><i>In terms of course sequencing, Table 6: Sample Full-Time Computer Network Architecture Student Schedule is presented in a sequential order that evolved from review of student coursework in the RTC Computer Network Technology AAS/AAS-T degree. It is anticipated that the majority of CNA students will be graduates of the CNT AAS/AAS-T degree. Based on this premise, CNA students will possess the prerequisite knowledge and skills to continue coursework at the 300/400 level of</i></p> |

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| | <p><i>study. Students who enter the CNA BAS degree from outside the CNT AAS/AAS-T degree will be counseled during the program application process with regard to potential success or failure that might arise from taking coursework out of sequence.</i></p> <p><i>Course design entails the employment of instructors who possess the requisite knowledge, skills, and experience to teach course content. CNA courses will be developed in partnerships with experts from industry that will participate in the curriculum development process. RTC will hire and utilize such experts as instructors of these courses. The courses listed in Table 5: Renton Technical College Computer Network Architecture Junior/Senior Coursework was derived from the completion of a Knowledge, Skills, and Abilities (KSA) process by members of the CNA BILT/DACUM membership. The same approach will be applied to the development of each course. While the course descriptions are generic to date, further in-depth development of each course will include the contribution of those from industry.</i></p> <p><i>Item #5: GPA requirement for graduation: All RTC students must complete the required coursework with the degree track in order to graduate. Presently, it is RTC policy that all courses must be completed with a grade of ‘C’ for better. In order to graduate from the CNA BAS degree, RTC students must maintain a cumulative Grade Point Average of 2.5 or better. This requirement will be listed and articulated in the CNA BAS degree application process and counseling of students.</i></p> |
| e) General Education Requirements | <p>Are the general education requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?</p> <p>Comment 30 credits of general education is required. It covers communication skills, humanities, social sciences, natural sciences, etc., which enhances the general education that students may obtain from their AAS degree. It meets breadth and depth requirements for a baccalaureate level program.</p> |
| f) Preparation for Graduate Program Acceptance | <p>Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?</p> <p>Comment The degree prepares students with sufficient technical backgrounds for entering into a related graduate degree program, such as Master of Cybersecurity and Leadership at our Institution, University of Washington Tacoma.</p> |
| g) Faculty | <p>Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?</p> <p>Comment Program faculty members have adequate credentials (e.g. Master’s and Ph.D. degrees) to teach and improve the curriculum. The faculty team consists of educators from diverse academic background and experiences, covering both general education and technology/networking well.</p> |
| h) Resources | <p>Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?</p> <p>Comment Both Institutional (e.g., in recruitment and facilitation of articulation, student service plan, general services) and program-level (e.g., virtual lab environment) resources are</p> |

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| | <p>well planned. They are adequate to support the degree program and its continuous development.</p> <p>Table 11 is not completed. Program budget is not very clear.</p> <p><i>RTC Response: The budget comments in this section are a reflection of the fact that the budget had not been finalized when Dr. Bai reviewed this proposal. We have since included a completed Table 11 and clearly laid out the budget.</i></p> |
| i) Membership and Advisory Committee | <p>Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?</p> <p>Comment No related information is found in the proposal draft.</p> <p><i>RTC Response: The CNA Advisory Committee met on May 31, 2016 and completed a Knowledge, Skills, and Assessment process originally developed by the national Convergence College Network in partnership with a National Business-Industry Leadership Team (BILT). The CNA Advisory Committee is comprised of employers from the Seattle Metro area that are both national and local in scope. Upon approval of a broad set of KSAs, advisory committee members worked directly with Dr. Sanderson to identify and describe a sequential listing of student coursework (See Tables 5 and 6.). In July 2016, the CAN Advisory Committee was provided a final draft of sequential coursework and descriptions for review. A final review and approval of the coursework will be conducted during Fall Quarter 2016.</i></p> |
| j)Overall assessment and recommendations | <p>Please summarize your overall assessment of the program.</p> <p>Comment The Applied Baccalaureate Degree in IT Networking-Network Architecture at Renton Technical College is developed to address the growing needs of networking professionals, in particular, in the areas of cloud computing and software defined networks. The curriculum and job placement plan are well designed to achieve the learning outcomes, leading to the expected job placement in networking. The program faculty possesses different expertise to fulfill teaching courses in the program, and contribute to continuous development of the program. Resources in the institutional and program levels are adequate to support this degree program. I recommend to approve this degree program proposal.</p> |
| Reviewer Bio or Resume | |
| <p>Dr. Yan Bai is an Associate Professor and Co-Director of Master of Cybersecurity and Leadership in the Institute of Technology at University of Washington Tacoma (UWT). She is also a founding faculty member of the Bachelor's degree in the Information Technology and Systems program at UWT. She received her Ph.D. in Electrical and Computer Engineering from the University of British Columbia, Canada in 2003.</p> <p>Dr. Bai has taught a series of courses on cyber security and computer networking both at the undergraduate and the graduate levels. Dr. Bai has over 60 refereed publications in the areas of computer networking, cyber security, eHealth, cloud computing, and Internet of Things. She has been invited to serve as a program vice chair, a publicity chair, student travel grants and PhD forum chair, a steering committee member, or a program committee member, and a reviewer for a wide range of high impact research journals and ACM/IEEE flagship conferences. She also serves on the Editorial Board for IGI Global International Journal of E-Health and Medical Communications, and the EAI Transactions on Industrial Networks and Intelligent Systems.</p> | |

Appendix III: Second External Expert Review of Applied Baccalaureate Degree

(see RTC response in italics and bold at the end of comment when improvements have been suggested)

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| College Name: | Renton Technical College | BAS Degree Title: | Networking – Network Architecture |
| Reviewer Name: | J. Richard Beer | Institutional or Professional Affiliation: | Saint Martin’s University |
| Professional License or Qualification: | Ph.D. Computer Science, Dean & Professor | Relationship to Program, if any: | N/A |
| Please evaluate the following Specific Elements | | | |
| a) Concept and overview | Is the overall concept of the degree program relevant and appropriate to current employer demands as well as to accepted academic standards? Will the program lead to job placement? | | |
| | <p>Comment As an Applied 4-Year Technical Degree the proposed program is well positioned with an appropriate level of breadth and depth. Graduates of the program are in a strong position for immediate job placement upon graduation – especially in the King County area.</p> | | |
| b) Degree Learning Outcomes | Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor? | | |
| | <p>Comment This is difficult to answer. The program learning outcomes are very high level (as most program learning outcomes are). The learning outcomes are certainly appropriate. However, academic rigor is mostly determined on the course level (i.e. detailed course description, and ideally a strawman syllabus). However, this information is not provided in the proposal. The learning outcomes also need to be mapped to the program curriculum (see Curriculum Assignment).</p> <p>[This shortcoming is understandable. At the time of program development the individual courses are most likely not developed yet]</p> | | |
| c) Curriculum Alignment | Does the curriculum align with the program’s Statement of Needs Document? | | |
| | <p>Comment A curriculum map (i.e. how the courses map to the program learning outcomes) is not provided in the proposal. The curriculum implies the learning outcomes; however, the proposal would benefit from providing an explicit curriculum map.</p> | | |
| | <p><i>RTC Response: A curriculum map was not necessary as part of the Program Proposal document. As part of the curriculum development process, a curriculum map will be developed to reflect alignment of courses to program learning outcomes.</i></p> | | |
| d) Academic Relevance and Rigor | Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees? | | |
| | <p>Comment Yes. Caveats: I cannot judge the academic rigor. As explained above this would require a detailed review of each course at least on the level of a detailed course description or ideally review of the syllabus. That said, I have no doubt that the faculty in charge of developing these courses have the technical qualification to design the course work with the appropriate level of academic rigor.</p> | | |

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| e)General Education Requirements | Are the general education requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements? |
| | <p>Comment Yes, the proposal follows the state guidelines for general education for applied baccalaureate degrees.</p> |
| f)Preparation for Graduate Program Acceptance | Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs? |
| | <p>Comment Not without further course work. Master and Ph.D. level graduate work typically require higher levels of math proficiency. The current proposal only lists pre-calculus (MTH 141) as a prerequisite and only requires MTH 146 (Statistics) in the program itself. For graduate studies the proposed program is also short on theoretical foundations in computer science. The very applied nature of the program is of course a compromise as the program also explicitly targets students with technical associate degrees.</p> <p>[Note: I am not 100% familiar with the different associate degrees. Most transfer students at Saint Martin’s University enter with an AA degree under the direct transfer agreement (DTA). In the case of Associate of Business, these student enter with Calculus, Statistics, etc. Student entering with a “technical” degree typically do not have the same general education breadth.]</p> <p><i>RTC Response: It is understood that higher math proficiency may be necessary for graduate work at colleges offering Master’s level coursework. However, creating an additional requirement for all BAS students would likely create an additional barrier to entry and completion of the proposed Bachelor’s degree. It must be acknowledged that there are those who do not intend to pursue a graduate degree. RTC will advise students interested in graduate school about the opportunity to substitute Calculus I for Statistics and the need for additional math courses, rather than make this a graduation requirement.</i></p> <p><i>Additionally, many Master’s degree programs that focus on IT leadership and management, including ones at the University of Washington, Western Governors University, and Central Washington University, require just a four-year degree in any discipline.</i></p> |
| g)Faculty | Do program faculty qualifications appear adequate to teach and continuously improve the curriculum? |
| | <p>Comment Yes. The proposal details a well-defined continuous quality improvement plan. Aside from the faculty qualifications it is noteworthy that the proposal outlines a program review effort involving faculty, dean, and VP of Instruction on an annual schedule.</p> |
| h)Resources | Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities? |
| | <p>Comment Yes. The proposal addresses all technical and administrative needs appropriately.</p> |
| | Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee’s recommendations? |

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| <p>i)Membership and Advisory Committee</p> | <p>Comment The proposal has solicited input and advice from an advisory board. However, I am not privy to any specific recommendations by the advisory board or if any formal approval/endorse have been sought.</p> <p>RTC Response: <i>Initial discussion and research on the possibility to develop a bachelor’s degree was conducted at various Computer Network Technology Curriculum Advisory Committee (CAC) meetings each quarter during the 2015-2016 academic year. In addition to endorsement of pursuing development of a bachelors’ degree for CNT students, CAC members were invited to become members of a CNA Advisory Committee.</i></p> <p><i>The first CNA Advisory Committee meeting was held on May 31, 2016 and members completed a Knowledge, Skills, and Assessment process originally developed by the national Convergence College Network in partnership with a National Business-Industry Leadership Team (BILT). The CNA Advisory Committee is comprised of members from the Seattle Metro area that are both national and local in scope. Upon approval of a broad set of KSAs advisory committee members worked directly with Dr. Sanderson to identify and describe a sequential listing of student coursework (See Tables 5 and 6.). In July 2016, the CAN Advisory Committee was provided a final draft of sequential coursework and descriptions for review. A final review and approval of the coursework will be conducted during Fall Quarter 2016.</i></p> |
| <p>j)Overall assessment and recommendations</p> | <p>Please summarize your overall assessment of the program.</p> <p>Comment The proposed program is of a very applied nature that will likely appeal to a large group of community college student with specific career goals in IT.</p> |
| <p>Reviewer Bio or Resume My primary appointment at Saint Martin’s University is as Dean of the School of Business. However, my academic background (and Ph.D.) is in Computer Science. I also hold a dual appointment at Saint Martin’s as professor in Computer Science. Furthermore I have extensive teaching experience in Computer Networking at my previous institution, the University of San Francisco, where I served as Associate Dean and program director of the Management Information System (MIS) program.</p> | |

Appendix IV: BILT/CNA Advisory Committee Membership Roster

Amir Moshar, Amazon Web Services, amirmosh@amazon.com

Brett Kappenman, Lyon Technologies, bkappenman@hotmail.com

Bryan Hawkins, Cisco, bhawkins@cisco.com

James Monfregola, Cascade Support, james@cascadesupport.com

Jerri Wood, Qwest Communications, wood45@q.com

Kim Yohanan, Dell/EMC, kim.yohanan@dell.com

Mark Hodge, Low Income Housing Institute, markh@lihi.org

Mark Myers, Microsoft, markmy@microsoft.com

Mike Skripek, Red Seal Co., mike@skripek.com

Milo Sivley, CEO Blue Spectrum Technologies, milosivley@bluespectrumtech.com

Richard Collins, AT&T Communications, rick@rickcollins.net

Rob Wagy, Rain Networks, robw@rainnetworks.com

Ronald Hansen, City of Renton, rhansen@rentonwa.gov

Ronald Nichols, AAA, RonNichols@aaawin.com

Todd Goe, All Phase Communications, toddg@allphasecom.com

Appendix V: BILT/CNA Advisory Committee Minutes

Report on the Knowledge, Skills, and Assessment (KSA) Meeting
Held on May 31, 2016

By

The Computer Network Architect Business-Industry Leadership Team (BILT)

Report Date: June 14, 2016

Meeting Attendees:

Rick Collins – AT&T

Brayan Hawkins – Cisco

Brett Kappenman – Lyon Technologies

Dante Leon - RTC

Amir Moshar – Amazon Web Services

William Sanderson - RTC

Mike Skrepik – Red Seal Corp.

Milo Sivley – Blue Spectrum Corp.

Kim Yohannan – EMC (Dell)

The above attendees met to conduct the first KSA process necessary for the development of courses to be created for the new Computer Network Technology BAS Degree. The KSA process was guided by William Sanderson and Dante Leon. The results of the KSA are listed in Table 1 below.

Overview of the KSA Process

Generally, Table 1 lists knowledge domains that have been developed and maintained by the National BILT formed by the National Convergence Technology Center. These KSAs are used to develop and maintain a general “standardized” curriculum that is offered at state and community colleges with the Convergence College Network (CCN) in order to provide a more standardized curriculum across the US. There are sixteen domains that encompass a broad set of knowledge, skills and abilities that should be resident within curriculum contained within an accredited AAS degree of certificate. By review of courses within a curriculum, one should be able to ascertain the presence of such KSAs within the course(s).

Each domain is “weighed” by BILT members during a discussion and then a vote on the “value” of that domain as a necessity within a curriculum. The votes are summed, then averaged and noted. The precedent for including a domain within a curriculum is based on an average value of “3” votes. Anything less than “3” is discarded and not included within a curriculum. The current KSA domains listed in Table 1 were created in 2006 upon the creation of the National BILT. They are reviewed annually by the National BILT membership.

As an example, of the KSA profess, refer to the row labeled “K2” (Windows). Also note that the columns labeled “4”, “3”, “2”, and “1” have entries in them that intersect with row K2. These values are the number of votes cast by BILT members. The column labeled, “Avg.” shows the average of the votes for the K2 domain. In this case, the value is 2.85. This value would be rounded up as “3” and retained within the curriculum.

Once the KSA process is complete, it is up to educators to the review the KSA report, and begin the creation process of course(s) to be included in the curriculum. This process can also be applied to revision processes as well.

Table 1 below depicts the KSA process results from the RTC CAN BILT meeting held on May 31, 2016.

Table 1.

| KSA | National Business and Industry Leadership Team Knowledge Domains | | 4 | 3 | 2 | 1 | Avg. |
|-----|---|--|---|---|---|---|------|
| | | | | | | | |
| | | Topics | | | | | |
| K1 | Unix / Linux | | 6 | 1 | 0 | 0 | 3.9 |
| K2 | Windows | | 0 | 6 | 1 | 0 | 2.85 |
| K3 | Operating System Maintenance | Includes topics such as account mgmt, installing apps, command line, directory, file structures, os scripting, config modification, backup/restore, os admin, scheduler, stopping/starting services, change control, documentation, awareness of KPI and SLA/OLA | 0 | 5 | 1 | 0 | 2.8 |
| K4 | OSI Model | Includes topics such as topologies, transmission media, Ethernet specs, CSMA/CD, operation of hubs, switches, routers, OSI model, TCP/IP protocols, IPv4, IPv4, CIDR addressing, subnetting, gateways, routing and routing protocols, transport protocols, IPv6, IPv4/6 integration, IPv6 tunnelling, hybrid environment, SDN/OpenFlow | 5 | 1 | 0 | 0 | 3 |
| K5 | Convergent Network Technologies | Includes such topics as PSTN and telecommunications basics as well as computer networking/telephone integration, voice over IP protocols and details of protocols and implementation, SDN/OpenFlow, SIP and Web RTC protocols. | 6 | 0 | 0 | 0 | 4 |
| K6 | Network Devices-Connectivity Components | Includes such topics as Nics, Hubs, Switches, Routers, Gateways, Cables and connectors, wireless access points, DTE, CTE, modems, sensors, wireless AP, fiber and fiber splicing. | 6 | 0 | 0 | 0 | 4 |
| K7 | WAN Technologies | Includes such topics as packet and circuit switching, T and E carrier systems for data communication, multiplexing and concentrating, Sonet/Synchronous Digital Hierarchy, ISDN, etc., SDN, PRI ISDN, MPLS | 6 | 0 | 0 | 0 | 4 |
| K8 | Wireless Infrastructure and WLANs | Includes such topics as cellular telephone, Personal area networks, Satellite data communications, microwave point to point, Broadband Mobile access/LTE, Wireless spectrum, Wireless IEEE 802 standards, near-field communications, wifi | 5 | 1 | 0 | 0 | 3.8 |
| K9 | Troubleshooting and Equipment Repair | May include use of diagnostic software and use of hardware including hand tools as well as knowledge of troubleshooting methodology, critical thinking, situation | 4 | 2 | 0 | 0 | 3.7 |

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|-----|--|---|---|---|---|---|-----|
| | | assessment, documentation, inspection routines | | | | | |
| K10 | Infrastructure Monitoring and Restoration | Includes such topics as backup and recovery, centralized log monitoring and correlation, types of alarms, network monitoring and provisioning software, fault tolerance, mass storage and backup devices, network and computer system redundancy including storage, power, connectivity and hot swapping, disaster recovery planning, business continuity, MDM exposure but not required, sensors | 0 | 6 | 0 | 0 | 3 |
| K11 | Network Security | Includes at least overview knowledge of topics such as knowledge of firewalls, password practices and procedures, encryptions, network virus protection, anti-theft and tamper proof devices, biometrics, security protocols, SSL, IPSEC, WEP, SSH, Security tools, Trojan horses, DMZ, Hack attacks, social engineering, public, private, symmetric, and secret keys, virus, worm, honey pot, and backdoor concepts, digital certificates, physical security, authentication, vulnerability scanners, intrusion detection systems, ACL, risk analysis, information security, data security | 6 | 0 | 0 | 0 | 4 |
| | | Basic hardening dos and don'ts | 6 | 0 | 0 | 0 | 4 |
| | | Certificate management | 0 | 6 | 0 | 0 | 3 |
| | | DNS | 0 | 6 | 0 | 0 | 3 |
| | | Application interactions | 6 | | 0 | 0 | 4 |
| | | Managing environments at scale | 4 | 2 | 0 | 0 | 3.7 |
| | | Configuration management | 2 | 4 | 0 | 0 | 3.0 |
| | | Password management | 2 | 4 | 0 | 0 | 3.0 |
| | | Change control process | 6 | 0 | 0 | 0 | 4 |
| | | Staying current with security advisories (how/where to find them) | 3 | 3 | 0 | 0 | 3.5 |
| | | Policies: Concept of network security should be woven into all other IT courses; take a moment at key points in all curriculum to ask "Is this secure? Why or why not?" and "What would you do you make it more secure?"; add to the class tests these questions, concepts, and elements - build it up, open it up, secure it | 6 | 0 | 0 | 0 | 4 |

| | | | | | | | |
|-----|--|--|---|---|---|---|-----|
| K12 | Virtualization Technologies (Network Function Virtualization NFV) | Includes such topics as installation of server and desktop virtualization solutions, management of virtualization solutions, administer/install/patch/recovery, virtual network and hypervisor configuration and optimization, identify solution | 1 | 5 | 0 | 0 | 3.2 |
| K13 | Storage Management | Includes such topics as evaluation of storage architectures such as DAS, SAN, NAS, CAS; understanding backup, recovery, disaster recovery, business continuity, and replication; understanding logical and physical components of an information storage infrastructure, tiered storage | 3 | 3 | 0 | 0 | 3.5 |
| K14 | "X" as a Service | Includes such topics as server virtualization as a services desktop virtualization as a services, storage virtualization as a services, I/O virtualization as a services, public/private cloud issues, security in the cloud, awareness of different "X as a service" types (differences between them), hybrid cloud | 4 | 2 | 0 | 0 | 3.6 |
| K15 | Soft Skills | Interwoven into classes likely through projects. Oral Communication, written communication, leadership, teamwork, appreciation of diversity, conflict management, customer service, work ethic, professionalism, integrity, attention to detail, adaptability, organization, stress management, multi-tasking, problem solving, decision-making, intellectual risk-taking, thoughtful reflection, initiative, creativity, dedication, perseverance, pride in work, numerical and arithmetic application, following directions, information gathering, resource allocation, time management, technology and tool usage, critical thinking, willingness to continue learning, technical writing, presentation | 6 | 0 | 0 | 0 | 4 |
| K16 | Basic Project Management | Basic understanding of principles including the individual's role in the process, accountability | 6 | 0 | 0 | 0 | 4 |

KSA Approval

Each KSA listed above was verbally voted on by each committee member for approval.

Next steps

William Sanderson will provide a final report in July 2016 of sequential coursework with descriptions to the committee.