



**Renton Technical College
Applied Baccalaureate Degree Program**

Bachelor of Applied Science in Application Development

Program Proposal

Forms C and D



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Form C: Cover Sheet New Degree Program Proposal

Program Information

Program Name: Bachelor of Applied Science – Application Development

Institution Name: Renton Technical College

Degree: BAS in Application Development

Level: Bachelor

Type: Science

CIP Code: 11.0103

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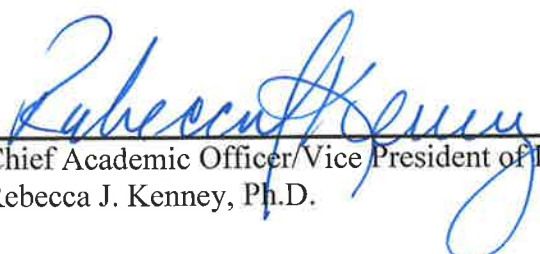
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5/23/14

Date

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Introduction

Renton Technical College (RTC) was selected by the Washington State Board for Community and Technical Colleges (SBCTC) as one of five colleges in the Washington State CTC system to develop a STEM based bachelor of applied science degree in a high demand field. During the development phase of our BAS in Application Development program, RTC worked with Green River Community 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 lead faculty in this effort sought curricular guidance from Central Washington University and City University.

Application development, a rapidly evolving discipline in computer science and software development, has consistently shown high demand and need for a qualified and highly educated workforce. As part of RTC's Bachelor of Applied Science in Application Development (BAS in Application Development) degree, we will create a seamless 2+2+2 pathway for high school students to enter into our BAS in Application Development program. RTC has a long history of successful collaboration and curriculum alignment with local high schools and their districts (e.g., Kent, Auburn, and Renton school districts), which has in turn led to high student completion and success rates.

RTC's BAS in Application Development degree will prepare graduates for employment in the field of information technology. Application Development is a high demand occupation that encompasses various aspects of data analysis, application and software development, programming, and project management. Students with associate technical degrees in information technology, database management, programming, and related areas will be good candidates for our BAS in Application Development program. Graduates of this program can expect to find work as software developers (applications and systems software), computer systems analysts, web developers and programmers, and database administrators to name a few. In some instances, students may work as IT project managers. In addition to a strong technical foundation, graduates will have received instruction in general education topics in science, communications, and quantitative reasoning; and have gained extensive experience working in teams, creating and conducting presentations, and authoring documentation for software development. The skills obtained by graduates of this degree program are transferrable to numerous information technology and computer systems positions across multiple industries, including corporations, nonprofit organizations, IT companies, and medical and research institutions.

As our economy continues to become more global and technological driven, more and more organizations will need educated and qualified individuals to fill these technical positions. RTC's BAS in Application Development degree responds to the growing demand for IT and computer systems professionals not only in our region but nationally. EMSI data indicate a steady increase in the number of jobs available between 2012 and 2022. The table below outlines the expected job growth in King, Pierce, Thurston and Snohomish Counties from 2012-2022.

Table 1: Job Growth Projections

| Occupation | 2012 Jobs | 2022 Jobs | Change | % Change |
|---|------------------|------------------|---------------|-----------------|
| Computer Systems Analysts (15-1121) | 10,890 | 13,821 | 2,931 | 27% |
| Software Developers, Applications (15-1132) | 30,053 | 37,476 | 7,423 | 25% |
| Software Developers, Systems Software (15-1133) | 14,878 | 19,824 | 4,946 | 33% |
| Database Administrators (15-1141) | 2,254 | 3,068 | 814 | 36% |

1. Baccalaureate Level Rigor

Program 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 in Application Development program will demonstrate skill and ability in four main areas: Data analysis, application development, project management, and professionalism. The table below outlines the program learning outcomes for this degree program.

Table 2: Student Learning Outcomes

| Area of Concentration | Expected Learning Outcomes |
|--------------------------------|---|
| Data Analysis | <ul style="list-style-type: none"> • Demonstrate ability to locate, connect to, extract, transform and load (ETL), business data, from disparate data sources. |
| | <ul style="list-style-type: none"> • Demonstrate ability to use query languages, and business intelligence techniques, to extract, analyze, summarize and report on specific data, in a manner that is usable by business decision makers. |
| | <ul style="list-style-type: none"> • Use database and database management systems to organize, store and retrieve data for use by application software, and demonstrate best practices for backup, security and privacy. |
| Application Development | <ul style="list-style-type: none"> • Demonstrate software engineering best practices, software testing principles, and quality assurance techniques. |
| | <ul style="list-style-type: none"> • Demonstrate an end to end project-level vision in planning application development, server and client scripting, and security. |
| | <ul style="list-style-type: none"> • Demonstrate ability to develop and deploy applications in a variety of platforms, including distributed computing and mobile applications. |
| Project Management | <ul style="list-style-type: none"> • Work on team projects and demonstrate critical thinking, teamwork, oral communications, inter-cultural appreciation, and technical and information literacy skills. |
| | <ul style="list-style-type: none"> • Demonstrate ability to obtain and confirm business requirements for an application, translate these into technical specifications, assess the resource requirements, and divide the overall project requirements into smaller steps, organized to conform to the System Development Life Cycle model. |
| Professionalism | <ul style="list-style-type: none"> • Demonstrate ability to conduct himself/herself in a professional and ethical manner in all situations, while working in person, remotely, individually, and/or in teams. |
| | <ul style="list-style-type: none"> • Demonstrate the ability to communicate technical information to both technical and non-technical audiences in written and oral form. |
| | <ul style="list-style-type: none"> • Demonstrate a professional level of competence in documenting project and application development 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 Information Technology, Database Management, Programming, and related areas will be good candidates for our BAS in Application Development. In order to benefit from the technical upper division courses, incoming students should have a solid foundation in Object Oriented Programming (OOP), Relational Databases, and Structured Query Language (SQL). Many of the technical degrees mentioned above contain the required foundational courses. The table below provides a summary of the subjects and credits required prior to enrolling in the BAS program.

Table 3: Entry Requirements for Application Development Degree

| Prerequisites | Credits |
|---|---------|
| Object Oriented Programming coursework including algorithms and data structures | 10 |
| Introductory coursework on relational databases | 5 |
| Introductory coursework on SQL | 5 |
| General education courses as listed 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 general education within applied baccalaureate degrees.¹ Over the course of the two year degree program, SBCTC requires that general education credits include a minimum of the following:

- Communication Skills (10 credits): Must include at least one English Composition course
- Quantitative/Symbolic Reasoning Skills (5 credits)
- 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
- Any remaining general education courses to achieve the required 60 credits may be distributed in a manner that best suits the curriculum needs of the baccalaureate program

All BAS in Application Development students will be required to take 60 credits of general education, to 30 credits of which are often satisfied at the associate degree level, as confirmed by entrance pre-requisites. The remaining credits will be satisfied over the course of the two-year BAS program. General education requirements in the Application Development 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 Application Development 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 | |
| Humanities | 10 | CMST& 101 Speech Communication (recommended or student choice) | PHIL 481 Legal and Ethical Aspects of IT |
| Social Sciences | 10 | PSYC&100 General Psychology (recommended or student choice) | ECON& 201 Micro Economics |
| Natural Sciences | 10 | | PHYS& 121 Physics I MATH& 146 Statistics |

¹http://www.sbctc.edu/college/e_appliedbaccalaureates.aspx. March 11, 2014

| | | | |
|---------------------------------|----|-----------------------------|-------------------------------|
| Other General Education courses | 15 | Student Choice (10 credits) | POLS& 202 American Government |
| Total Credits Required | 60 | 30 | 30 |

Additionally, students with earned general education credits who are transferring from other community and technical colleges will be evaluated on an individual basis to determine transfer credits. 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.

Junior/Senior Level Coursework

RTC’s BAS in Application Development program takes into consideration the needs of working students. The majority of courses 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. With a planned entry point every fall 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, Microsoft Solutions Developer, and Oracle Certified Associate.

Table 5: Renton Technical College Application Development Junior/Senior Coursework

| Baccalaureate Courses | | Credits |
|---|--|-----------------|
| Core Technical Courses | | |
| CSI 332 Data Mining & Business Analytics | | 5 |
| CSI 351 Systems Analysis and Design | | 5 |
| CSI 352 Software Application Development | | 5 |
| CSI 342 Mobile Application Development | | 5 |
| CSI 483 IT Project Management | | 5 |
| CSI 381 Principles of Human-Computer Interaction/GUI Design | | 5 |
| CSI 434 Business Intelligence | | 5 |
| CSI 331 Securing and Managing Data | | 5 |
| CSI 341 Web Development | | 5 |
| CSI 443 Web Programming for Mobile Devices | | 5 |
| CSI 453 Software Application Testing and Deployment | | 5 |
| CSI 493 Senior Capstone Project | | 5 |
| CSI 494 Cooperative Education/Internship (optional) | | Varies – 5 max. |
| Total Core Requirements | | 60 |
| General Education Courses | | |
| ENGL& 235 Technical Writing | | 5 |
| PHIL 481 Legal and Ethical Aspects of IT | | 5 |
| ECON& 201 Micro Economics | | 5 |
| PHYS& 121 Physics I | | 5 |
| POLS& 202 American Government | | 5 |

| | |
|--|-----------|
| MATH& 146 Statistics | 5 |
| Total General Education Requirements | 30 |
| Total BAS in Application Development Requirements | 90 |

After evaluating the content of PHIL 481 Legal and Ethical Aspects of IT, it was decided that this course will remain a general education component rather than a technical course – in keeping it as is, there is no reduction in the number of technical courses proposed for the program and the ethics course can still remain part of the BAS in Application Development curriculum. 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. The table below gives a sample schedule for full-time students enrolled in the program.

Table 6: Sample Full-Time Application Development Student Schedule

| First (Junior) Year | | | |
|---|--|---|---------------|
| Fall | Winter | Spring | Summer |
| CSI 351 Systems Analysis and Design | CSI 352 Software Application Development | CSI 342 Mobile Application Development | |
| CSI 381 Human-Computer Interaction | CSI 341 Web Development | CSI 332 Data Mining & Business Analytics | |
| ENG&235 Technical Writing | ECON&201 Micro Economics | MATH&146 Statistics | |
| Second (Senior) Year | | | |
| Fall | Winter | Spring | Summer |
| CSI 453 Software Application Testing and Deployment | CSI 442 Web Programming for Mobile Devices | CSI 331 Securing and Managing Data | |
| CSI 483 IT Project Management | CSI 434 Business Intelligence | CSI 492 Senior Capstone Project, or CSI 494 Cooperative Education/Internship (optional) | |
| PHYS&121 Physics I | POLS&202 American Government | PHIL 481 Legal and Ethical Aspects of IT | |

RTC BAS in Application Development program will capitalize on the College’s efforts to create deliberate career pathways for students that are linked to wage progression. Pathways link education attainment to occupation and earning potential. The following table outlines a viable pathway in application development occupations, starting with an associate’s degree up to a doctoral degree.

Table 7: Viable Pathways to Computer Application Development Occupations

| Degree | Occupation(s) | Earning Potential |
|---|--|--------------------------|
| Associate’s Degree | Web Developer | \$62,500 |
| Bachelor’s Degree | Computer Programmers | \$74,280 |
| | Database Administrators | \$77,080 |
| | Computer Systems Analysts | \$79,680 |
| | Software Developer | \$93,350 |
| Master’s, Doctoral and Professional Degrees | Computer and Information Research Scientists | \$102,190 |

The data shown in Table 7 was taken from the Bureau of Labor Statistics Occupational Handbook. The data was published on January 8, 2014. (<http://www.bls.gov/ooh/computer-and-information-technology/home.htm>)

Program Evaluation Criteria and Process

Assessment for the proposed degree program will be based on RTC's comprehensive student achievement and program assessment processes. In accordance to college policy, all certificate and degree programs are reviewed annually on a three-year cycle. In years one and two, program data is reviewed by the Dean and Faculty, with an in-depth review and planning session occurring in year three. In addition, the Vice President of Instruction will review faculty and dean level program reviews and assessment summaries and provide ongoing and annual feedback and guidance. 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 outcomes that are aligned with the College's Core Themes and supported by data. This data, which includes student retention, completion, financial performance, program outcomes, job placement rates, and wages, is used by instructional staff and advisory committee members to make sound decisions regarding curriculum revisions and program delivery. A PEP will be completed annually, with an expanded PEP completed every three years. In addition, RTC will track wage progression opportunities of our graduates as well as on-the-job retention at six months and one year after completion.

Advisory Committee Membership

The advisory committee for the BAS in Application Development program was created through referrals from the Center of Excellence for Information Technology and members from our advisory committees from the Computer Science and Computer Networking programs. Committee members are made up of industry representatives from a wide range of companies. Committee members are active practitioners working in software, database and web development. Primary membership duties are as follows:

- Conduct reviews and provide recommendations on curriculum design and other program elements.
- Attend regular conference calls with lead BAS in Application Development instructor, Tim Culler, and commit to attendance throughout entire BAS curriculum development phase as well as implementation process.
- Ensures academic rigor of course content and learning methodologies.
- Serve as a subject matter expert in one or more of the following areas: computer science, information technology, instruction, and/or higher education.
- Ability to 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 (3 times a year – the committee will not meet during the summer). The primary responsibilities of the advisory committee is 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 9 FTE enrollments in Year 1, with full capacity achieved by 2019 with FTE of 43. To support this enrollment number, the program requires six technical courses and two general education courses each quarter. We will use a combination of adjunct and full-time faculty to deliver this course-load. The BAS in Application Development program will have a full-time faculty chair at 75% release time that will teach one technical class each quarter and manage the curriculum and teaching assignments as part of the administrative duties. Several of our full-time faculty are qualified to

teach portions of the BAS curriculum and will do so as additional evening assignments. Other adjunct positions will be covered by experienced industry practitioners.

Faculty teaching in the program will be required to hold a minimum of a master’s degree and maintain appropriate certifications. We also recognize that some BAS technical topics are very specialized and there may not be enough candidates with advanced degrees. In these circumstances, experience in the field and/or certifications will be the main selection criteria. Faculty who do not hold at least a master’s degree, but who have ample experience and are highly qualified to teach particular technical courses that include specialized knowledge, will be required to work with their Dean and the Vice President of Instruction to create a development plan and determine a reasonable timeline for obtaining a master’s level credential. 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: Faculty Profiles

| Faculty Name | Credentials | Status | Area of Expertise |
|-------------------|-----------------|--------|--|
| Timothy Culler | MBA/IS | FT | E-commerce, database, Office applications |
| Lhoucine Zerrouki | MS/EET | FT | Software development C# and Java |
| William Sanderson | Ph.D. | FT | Virtualization, cloud computing, storage networks |
| Nathan Timke | MBA | PT | SQL Server |
| Ankur Suri | MS/CSI | PT | Web development, Java, AJAX |
| Kathleen Higgins | MA English | FT | ENG& 235 Technical Writing |
| Martin Cooksey | MS/Applied Math | FT | MATH&141 Pre-Calculus, MATH & 146 Statistics |
| Curt Holman | MBA | FT | ECON&201 Micro Economics |
| Donovan Bigelow | MA, JD | FT | PHIL 481 Legal and Ethical Aspects of IT POLS&202 American Government |
| Daniyel Arushanov | MS | PT | PHYS&121 Physics |

3. Selective Admissions Consistent with Open Door Institution

Admission into the BAS in Application Development program will be consistent with the College’s open door policy and the program will maintain an open admissions process. Students interested in enrolling in the program will be required to meet the minimum admissions requirements as outlined below. Students with an associate’s degree in information technology from other community and technical colleges will be evaluated individually to determine if they meet the minimum requirements and assess additional technical credit transfer. Students who are deemed qualified and who meet the priority application due date will receive first consideration. Those who intend to enroll in the program full-time will also receive first consideration, as well as those with associate technical degrees in information technology, database management, programming 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 be considered.

Program Admission Requirements

Admission to the BAS in Application Development program is open to students who meet all of the following requirements:

1. An earned associate degree (or equivalent) in Information Technology or related area from a regionally accredited institution

2. Minimum cumulative GPA across all college coursework of 2.5 and a 2.5 or higher GPA in all IT coursework that includes the following:
 - Programming courses in Object Oriented Programming – 5 credits
 - Introductory coursework on relational databases – 5 credits
 - Introductory coursework on Structured Query Language – 5 credits
3. Completion of at least 30 credits of college-level General Education coursework with a minimum of a 2.5 GPA in each class as follows:
 - College Algebra or higher – 5 credits
 - English Composition (ENGL&101 or equivalent) - 5 credits
 - Social Sciences - 10 credits
 - Humanities – 10 credits
4. Statement of purpose – one page in length
5. Personal statement – one page in length
6. \$30 non-refundable admissions fee

Selection Criteria

Complete applications will be reviewed by an admissions committee chaired by the program director. The admissions committee will include the BAS Program Chairperson, Dean of Automotive & Technology, 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 all applicants have met all admissions criteria. Applicants who meet all criteria will be admitted in order of their placement on a pre-registration list (date received). Any applicant who does not meet the admissions requirements will be moved to the bottom of the pre-registration list and will be considered on a case-by-case basis, per available space in the program.

Table 9: Admissions Criteria

| Admissions Requirements | Points | Notes |
|---|------------|---|
| Earned Associate’s Degree | 30 | Information technology or related field of study |
| Transcript Evaluation(s) of Previous Coursework | 20 | Minimum of a 2.5 cumulative GPA across all college coursework |
| 20 Information Technology Pre-Requisite Credits | 15 | Minimum of a 2.5 GPA in each related course |
| 30 General Education Credits | 15 | Minimum of a 2.5 GPA in each course |
| Statement of Purpose | 10 | Describes how the program will advance professional goals |
| Personal Statement | 10 | Describes what has brought the student to this point |
| 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 via a lottery system, ensuring equal opportunity for admission.

Annually, BAS staff and the BAS Advisory Committee will assess this process and revise it as needed. Process evaluation and revision will be led by RTC’s Dean of Student Success, Scott Latiolais. Scott has over 15 years of experience working in student affairs at various higher education institutions across the country. He has served in numerous leadership roles and has been instrumental in developing, implementing and monitoring the success of RTC’s current student advising model.

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

- The College’s current and recent computer science graduates will serve as a feeder into the BAS program. RTC’s retention rates for underrepresented student populations in this program remain consistently high – African Americans 52%, Asian 77%, Hispanic/Latino 70%, Native American 100%, and White 67%.
- 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 Application Development Enrollment Projections

| Year | 1 2014-15 | 2 2015-16 | 3 2016-17 | 4 2017-18 | 5 2018-19 |
|------------------|--------------|--------------|--------------|--------------|--------------|
| Headcount | 14 | 29 | 41 | 48 | 51 |
| FTEs | 9 | 27 | 39 | 46 | 49 |
| Graduates | 0 | 11 | 14 | 19 | 22 |

Serving Place-Bound Working Adults

To address the scheduling needs of working adults and other “place-bound” individuals, the BAS in Application Development program will be a hybrid program with significant online components. When comparing student success rates in courses offered in traditional, online and hybrid formats, RTC found that hybrid courses have the highest success rate. This program will use the existing lab facilities of the Computer Science program where virtualized environments are being 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 Application Development program will have a set of servers dedicated to the 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 information technology 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 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 partnered with the Renton and Kent School Districts to align their corresponding IT and computer science classes with the courses within our AAS degree in Computer Science. Our aim is to articulate at least one full quarter of technical courses between those high schools and our AAS degree. In November 2013, the faculty and administrators from RTC met with the teachers and administrators from Renton and Kent School Districts to begin discussions and identify areas of articulation. At that meeting, three major technical areas were identified: programming classes, computer hardware, and computer applications. We will continue working with this group throughout the rest of the year to develop an articulation document that maps the path from high school to the AAS degree and ultimately the BAS degree. In addition to the articulation of technical courses, we will also examine the general education AP classes offered at our partner high schools with the goal of maximizing transferability towards our AAS and BAS programs.

During the development phase of our BAS in Application Development program we have worked with Green River Community College (Green River) Faculty Alan Carter and Ken Hang who attended our initial advisory committee meeting to discuss our program outcomes. Green River has also shared the results of their own DACUM with us. RTC will continue to collaborate with Green River in order to identify common courses and shared content, as well as to develop articulation agreements that will allow our respective AAS graduates to attend either BAS program. Green River and RTC have experience working collaboratively in the area of information technology. Within the past year we developed an articulation agreement between our AAS in Computer Network Technology and Green River's BAS in Network Administration and Security. This work is a reflection of our continued successful partnership. On May 15 and 16, the Center of Excellence for Information Technology will hosted a summit that included work on common course numbering and standardizing of BAS degree titles for information technology. RTC is an active participant in the Center of Excellence's efforts and will continue to do so in order to coordinate efforts with our sister institutions.

4. Student Services Plan

RTC anticipates the majority of students in the Application Development 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 Application Development 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 Application Development program will have access to the following services:

- Advising and counseling

- Student Success and Career Center
- Credentials evaluation and assessment
- Disability Resource Center
- Financial aid
- RTC Library
- Veteran's services
- LGBTQ resources

Dave Pelkey, Ph.D., Vice President for Student Services, and Scott Latiolais, M.S., 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 Application Development program will have access to all support, advising and counseling services generally available to students at RTC. General services include:

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. Currently, approximately 10-15% of RTC's student population includes individuals with exceptional education needs requiring special services. The Center serves approximately 160 students annually. RTC disability services staff includes three individuals who provide a wide range of support services and accommodations tailored specifically to a student's needs.

Admission and Enrollment Services:

RTC is dedicated to making the admissions experience as simple and intuitive as possible for new students. The registration process is available online at <http://www.rtc.edu/StudentServices/Registration/>. Credit evaluation, transfer review, and prior learning assessment are handled by RTC's Credentials Evaluator in the Registrar's Office.

Advising and Counseling Services:

RTC offers a wide range of advising and counseling services, from career counseling and job placement assistance to linkages to social and health services. Services include:

- **Student Success and Career Center**

The Student Success and Career Center helps students explore and choose professions and training programs, as well as provide students with the opportunities and resources to learn the necessary skills needed for success in their programs and in the workplace. The Center staff develops workshops, creates information and provides 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. The Center is run by a highly educated and qualified staff who provide the following support services to RTC students: academic advising, access services, career advising, counseling, entry advising, high school programs, international student services, information on rights and responsibilities, testing services, veteran's services, and workforce programs.

- **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 respective programs, and an early alert system. New students are required to attend pre-quarter new student orientation sessions as well as a college success course that provides them with necessary academic and life success skills.

- **Veteran's Services**

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.

As a veteran-friendly institution, RTC reserves two spots in all of its certificate and degree programs specifically for veteran students. To ensure veteran students are successfully integrated back into civilian life, RTC veteran services staff strongly recommends students join the RTC Veteran's Club in order to connect with their peers and assume leadership roles on campus. RTC's Veteran's Club holds weekly meetings and hosts two events per month that focus on creating strong family and community connections. Additionally, the Veteran's Services Office publishes a weekly online newsletter that includes scholarship information, job opportunities and upcoming registration deadlines.

- **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.

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.

Library and Computer Labs:

RTC's Library is located in the College's Technology Resource Center. The library serves as a one-stop learning center dedicated to providing facilities and resources that support students, faculty and staff. The mission of the RTC Library is to provide education and informational resources that prepare students for work and that meet the needs of business and industry.

Program Specific Services

Additional Resources:

The financial plan outlined in Section 5 (Building and Sustaining a High Quality Program) indicates the following additional resources to provide specialized support to BAS in Application Development students: .25 FTE Librarian, .25 FTE Financial Aid Specialist, .75 FTE BAS Program Manager. These staff will be dedicated specifically to the BAS in Application Development program and will support BAS students throughout all stages, in particular, the admissions process. RTC already has the capacity to staff the Librarian and Financial Aid Specialist positions. We plan to identify and hire the BAS Program Manager several months prior to the commencement of our first cohort to ensure sufficient time to establish formal processes for recruiting and enrolling students.

Financial Aid:

Although 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 do not plan to identify a separate group of staff to take this on. Instead, 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 Application Development program will serve as a liaison between baccalaureate students and the financial aid office.

Program Advising:

Advising at RTC is the responsibility of our student services staff. Therefore, RTC's Vice President of Student Services, Dave Pelkey, 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 Chairperson and BAS Program Manager to ensure students received the support needed. BAS Program Manager duties include student advising pertaining to course choice, discussions about academic progress, linking students to additional resources, and assisting with other program-related issues.

Prior Learning Assessment:

The management of Prior Learning Assessment will continue to be the responsibility of the Director of Enrollment Services, Robin Young. 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.

Extension of Student Services Hours:

Because the student population we serve is primarily working adults, and after several student surveys, RTC's primary hours of operation are 7:00 a.m. to 5:00 p.m. Many of our training programs begin at 7:00 a.m. to accommodate the needs of working adults. With that said, we understand that BAS student needs may be different; and therefore, the BAS Program Manager will hold flexible work hours that include availability in the evenings when needed.

Our student services division currently offers access to financial aid, 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.

Job 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 Application Development program. The advisory committee, comprised of regional information technology professionals, will assist in identifying current and upcoming job openings. The BAS Program Manager, in conjunction with the BAS Faculty Chairperson, will work to generate cooperative education and internship opportunities for students. In addition, through the required senior capstone project, students will have the opportunity to build their professional network – real work components will be an integral part of the project. The Student Success and Career Center have a successful track record in helping students find and secure jobs by providing career planning and hosting career fairs.

Renton Technical College Library:

The RTC Library has sufficient physical space to support the BAS in Application Development. 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.

RTC's Library has a print collection of more than 38,000 volumes, more than 2,500 audio-visual items and e-books numbering more than 47,000 titles. General online journal databases provide access to more than 3,000 periodical and newspaper titles. The library participates in a cooperative reference service that makes online chat-reference consultations with a librarian available to all students and faculty 24 hours a day, seven days a week. Our library's robust instruction program conducts hundreds of workshops and orientations annually, most of which are held in our library instructional classroom equipped with 24 instructional computers.

To support a new BAS in Application Development program, the library will add a part-time librarian (.25 FTE) to work specifically with faculty and students in the program. The library will also add a new specialized e-book collection, an information technology online journal collection, and dedicate funds for a modest number of selected additional print resources.

The proposed e-book collection is Safari Tech Books, a ProQuest product, with a two concurrent user license. This product provides more than 21,000 digital books and videos from the publishers specializing in computer applications and training manuals. These publishers include well-known names such as Addison-Wesley, Financial Times, Prentice Hall, Cisco Press, New Riders, O'Reilly, Peachpit Press, Que, and Sams. The collection also includes some business and management texts appropriate for technology firms. Users will have the ability to search, browse, and read e-books online right from a browser – no additional software will be needed.

In addition, ProQuest will also provide an online journal collection to support the BAS in Application Development program. The ProQuest Computer Science Collection is a database of more than 750 full-text journals including more than two million tables and figures. The database provides extensive coverage of the literature in applied math, computer science, and computer systems, offering full-text to articles and includes a proprietary system of "deep indexing" of tables and figures.

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 40 items per year. Building on that base of targeted print resources and

coordinating with the changing collection of e-resources, the library recommends purchasing 25 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 Application Development program will be tuition and fees. The goal is that the program will be self-supported. The table below shows a five year projection of costs. Starting with a first cohort in winter 2015, the BAS program will show a loss in FY2014-15 and FY2015-16. RTC is committed to fund these losses and sustain 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 Application Development: Estimated Program Expenses, Income and Reinvestment

| | FY 14-15 | FY 15-16 | FY 16-17 | FY 17-18 | FY 18-19 |
|---|--------------------|-------------------|------------------|------------------|------------------|
| Enrollment | 14 | 29 | 41 | 48 | 51 |
| FTE | 9 | 27 | 39 | 46 | 49 |
| Tuition | \$70,109 | \$220,343 | \$307,980 | \$358,058 | \$380,593 |
| BAS \$15 per credit IT Fee | \$6,300 | \$19,800 | \$27,675 | \$32,175 | \$34,200 |
| Revenue | \$76,409 | \$240,143 | \$335,655 | \$390,233 | \$414,793 |
| Instructor (moonlight F/T) | \$5,812 | \$16,238 | \$20,059 | \$17,946 | \$17,946 |
| Instructor P/T | \$10,285 | \$29,079 | \$33,385 | \$29,742 | \$29,742 |
| Benefits Instructors | \$3,237 | \$9,078 | \$10,961 | \$9,794 | \$9,794 |
| Instructional Salaries & Benefits | \$19,334 | \$54,395 | \$64,405 | \$57,482 | \$57,482 |
| Library (.25 FTE) | \$12,450 | \$16,600 | \$16,600 | \$16,600 | \$16,600 |
| Financial Aid (.25 FTE) | \$8,438 | \$11,250 | \$11,250 | \$11,250 | \$11,250 |
| Benefits Support Staff | \$7,937 | \$10,583 | \$10,583 | \$10,583 | \$10,583 |
| Support Salaries & Benefits | \$28,825 | \$38,433 | \$38,433 | \$38,433 | \$38,433 |
| BAS Program Manager (.75 FTE) | \$36,563 | \$48,750 | \$48,750 | \$48,750 | \$48,750 |
| Faculty Program Chair (.75 FTE) | \$36,563 | \$48,750 | \$48,750 | \$48,750 | \$48,750 |
| Benefits Administration | \$27,788 | \$37,050 | \$37,050 | \$37,050 | \$37,050 |
| Administration Salaries & Benefits | \$100,913 | \$134,550 | \$134,550 | \$134,550 | \$134,550 |
| Supplies & materials | \$5,100 | \$5,950 | \$5,950 | \$5,950 | \$5,950 |
| Reserve computer hardware/software | \$10,500 | \$14,000 | \$14,000 | \$14,000 | \$14,000 |
| Library purchases | \$10,950 | \$15,860 | \$19,190 | \$19,365 | \$19,580 |
| Professional development | \$3,000 | \$4,000 | \$4,000 | \$4,000 | \$4,000 |
| Marketing | \$9,000 | \$10,000 | \$8,000 | \$6,000 | \$6,000 |
| Total Other Expenditures | \$38,550 | \$49,810 | \$51,140 | \$49,315 | \$49,530 |
| Total Expenditures | \$187,621 | \$277,188 | \$288,528 | \$279,780 | \$279,995 |
| Net | (\$111,212) | (\$37,045) | \$47,127 | \$110,453 | \$134,798 |

Below is an explanation of the main budget items.

Revenue:

Tuition is calculated based on a 15 credit per quarter course load, 3 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. Students will be charged a \$15/credit BAS IT fee. During the first year we only expect 2 quarters of tuition revenue as we are starting the first cohort in winter.

Subsequent years will generate 3 quarters of revenue with 2 cohorts. In general a full-time student will generate 1 FTE at a rate of 15 credits - \$2,503.90/quarter.

Revenue = 1FTE x \$7,511.70.

Instructional Salaries & Benefits:

Reflects the employment of two part-time instructors and one full-time instructor to teach one cohort of students. The FY2014-15 charges correspond to one cohort starting in winter and also attending spring quarter. The FY2015-16 charges include the teaching load for the initial cohort as well as a new cohort starting fall 2015.

Support Salaries & Benefits:

A part-time librarian (.25 FTE) will be hired to work specifically with 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.

A part-time (.25 FTE) financial aid specialist will 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.

Administration Salaries & Benefits:

The BAS program Chairperson's (.75 FTE) responsibilities will be filled by a full-time faculty member, which may be a current tenured faculty in the computer science program or a future hire. In addition to overseeing the program, the BAS in Application Development Chairperson will teach one course per quarter (.25 FTE), creating a valuable connection to and insight into many aspects of the program.

Administrative responsibilities of the Chairperson include, and are not limited to:

- Curriculum development, revision and implementation.
- BAS quarterly course scheduling and teaching assignments.
- Conducting articulation with both two-year and graduate degree programs.
- Working closely with RTC's High School partners to develop a seamless 2+2+2 pathway for participating students.
- Participation in college governance.
- Organizing and maintaining an industry advisory committee.
- Engaging in ongoing program assessment in order to maintain program currency and relevancy.
- Employer and partner outreach.

The Program Manager (.75 FTE) will serve as a liaison between the Program Chairperson and students. He/she will provide student advising to current and potential students in the program 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 drive the recruitment of students in the program.

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

- 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.
- Working with the Program Chairperson in overseeing the admissions process.
- In collaboration with the Program Chairperson, conducting program assessment.
- Overseeing program budget.
- Scheduling and organizing regular advisory committee meetings.
- 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.
- Coordinating the application and approval processes for BAS programs at RTC.
- Other administrative and clerical duties as assigned.

Other Expenditures:

RTC has set aside reserves in the amount of \$14,000 per year to fund BAS specific hardware/software. This is in addition to the existing infrastructure from the full-time Computer Science 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 overlap between the two programs. RTC facilities for computer science are optimal and include four computer labs with work-station class computers of the latest generation, interactive whiteboards with projectors, wireless access, and dedicated servers. 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 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 Application Development program. Because application development 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 has tentatively confirmed (pending approval from the SBCTC) that the NWCCU will review the proposal at their next meeting set for late fall 2014. RTC’s Financial Aid Director, Debbie Solomon, will also submit the appropriate paperwork to the U.S. Department of Education for program approval at the federal level. On average, approval from the U.S. Department of Education takes a minimum of 90 days. Approvals from the Department of Education and the NWCCU were factored into our timeline for commencement of the program’s first cohort in winter 2014.

Industry Accreditation for Individuals:

Other accreditation possibilities for immediate graduates of the program are the Certified Software Development Associate and the Certified Software Development Professional sponsored by the IEEE Computer Society. Accreditation options will be further explored in year one.

7. Pathway Options beyond Baccalaureate Degree

Graduates of the Application Development 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 science or computer networking may take specific pre-requisite courses prior to admissions. There are several options for place-bound students who want to pursue a master's degree after completing a BAS in Application Development 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 (ITAM)

Contact Information: Dr. Natalie Lupton; luptonn@cwu.edu; (509) 963-2064

M.S. Computer Science

- Contact Information: Dr. Razvan Andonie; andonie@cwu.edu; (509) 963-1430
- *Only available on Main Campus, not offered online or at extension campus*

University of Washington, Tacoma

M.S. Computer Science and Systems (MSCSCI)

- Contact Number: (253) 692-5860
- *Students must complete the GRE if applying to the Master of Science in Computing and Software Systems*

M.S. Cybersecurity and Leadership (MCL)

- Contact Information: Bryan Goda, Ph.D., Graduate Program Director; godab@uw.edu; (253) 692-4581, or Morgan Zantua, Recruiter/Advisor MCL; zan5@u.washington.edu; (253) 692-4795

University of Washington, Bothell

MBA – Technology

- Contact Information: Vicki Tolbert, MBA Admissions Advisor; vtolbert@uwb.edu; (425) 318-7927
- GMAT scores required for admission. Recent GMAT scores are acceptable as an alternative if students are unable to provide GMAT scores.
- All applicants must submit two essays.
- All applicants must submit two letters of recommendation from individuals who can speak to their professional achievements.

Seattle Pacific University

Information Systems Management (MS-ISM)

- Contact Information: Deb Schleusener, Associate Graduate Director; deb@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

Seattle University

Master of Software Engineering and M.S. Computer Science

- Contact Information: Richard LeBlanc, Chair; leblanc@seattleu.edu; (206) 296-5510 or Michael Smith, Administrative Assistant; mikesme@seattleu.edu

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
- Accept any degree from a regionally accredited institution
- 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
- Accept any degree from a regionally accredited institution
- No course pre-requisites required

DeVry University

Master of Information Systems Management (online only)

Master of Network and Communications Management (online only)

- Contact Information: 1-888-653-5537
- Accept any technology-based degree from a regionally accredited institution
- No course pre-requisites required, unless applicant holds a non-technology degree

University of Phoenix

M.S. Information Systems (online only)

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

Currently, RTC is in the early stages of discussion with these institutions to determine the potential for articulation agreements for master's degree programs.

8. Expert Evaluation of Program

Renton Technical College has selected two experts to provide external review, Mr. Alan Carter and Mr. Andrei Khlopotine.

Alan Carter is currently a full-time IT faculty member and the BAS Program Director at Green River Community College. Mr. Carter has extensive experience in the field of information technology as a systems engineer and consultant. Overall he feels that our BAS in Application Development program will be a good program that will benefit our students.

Mr. Carter submitted recommendations regarding the content and course pre-requisites. His input was insightful and valuable in helping us refine the focus of the Application Development and Application Testing and Deployment courses.

He provided suggestions on pre-requisites that led to the revised Web Development and IT Project Management classes so as not to burden students with additional prior coursework.

Andrei Khlopotine worked as a software engineer for Intel Corporation for 10 years where he was involved in the development of APIs and device drivers for various board components. Most recently, Mr. Khlopotine designed and implemented software development kits and test benches for various Intel silicon products.

Mr. Khlopotine recommended more balance between Data Base and Programming courses, which was addressed through the review of the Application Development and Application Testing and Deployment

courses. He also provided insight on incoming student educational background and what prior skills are needed to successfully complete the BAS in Application Development. Based on these recommendations, RTC edited the entry pre-requisites to ensure student have knowledge of Object Oriented Programming prior to enrolling in the BAS program. In regards to Java and Python, RTC will work to achieve vendor neutral content in as many courses as possible.

For further detail and complete reviewer comments, see Appendix II.

Appendix I: Course Descriptions

CSI 331: Securing and Managing Data – 5 credits

In this course the students will learn advanced topics on planning for data storage (over time), data quality, backup, disaster recovery, and security of data (in transit and in storage). The techniques for setting up an audit trail for critical data will also be introduced. Students will learn industry best practices and commercially available solutions that can be recommended and implemented. Critical tradeoffs of accessibility, convenience, and good security practices, that occur with laptops, hand held devices, and cloud computing will also be discussed.

CSI 332: Data Mining and Business Analytics – 5 credits

This course takes students through the steps of analyzing a business' need to access and analyze data from multiple data sources. Topics covered include best practices in requirements gathering, data project management, Data Access issues, Data cleanup issues and approaches, ETL (Extract, Transform, and Load) tactics and automation, and various Data Analysis methodologies. Students will be able to practice overcoming problems with data from non-database sources, like XML, text, or multimedia.

* Course is designed to be software vendor-neutral. Students whose employer, or potential employer, uses a particular Database or Analysis platform, may use that software to complete any class projects.

CSI 341: Web Development – 5 credits

This course takes students through the development lifecycle involved in the construction of fully functional commercial website applications, which employ server-side scripts that query relational databases. The students will implement industry best practices regarding two- and three-tier software architectures, separation of responsibility, and web security considerations.

*Course is designed to be software vendor-neutral. Students' whose employer, or potential employer, uses a particular web development platform, or scripting language, may use that software to complete any class projects.

CSI 342: Mobile Application Development – 5 credits

This course covers Android application programming including use of a standard integrated development environment, debugging, user interface creation, multithreading and network applications. The students will be able to code, run, and debug a variety of applications using software emulators as well as tethered hardware devices. The students will also learn about the limitations imposed by these devices' processing power and learn to operate within those constraints. Software engineering life cycle processes are also covered.

CSI 351: Systems Analysis and Design – 5 credits

The students will learn how to implement industry best practice methods and tools to identify and confirm business requirements, propose solutions, develop technical specifications usable in the design process, and communicate effectively to management, customers, and software developers. Other topics include

Business Process Diagramming, Data Flow Diagrams, Entity Relationship Diagrams, and other techniques that help confirm understanding and agreement between the various parties.

CSI 352: Software Application Development – 5 credits

This course takes students from the technical specifications for a software application through the design and development of the code. Architecture styles and patterns, including explicit, event-driven, client-server, middleware, and distributed architectures will be covered. The students will be introduced to agile methodologies and related tools and techniques. Other topics include secure coding, quality assurance techniques, verification and validation, code management and version control.

CSI 381: Principles of Human-Computer Interaction/GUI Design – 5 credits

This course introduces fundamental methods, principles and tools for designing, programming and testing interactive systems. The course covers topics such as usability, user-centered design, human cognitive and physical ergonomics, information and interactivity structures, interaction styles, interaction techniques (including the use of voice, gesture, and eye movements), and user interface software tools, with a special focus on mobile user interfaces. Conflicts and trade-offs, such as affordability, practicality, battery life, and suitability for differing groups of users, will be discussed.

CSI 434: Business Intelligence – 5 credits

The students will learn the concepts and principles of Business Intelligence. The course covers the complete lifecycle of designing, building and managing business intelligence systems. Students will be introduced, step by step, to the various phases and complexities in building and supporting successful business intelligence and decision support systems. Business Intelligence (BI) systems are applications and technologies for performing data mining and analysis on business customer, product and transaction information to discover new business opportunities and opportunities for efficiency. Emphasis will be placed on how to summarize and present findings in a manner which produces instant recognition of the value of the information and supports recommendations for a business client or project.

*Course is designed to be software vendor-neutral. Students whose employer, or potential employer, uses a particular Database or BI platform, may use that software to complete any class projects.

CSI 443: Web Programming for Mobile Devices – 5 credits

The 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.

CSI 453: Software Application Testing and Deployment– 5 credits

This course covers advanced topics, like time and cost estimation, feature and function tradeoff analysis and risk management. The students will also learn different software testing techniques like TDD, unit testing, and functional testing with an emphasis on secure coding. Component based software development, and issues in deployment including internal/external/cloud are also covered. Finally, best practices in documentation are required, including user manuals and technical documentation, with user testing of documentation.

PHIL 481: Legal and Ethical Aspects of IT – 5 credits

This course covers current legal issues in information technology such as: privacy, identity theft, copyright law, hacking, and fraud. An overview of related international laws and state and local regulations is also included. The students will study the difference between laws and ethics and examine ethical issues encountered in the business world to arrive to appropriate ethical choices.

CSI 483: IT Project Management – 5 credits

In this course the students will learn the concepts, methodologies, and tools to successfully plan, manage, and deploy an IT development project. The students will employ the discipline of organizing and managing resources in a way that the project is completed within defined scope, quality, time and cost constraints.

Mastering project management with the application of agile methodologies and securing coding is a key to gaining a competitive advantage. Budgeting and Procurement of Vendor Hardware/Software systems will also be covered.

CSI 493: Senior Capstone Project – 5 credits

The Senior Capstone Project is designed to be a Quarter-long project, involving from 1 – 4 students. The students involved must have successfully completed the IT Project Management II course. Students will submit their project proposal for approval, prior to the start of this course. The project may be an original invention of the student(s) involved, or it may be undertaken on behalf of a non-profit agency, or an employer (with permission of faculty).

The project should be designed to demonstrate what the student(s) have learned over their Application Developer curriculum, including applying their knowledge and ability to plan and manage IT projects successfully. In their project plan, student(s) will define project scope, create workable project plans, and manage their project with quality, budget, and schedule in mind. The course is structured around the key phases of project lifecycle, including initiating a project, developing a project plan, executing and managing a project, and closing out a project. In addition, students will be coping with change management and political issues associated with project management.

CSI 494: Cooperative Education/Internship – Optional (5 credits maximum)

This course provides the option of cooperative education/internship training in the BAS in Application Development 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

External Evaluator: Alan Carter

Evaluator Biography

Alan Carter is currently a full-time IT faculty member and the BAS Program Director at Green River Community College. Mr. Carter has extensive experience in the field of information technology as a systems engineer and consultant. He has published several instructor guides and lab manuals for the Microsoft Official Curriculum series. Mr. Carter's experience in the field, coupled with his work as an educator and trainer, make him an ideal reviewer for this degree program, specifically to address the technical content and any pedagogical issues. Mr. Carter holds a Master's of Science degree in Information Technology: Network Architecture and Design from Capella University.

Evaluator's Comments

(College's response in italics)

Recommendation #1: Lower the total credits for the degree to get it closer to 90 credits and balance the load on the students. One way to work around this is to make the ethics class fit into another department such as humanities.

Response: *Changed the Legal and Ethical Aspects of IT course to PHIL 481 to replace the US History II class. Adjusted total credits from 110 to 100.*

Recommendation #2: I noticed three classes that focused on project management, and the software development lifecycle. These are older methodologies which are not used as much today. I would recommend at least adding at least one agile development methodology such as scrum, test driven development, refactoring and continuous integration into these courses.

Response: *Removed references to waterfall and life cycle from CSI 352 Software Application Development and included agile methodologies in its place.*

Recommendation #3: You do not list a project management prerequisite for your program, but are requiring it to take project management II. This is a "hidden" prerequisite, and should probably be explicitly stated up front.

Response: *Revised course title and pre-requisite. Students do not need a previous project management class to take CSI 483 IT Project Management, included application of agile methodologies as part of the class.*

Recommendation #4: The names on Software Development I and II are somewhat generic. It might be clearer to name them after the primary topics covered in each course.

Response: *Changed title and content of CSI 352 Software Development I to Software Development to concentrate on agile methodologies and secure computing. Changed title and content of CSI 453 Software Development II to Software Testing and Deployment to concentrate on testing, deployment and documentation.*

Recommendation #5: Is there a prerequisite to the advanced web development? If not, maybe a different course title would be appropriate. If it does have a prerequisite, it should be clearly stated in the course description and in the program prerequisites.

Response: *Removed Advanced from the title CSI 341 Web Development.*

Recommendation #6: Is testing only covered in Software Application Development I? If so, what types of testing are covered? i.e. TDD, Unit Testing, Functional Testing, and Acceptance Testing.

Response: *Edited the contents of CSI 453 Software Application Testing and Deployment to state the different testing techniques that will be covered.*

Recommendation #7: Consider actually purchasing the equipment necessary for I-phone/I-pad development for the mobile application development class. This is a huge segment of the market, and the Macintosh mini's are pretty inexpensive. You can outfit a whole classroom with these, including a KVM for around \$20,000.00.

Response: *Included in the budget is a yearly reserve of \$14,000.00 to purchase additional equipment including the mobile devices recommended above.*

Recommendation #8: How is secure coding addressed in the curriculum? It was not apparent in the course descriptions. Is it threaded throughout the curriculum? If so, you might want to mention it in the program description.

Response: *Secure coding is embedded throughout the curriculum. Highlighted this topic in the course descriptions for CSI 352 Software Application Development and CSI 453 Software Application Testing and Deployment*

Recommendation #9: Is application deployment covered anywhere in the curriculum? Will issues such as internal/external/cloud deployment be covered?

Response: *Included this topic in CSI 453 Software Application Testing and Deployment*

Recommendation #10: In your part C and D in the area of accreditation, remove the industry certifications. This area should discuss ABET and/or CSAB. You might want to simply state that you do not intend to seek separate program-level accreditation.

Response: *Moved the references to industry certifications to Section 1 under Junior/Senior Level Coursework where is more pertinent as it refers to individual course content.*

Recommendation #11: Also, for transfer possibilities, UWT is not a very friendly option for a degree like this because students would be missing a significant amount of prerequisites including discrete math, data structures, algorithms, computer organization, computer architecture, and calculus.

Response: *We will take this advice into consideration when approaching four-year institutions.*

Overall I think this is a great degree program, and it should serve your students very well.

External Evaluator: Andrei Khlopotine

Evaluator Biography

Andrei Khlopotine worked as a software engineer for Intel Corporation for 10 years where he was involved in the development of APIs and device drivers for various board components. Most recently, Mr. Khlopotine designed and implemented software development kits and test benches for various Intel silicon products. In addition to his work at Intel, Mr. Khlopotine teaches evening continuing education classes in programming. He provides a unique perspective as a software engineer working with complex systems in high performance teams and as a part-time instructor working with adult learners. Mr. Khlopotine holds a Master’s of Science degree in Computer Engineering from Portland State University and is currently completing a Ph.D. in Electrical Engineering at the University of Washington.

Evaluator’s Comments

(College’s response in italics)

Recommendation #1: Overall I would slightly shift the focus to the technical side since the curriculum looked to me more as a database/information systems plan. I considered full time students to be a target audience here.

Response: The revision of CSI 352 Software Application Development and CSI 453 Software Application Testing and Deployment provides more depth and breadth in programming topics to balance them versus the data base courses, CSI 332 Data Mining & Business Analytics and CSI 331 Securing and Managing Data

Recommendation #2: I noticed absence of Computer Science/Engineering classes. I wonder if this shall be addressed since BAS program is associated with Computer Science. If so, having two additional basic classes would probably address this deficiency. I have looked up on internet for similar offerings and found these classes/descriptions:

Principles of Computing: A course in fundamental computing principles for students with minimal or no computing background. Programming constructs: sequencing, selection, iteration, and recursion. Data organization: arrays and lists. Use of abstraction in computing: data representation, computer organization, computer networks, functional decomposition, and application programming interfaces. A technical introduction to the fundamentals of programming with an emphasis on producing clear, robust, and reasonably efficient code using top-down design, informal analysis, and effective testing and debugging

Introduction to Data Structures: Process of program design and analysis for students with some prior programming experience (functions, loops, and arrays, not necessarily in Java). The course reinforces object-oriented programming techniques in Python/C++/Java and covers data aggregates, data structures (e.g., linked lists, stacks, queues, trees, and graphs), and an introduction to the analysis of algorithms that operate on those data structures.

Response: Revised the pre-requisites for admission to include prior coursework in Object Oriented Programming (OOP), at least two courses with any OOP language such as C# or Java. See Table 3 pasted below.

Table 3: Entry Requirements for Application Development Degree

| Prerequisites | Notes | Credits |
|--|--|----------------|
| <i>CSI 152 Introduction to Programming, CSI 154 Introduction to C# Programming</i> | <i>OOP coursework equivalent to CS &141 and CS 142</i> | <i>10</i> |

| | | |
|---|--|----------|
| <i>CSI 156 Introduction to Database Theory and Design</i> | <i>Introductory coursework on relational databases</i> | <i>5</i> |
| <i>CSI 159 Applied Database Development</i> | <i>Introductory coursework on SQL</i> | <i>5</i> |

Recommendation #3: I would include a class on Python and / or Java since these languages are in high demand nowadays both in engineering and information system areas.

Response: *Course developers will be required to emphasize a vendor-neutral approach. Wherever possible, the students whose employer uses a particular platform such as C#, Java or Python, may use that software to complete class projects.*