Winter 2016

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COVER SHEET

NEW DEGREE PROGRAM PROPOSAL

Program Information

Institution Name: **Bellevue College**

Degree: **Bachelor of Science in Computer Science** CIP Code: 11.0701

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

Degree N/A CIP Code: ____ Year Began: ____

Degree N/A CIP Code: ____ Year Began: ____

Planned Implementation Date (i.e. Fall 2014): **Fall 2016**

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

Page Limit: 30 pages

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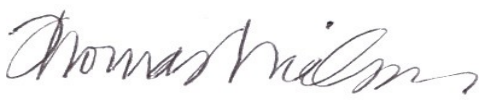


Chief Academic Officer

2/25/16
Date

Preface:

Legislative Budget Proviso:

Since the Revised Codes of Washington - 28B.50, and 28B.50.810 - together limit Washington State Community and Technical colleges to offering "applied" baccalaureate degrees only, Bellevue College sought legislative authority to develop a four-year, standard Bachelor of Science degree typically reserved for offering by the State's universities. In July of 2015, the State Legislature granted Bellevue College this authority with approval of the following budget proviso:

(7) $750,000 of the general fund–state appropriation for fiscal year 2016 is provided solely for Bellevue College to develop a baccalaureate of science degree in computer science. Subject to approval by the state board for community and technical colleges, in fiscal year 2016 Bellevue College shall develop a baccalaureate of science degree in computer science. This degree must be directed at high school graduates who may enroll directly as freshmen and transfer-oriented degree and professional and technical degree holders. Bellevue College will develop a plan for offering this new degree by no later than fall quarter 2016. With the exception of the amounts provided in this subsection, the plan must assume funding for this new degree will come through redistribution of the college's current per full-time enrollment funding. The plan shall be delivered to the state board by June 30, 2016.

State Senate Bill (SSB) 5928

Although the budget proviso provided Bellevue College the authority to "develop" a computer science baccalaureate program, the Revised Codes of Washington - 28B.50, and 28B.50.810 – still prohibited the State Board for Community and Technical College from approving the proposed degree. To gain the authority to "offer" its proposed computer science bachelor degree, Bellevue College and the State Board sought and received legislative approval with the passage of State Senate Bill 5928. The bill states that "Bellevue College is authorized to offer Bachelor of Science degrees in computer science."

Bellevue College interpreted the aforementioned budget proviso to mean that it would develop and deliver a plan for offering a B.S. Degree in Computer Science to the State Board of Community and Technical Colleges no later than June 30, 2016 with the expectation that this Computer Science program will begin enrolling students in fall 2016.

Bellevue College interprets the recent passage of SSB 5928 to mean that the State Board of Community and Technical Colleges has been granted the authority to approve Bellevue Colleges proposed B.S. Degree in Computer Science.

In keeping with the stipulations of the Budget Proviso and the requirements of the State Board of Community and Technical Colleges for Baccalaureate degree approval, Bellevue College submits this program proposal with revisions as its plan for offering a B.S. degree in Computer Science. The College looks forward to the guidance of the State Board, and pledges full-cooperation in its partnership with the State Board on this degree development project.

Introduction

Bellevue College proposes the development of a Bachelor of Science Degree (B.S.) in Computer Science to meet the critical and pervasive demand for rigorously trained computer science professionals. Seeking accreditation from the Accreditation Board for Engineering and Technology (ABET), this proposed degree program will prepare graduates to apply mathematical foundations, algorithmic principles, and computer science theory in the design of computer and software based systems of varying complexity.[1] In conjunction with preparing students to undertake these assorted design responsibilities, the degree aims to teach students to comprehend the tradeoffs among various modeling and design choices. Even more critical to student success, the degree will offer students applied experience by connecting them in numerous ways to industry professionals as well as require them to undertake a senior capstone project. Accordingly, graduates will be trained to work in a wide range of computer development, engineering or information technology positions in private, government and non-profit organizations.

This proposed Bachelor of Science program will break new ground for Bellevue College and the system of Washington State Community and Technical Colleges (WSCTC) on several counts. First, while Bellevue College will remain true to its open access philosophy, the academic rigor of this proposed program will necessitate use of a carefully applied competitive admission process. Such a process will ensure that students are academically equipped for success. Second, as a conventional Bachelor of Science degree, the proposed program will span four-years, serving first-year, sophomores, juniors and seniors as well as qualified transfer students. This design will make the program the first of its kind in the WSCTC system. Finally, the proposed program will serve as a vital and necessary challenge to the Revised Codes of Washington, 28B.50, and 28B.50.810, which together limit Washington State Community and Technical colleges to offering only applied baccalaureate degrees. Approval of this degree program will position Bellevue College and the State Board of Community and Technical Colleges (SBCTC) to alter the educational landscape, providing WSCTCs equal opportunity with the State's university system to transform the state's educated workforce.

Breaking this ground seems both right and just. As described in Bellevue College's Statement of Need, trends cited by the Bureau of Labor Statistics as well as by a wide range of public and private organizations show an inordinate unmet demand for computer science graduates.[2] This unmet demand has reached a crucial tipping point, placing the economic health of our communities and state at risk. Government, industry and educational institutions alike recognize the risks of this critical labor shortfall. The Washington State Legislature, for example, not only furnished Bellevue College with a budget proviso of $750,000 for development of a computer science program, but also substantially increased funding for the University of Washington (UW) to increase the number of graduates from its computer science program. In addition, Washington's

[1] Criteria for Accrediting Computing Programs, 2015-2016, ABET Computing Accreditation Commission, General Criterion 1. Students, http://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-computing-programs-2016-2017/

[2] See Bellevue College's Statement of Need document which strongly substantiates this unmet demand.

high-tech companies have long been aware of the impending crisis of this labor shortfall. Michael Schutzler, CEO of the Washington Technology Industry Association, reports that "Washington suffers from a limited supply of Computer Science professionals, [making] Washington State…the number one per capita importer of technical talent in the country." Schutzler knows, as do the industries he represents, that Washington's technology companies cannot operate under a scarcity of talent indefinitely without losing their competitive edge. Even the UW knows well that it alone or its fellow university partners cannot supply enough computer science graduates to keep the state economy healthy. UW has openly supported development of BCs program, writing that the new program could "fill a complementary role" in the market place.

So among the array of actions needed to increase the number of computer science graduates across the state of Washington, Bellevue College's proposed B.S. degree in Computer Science seems both a warranted and common sense option. To this end, Bellevue College submits the following proposal to show how its proposed program will exhibit baccalaureate rigor; employ qualified faculty; assure that its selective admission policy is consistent with an open door institution; offer an appropriate student services plan; model a sustainable, quality program; seek accreditation; open pathways beyond the bachelor's degree and meet expert reviewer expectations.

Baccalaureate Level Rigor

Curriculum Design

Bellevue College has carefully designed the scope of it computer science degree to impart the knowledge, skills and abilities needed by students to be successful computer science professionals. The curriculum is mathematically rigorous and scientifically oriented, preparing students to become proficient in all fundamental areas and techniques of computer science. Even more important, the curriculum is progressively experiential, teaching students not only how to develop and implement efficient algorithms to solve a variety of application problems, but also how to apply their learning to company sponsored projects, sparking their curiosity, unleashing their imaginations and advancing their job readiness.

Program Learning Outcomes

The program learning outcomes are designed to establish a student's core foundational learning, strengthen their general education and deepen their understanding of the theories and practices of the field of computer science.

To ensure baccalaureate rigor and job competitiveness, successful graduates of the program will meet all course and program learning outcomes.

Upon graduation, program graduates should be able to:

- Demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems
- Demonstrate the conceptual knowledge to identify and analyze a problem, and then define the computing requirements to creatively solve it.

- Demonstrate the ability to design, implement, evaluate, trouble-shoot and test a computer-based system process, component, or program to meet desired results
- Demonstrate the ability to use current techniques, skills and tools for computing practice
- Demonstrate success skills, including teamwork, leadership, communication, critical thinking, creative problem-solving, personal responsibility and management skills.
- Demonstrate an awareness of the impact of computers in society as well as an understanding of the key ethical issues shaping the practice of Computer Science.

Mathematics

Mathematical reasoning is fundamental to the study of computer science. A significant portion of computer science concepts cannot be described and understood without sophisticated mathematics. What's more, mathematics is, perhaps, the best way of learning clear and logical thinking, an ability vital to doing computer science well.

Table I below lists the required mathematics courses deemed essential to Bellevue College's computer science curriculum. Course numbers with an ampersand (&) are common course numbers at all Washington State community and technical colleges. Course numbers without the ampersand (&) symbol refer to Bellevue College Courses.

Table I: Mathematics

	Titles	Number	Credits
Required Math Courses 30 Credits 5 credits of which count toward General Education	Calculus I	Math& 151	5
	Calculus II	Math& 152	5
	Calculus III	Math& 153	5
	Probability & Statistics	Math 270	5
	Linear Algebra	Math 208	5
	Discrete Math	Math 301	5
	TOTAL		30

Core Courses

While it encompasses knowledge and technologies that change rapidly over time, computer science should be taught as a "science" buttressed by essential concepts and methodologies housed in a coherent, cumulative and content-specific core curriculum.

Table II below identifies the core courses that all student will take. Students begin core courses in their first year and continue to take them throughout the four-year program.

Table II: Computer Science Core

CS Core Courses 57 Credits	Required	Credits
	CS 196 Special Topics in Computer Science – CS 210 Enrichment	1
	CS 196 Special Topics in Computer Science – CS 211 Enrichment	1
	CS 210 Fundamentals of Computer Science I	5
	CS 211 Fundamentals of Computer Science II	5
	CS 300 Data Structures	5
	CS 320 Programming Languages	5
	CS 331 Database Systems	5
	CS 351 Computer Architecture I	5
	CS 360 Operating Systems	5
	CS 401 Algorithms	5
	CS 410 Software Engineering	5
	CS 481 Capstone I	3
	CS 482 Capstone II	4
	CS 483 Capstone III	3
	Total	57

CS Elective Courses

The electives are immersive, flexible, and innovative courses intended to help students achieve a depth of knowledge in an area of individual interest. Elective courses will provide a combination of lecture, workshop, laboratory and field segments, as appropriate. Some specialty courses of

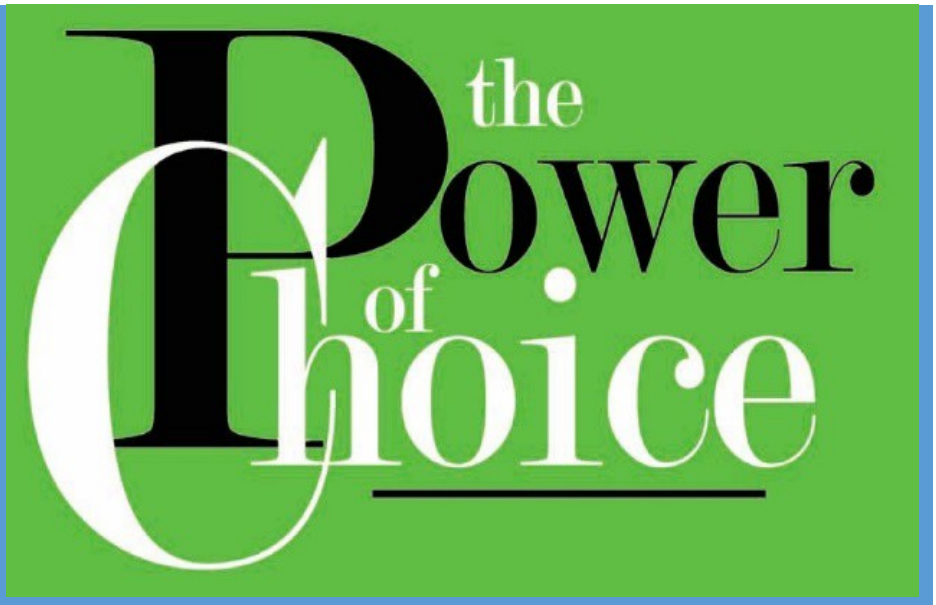
broad interest will be offered, determined by faculty expertise and student interests. Table III describes the current set of elective courses that will be available as the program begins.

Table III: CS Elective Courses		
	Courses	**Credits**
CS Elective Courses Choose 3 15 Credits	CS 341 Computer Networks	5
	CS 352 Computer Architecture II	5
	CS 356 Computer Security	5
	CS 405 Numerical Methods	5
	CS 411 Software Engineering Project Management	5
	CS 420 Theory of Computation	5
	CS 455 Cloud Computing	5
	CS 460 Machine Learning	5
	CS 485 Computer Science Co-Op/Practicum	1-5
	TOTAL	15

Free Electives:

Although a highly prescribed guided pathway, the computer science curriculum also gives students the opportunity to pursue interests of their own calling. Twenty credits of the curriculum are designated as free electives. Student may choose to take additional computer science courses, or additional general education courses. Whatever they choose, students are afforded personal agency with their education, thereby learning the power of choice.

20 credits of Free Electives



General Education

The General Education requirements of this computer science degree conform to state general education guidelines for university baccalaureate and applied baccalaureate programs. Students will earn 63 credits of general education over the course of their four years. (See Table IV below). Bellevue College plans to work closely with other system colleges to ensure that students currently enrolled in transfer and technical associate degrees complete appropriate general education courses prior to entry into the computer science program. Course numbers with an ampersand (&) are common course numbers at all Washington State community and technical colleges. Course numbers without the ampersand (&) symbol refer to Bellevue College Courses.

Table IV: General Education Courses

Subject	Credits	Recommended Courses	Optional Current G.E. courses at 300 level
Communication Skills (Eng. Comp. required)	10	ENGL& 101 English Composition	
		ENGL 201 The Research Paper, or ENGL 235, Technical Writing	
Quantitative Skills (Calculus I or higher)	5	Calculus I	

Humanities	15	Choose 3 different subjects from AAS-DTA transfer list	CMST 330 Intercultural Communication for the Professional
			PHIL 365 Biomedical Ethics: Theory & Practice
Social Science	15	Choose 3 different subjects from AAS-DTA. One course should meet the cultural diversity requirement.	ECON 315 Economics of Healthcare
Natural Sciences	18	Physics 121 Physics 122 Chemistry or Biology	
Total required	63[3]		

[3] Laboratory science courses at Bellevue College are 6 credit courses. Hence, students will accumulate 63 general education credits rather than the standard 60 credits.

Sample Four-Year Course Plan

Table V below offers a sample plan, illustrating the integration of Mathematics, Core, General Education and Elective course throughout the four-year program.

Table V Computer Science - Sample 4 Year Plan

	FALL		WINTER		SPRING	
	Course	Credits	Course	Credits	Course	Credits
First-Year			CS 196 Special Topics in Computer Science – CS 210 Enrichment	1	CS 196 Special Topics in Computer Science – CS 211 Enrichment	1
	Calculus 151	5	CS 210	5	CS 211	5
	English 101 Composition	5	Calculus 152	5	Calculus 153	5
	Hum or SS	5	Physics 121	6	Physics 122	6
Second-Year	CS 300 Data Structures	5	CS 331 Database Systems	5	CS 320 Programming Lang.	5
	Math 270 Probability and Statistics	5	Math 208 Linear Algebra	5	Math 301 Discrete Math	5
	English 201	5	Hum or SS	5	Hum or SS	5
Third-Year	CS 351 Computer Arch I	5	CS 401 Algorithms	5	CS 360 Operating Systems	5
	CS Elective	5	Free Elective	5	CS Elective	5
	Chemistry or Biology	6	Hum or SS	5	Hum or SS	5
Fourth-Year	CS 481 Senior Capstone I	3	CS 482 Senior Capstone II	4	CS 483 Senior Capstone III	3
	CS 410 Software Engr. & Dsgn.	5	CS Elective	5	Free Elective	5
	Free Elective	5	Free Elective	5	Hum or SS	5
					TOTAL	**180**

*For a complete listing of course descriptions and learning outcomes for computer science courses see appendix I

Course Preparation for Students

Since the proposed B.S. degree in Computer Science is a four-year degree, it does not require completion of any existing associate, professional, or technical degree program prior to admission as is the convention of approved BAS degree programs. Rather, the new B.S. Degree in Computer Science will offer three pathways to entry and completion. Course preparation for each of these pathways differs depending on whether one chooses to apply as a first-year or transfer student. These pathways are the foundations on which Bellevue College intends to build its B.S. degree program in Computer Science.

Pathway I: First-Year Admission Process & Preparation

The first-year admission policy applies to applicants who enter college directly from high school, and students who enter college with fewer than 40 transferable college-level credits.

Admission for first-year students is selective. Course preparation for first-year standing demands a rigorous high school curriculum that subscribes to the College Academic Distribution Requirements (CADR), the requirements to which all state university and most private four-year Bachelor of Science programs subscribe. Students will be evaluated thoroughly by the admissions committee who will review an array of qualifications, including, but not limited to, grade point average (GPA), an essay and the rigor of past course work.

To be eligible for first-year standing, students must:

a) complete the minimum number of high school credits in six subjects areas as prescribed in the College Academic Distribution Requirements (CADR). See Table VI below.
b) be ready to enroll in the required courses described in table VII. (Readiness is defined by meeting the listed pre-requisites)

Table VI: College Academic Distribution Requirements

Minimum College preparatory course work to be completed in high school	
English	4 credits
Mathematics	3 credits (Algebra I, Geometry, Algebra II (intermediate algebra), or Integrated math I, II, and III [i]
Senior Year Math-Based Quantitative Course	1 credit [ii]

Science	2 credits [iii]
World Languages	2 credits [iv]
Social Science	3 credits [v]
Arts	1 credits [vi]

(i) Algebra I, Geometry & Algebra II are the minimum college readiness requirements. Readiness for the B.S in Computer Science requires completion of a pre-calculus course or its equivalent as well

(ii) If a student has completed pre-calculus course, then senior year math may be statistics, applied math, appropriate career and technical courses, a senior year AP computer Science course, or an algebra-based science course. Exception: Completion of higher-level math prior to the senior year exempts students from the senior-year quantitative course requirement (E.G, pre-calculus, math analysis, or calculus).

(iii) One credit must be in an algebra-based science course as determined by the school district. One credit must be in biology, chemistry, or physics. (This course may also meet the algebra-based requirement)

(iv) 2 credits must be earned in the same World Language, Native American Language, or American Sign Language. Schools may award credit based on a district approved competency assessment consistent with the State Board of Education policy and American Council on the Teaching of Foreign Languages (ACTFL) Proficiency Guidelines. (Note: a World Language course taken in middle school may satisfy one credit of the requirement if the second year level course is completed in high school grades 9-12)

(v) 3 credits of history or other social science (e.g. anthropology, contemporary world problems, economics, geography, government, political science, psychology).

(vi) 1 credit of fine, visual, or performing arts – or 1 additional credit in other CADR academic subject areas as defined above. Acceptable course work in the fine, visual, or performing arts includes art appreciation, band, ceramics, choir, dance, dramatics performance and production, drawing, fiber arts, graphic arts, metal design, music appreciation, music theory, orchestra, painting, photography, print making, or sculpture.

Students should consult with their local high school to obtain complete information about minimum college admission standards, and to be aware of which courses at their high school meet CADR guidelines, as determined by the local school district.

Table VII: First-Year Standing To begin the Computer Science program as a First-Year in full standing, a student must be qualified to enroll in the following courses.	
Courses	**Pre-requisites**
Calculus I	Placement by assessment or MATH& 142 with a C- or better, or Advanced Placement score of 2 or higher on AB or BC exam.
English 101 Composition	Placement by assessment or ENGL 092 or 093 with a C- or better

Pathway II: Transfer Admission Process & Preparation:

The transfer student admission policy applies to applicants who enter college with 40 or more credits of college-level coursework.

Admissions for transfer students is selective. Students will be evaluated thoroughly by the admissions committee who will review an array of qualifications, including, but not limited to, grade point average (GPA), an essay and the rigor of past course work.

In applying its transfer policy, Bellevue College,

- will subscribe to the statewide *Policy on Inter-College Transfer and Articulation Among Washington public colleges and Universities*, endorsed by public colleges and universities of Washington, the Washington Achievement Council as well as by the State board for Community and Technical Colleges. The original policy was adopted by the Higher Education Coordinating Board
- will generally accept credits earned at institutions fully accredited by their regional accrediting association for colleges and universities, provided that such credits have been earned through college level courses appropriate to the students degree program at BC
- will determine class standing by the total number of transfer credits awarded by BC, not the number of years of college study or by the completion of an associate degree. In general, class standing is determined as follows:

    - A First-Year has 0 to 44 transfer credits
    - A Second-Year has 45 to 89 credits
    - A Third-Year has 90 to 134 credits
    - A fourth-Year has 135 or more credits

- will limit the maximum number of lower-division transfer credits applied to the degree 93 credits, depending on the number of 6 unit lab courses transferred.
- will limit the maximum number of total transfer credits to 135

- will require completion of a minimum of 45 credits in residence at BC

Awarding of Non-Traditional Transfer Credit

Students entering the B.S. degree in Computer Science may also be eligible for non-traditional transfer credit. Non-Traditional Credit is generally considered to be learning that took place outside of a regionally accredited college or university. Bellevue College follows the standards set by the State Board for Community and Technical Colleges in awarding credit for non-traditional learning.

There are four categories of Credit for Non-Traditional Learning:

1. Credit by Testing
2. Prior Experiential Learning
3. Extra-Institutional Learning
4. Course Challenges (formerly Credit by Examination)

In considering non-traditional credit for transfer, BC will apply the following conditions:

- Transferability of awarded credits are subject to the policies of the receiving institution and the college makes no claim regarding the application or transfer of awarded credits to the programs at other institutions.
- Awarded credits do not count toward college residence requirements. Students must earn one-third of the credits needed to complete their programs at Bellevue College.
- Depending on the type of awarded credit, other limitations or restrictions on the number of credits accepted may apply.
- Awarded credits must apply to the student's program.
- Awarded credits must generally meet the same standards, course objectives and learning outcomes of equivalent courses offered by the college.
- Awarded credits are subject to review and approval by faculty.
- Official Admission to Bellevue College for the current or upcoming quarter must occur before the process of awarding Non-Traditional credit begins.

Table VIII below shows the recommended series of courses for transfer to BC's computer science degree program. This table draws courses from the currently accepted Direct Transfer Agreement/Major Related Program for community college students to transfer into B.S. degree programs in computer science.[4] These courses or their equivalent will transfer if the student earns a grade of C (2.0) or higher, and offer the soundest preparation for BC's computer science program. For a complete listing of all courses and course numbers that will transfer to the BS in Computer Science, see Appendix II.

[4] A new computer science DTA/MRP is being developed by the SBCTC, the Joint Transfer Council and the Education Commission. Upon its completion and approval, BC will adopt this newer version to compile its recommended list of courses for preparation and transfer. It is anticipated that the core of this newer DTA/MRP agreement will look much like the course preparation describe here.

Table VIII: Associate in Arts and Science Direct Transfer **Recommended courses for Computer Science Preparation & Transfer**	
Distribution Area	**Recommended Courses**
Written Communication: 10 credits	English 101, and English 201 or English 235
Quantitative/Symbolic Reasoning: 5 credits	Mathematics 151 (Calculus I)
Humanities: 15 credits • **Choose 3 different subjects.** • **Maximum 5 credits in performance/skills** • **Only one single language for a maximum of 5 credits**	American Studies, Anthropology, Art Communication Studies, Cultural & Ethnic Studies, Dance, Drama, English, History, Humanities, Philosophy, Arabic, American Sign Language, Chinese, French German, Italian, Japanese, Spanish
Social Sciences;: 15 credits • **Choose 3 different subject**	American Studies, Anthropology, Business Communication Studies, Cultural & Ethnic Studies, Economics, Geography, History, Humanities International Studies, Philosophy, Political Science, Psychology, Sociology
Natural Sciences: 15-18 • **Take Physics 121 & 122, or equivalent** • **One course with a lab component required**	Physics 121 and 122 Biology or Chemistry
Computer Science & Electives • **The following additional courses should be planned with the computer science advisor:**	Computer Science 210 and 211 (fundamentals of CS I and II), Physics123, Mathematics 153 and either Mathematics 254 or 208, or Business Administration 240 (Statistics)

Pathway III: High School Dual Credit and Engineering and Technology Associated degrees:

Pathway three students will fall under either the first-year or transfer policies, depending on the number of transfer credits completed. However, because BC's computer science program opens new avenues for a variety of students who, to date, have not looked to the community and technical college for the opportunity to earn a computer science bachelor's degree, BC wishes to draw special attention to these prospects.

High School Dual Students Credit (Running Start, Tech/Prep & College in the High School)

Depending on the nature and rigor of their coursework, students in an array of dual credit high programs may be eligible and well-prepared for admission to the B.S degree in Computer Science. Admitted students who undertake college level calculus, computer science, laboratory sciences, humanities and social sciences courses as part of their dual credit program open opportunity to accelerate completion of the computer science program by transferring this credit.

Running Start

Running start students who have earned less than 40 transferable credits will be subject to the first-year admission policy. Those who have earned more than 40 transferable credits will be subject to the transfer admission policy. All relevant, eligible college-level courses in Mathematics, Physics, laboratory sciences and general education will transfer into the computer science degree program.

Tech/Prep

Tech Prep students who have completed Engineering and Technology courses in computer science, CISCO Networking and other related courses may transfer up to 20 eligible, college elective credits into the computer science program. Transfer credit is subject to the BC's transfer credit policy and will be evaluated on a course-by-course basis.

College in the High School

College in the High School students who have earned college-level credit in Calculus, Physics World Languages and other general educations courses may transfer all relevant and eligible credit into the computer science program. Transfer credit is subject to the BC's transfer credit policy and will be evaluated on a course-by-course basis.

Engineering and Technology Associate Degrees (AS-T & AAS-T degrees)

AS-T (track 2) and AAS-T technology degrees

Community and Technical College AS-T (track 2) and AAS-T technology degrees, or their equivalent offer excellent preparation for the B.S. degree in computer science. Students undertaking AS-T (track 2) programs in Civil, Chemical, Bio-Engineering, Electrical and Mechanical engineering, or students in professional technical AAS-T Engineering Technology degrees, especially those who take computer programming as part of their coursework, will find a large number of their courses transferrable into the B.S. degree in Computer Science. Transfer credit is subject to the BC's transfer credit policy and will be evaluated on a course-by-course basis.

Program Evaluation Criteria and Process

Assessment for the proposed Computer Science program is based on the comprehensive student achievement and program assessment processes in place at Bellevue College for all programs, including associate and baccalaureate degrees. Program review occurs every five years and provides

a thorough assessment of every aspect of the program. Reviews includes strategic planning; student headcount, full-time equivalent student (FTES) and schedule trend analysis; program enrollment data, including student faculty ratios, analysis of full-time and part-time faculty ratios and other staffing indicators; student performance evaluation; an evaluation of curriculum coherency and currency, including an evaluation by the workforce advisory committee; program viability, including employment placement data and market analysis; and analysis of student demographics, program costs and revenues, retention and advising, articulation agreements, and course delivery methods.

Industry will engage in recommendation and review of the curriculum and program elements through the college's Science, Technology, Engineering and Mathematics (STEM) advisory committee comprised of professionals from the field. The STEM advisory committee's mission has already been expanded to evaluate and serve the outcomes and scope of the new B.S. program. The role of this committee will be to advise the program on recommended curriculum improvements; help keep the program abreast of changes in the field; assist in student recruitment and placement; and make recommendations for other changes that will keep the program current.

Table IX summarizes 5-year assessment mechanisms.

Table IX: 5-Year Program Assessment	
Effectiveness of curriculum/ program — continuously refines curriculum and program design, keeping the program current, including discipline-based, general education and electives	
Course evaluations by students	• Effectiveness of curriculum & teaching methods in courses • Effectiveness of program in skills & knowledge progression
Field studies evaluation by students and by employers	• Adequate balance of knowledge & skills, theory & practice • Effectiveness of program in meeting students' expectations • Effectiveness of program in meeting employers' expectations
Student survey and/or focus group mid-point through the program and at graduation	• Effectiveness of the program in skills & knowledge progression • Adequate balance of knowledge & skills, theory & practice • Effectiveness of program in meeting students' expectations • Effectiveness of institutional and program resources and support • Preparedness of faculty • Preparedness of students upon entering individual courses
Program statistics	• Student retention • Student course success • Student progression through program • Correlation of student success and training/ job experience prior to entry
Survey of CS program faculty	• Preparedness of students upon entering individual courses • Preparedness of students upon entering the program

Graduate follow-up and industry feedback — assesses effectiveness of program in meeting career goals and employer expectations and uses findings to refine curriculum and teaching methodologies	
Survey of program graduates six-nine months after graduation	• Effect of program completion on career • Effectiveness of program in meeting job expectations • Wage and career progression
Survey of program graduates 3-5 years after graduation. IPEDS DATA	• Effectiveness of program in placing graduates into graduate school
Survey of employers of program graduates six-nine months after graduation	• Effectiveness of program in meeting job expectations • Observed increased skills and performance • Perceived strengths and weaknesses of current program
Oversight by STEM Advisory Committee – provides ongoing support and program review.	
STEM Advisory Committee	• Completeness & relevance of curriculum to employer needs • Trends in field, technologies, practices and job markets • Continuing education needs of graduates
Survey of faculty satisfaction — assesses adequacy of program support and faculty training	
Survey of program faculty	• Effectiveness of institutional & program resources & support • Preparedness to teach the curriculum

Until the first five-year program review occurs, staff will evaluate the Computer Science program's effectiveness by collecting and analyzing data annually on student satisfaction, preparedness, and retention; faculty assessment of student preparedness; and effectiveness of courses to meet the program outcomes. The program will be assisted in its collection of data by the College's office of Effectiveness and Strategic Planning. Table X summarizes the annual schedule for the collection of data. This annual collection of data serves as preparation for the program's five-year review.

Table X: Annual Assessment

PERIOD	DATA COLLECTED	RESPONSIBILTY
Spring 2017	• Student Survey • Faculty Evaluations • Retention Data • Faculty survey of student readiness	Program Manager; Program Chair Dean, Science Division, Office of Effectiveness and Strategic Planning
Spring 2018	• Student Satisfaction Survey • Faculty Evaluations • Retention Data • Faculty survey of student readiness	Program Manager; Program Chair Dean, Science Division, Office of Effectiveness and Strategic Planning
Spring 2019	• Student Satisfaction Survey • Faculty Evaluations • Faculty survey of student readiness	Program Manager; Program Chair Dean, Science Division, Office

	• Retention & graduation data • Wage, job & progressions data	of Effectiveness and Strategic Planning
Spring 2020	• Student Survey • Faculty Evaluations • Retention Data • Faculty survey of student readiness • Retention & Graduation data • Wage & job & progression data • Survey of Employers	Program Manager; Program Chair, Dean, Science Division, Office of Effectiveness and Strategic Planning
AY 2020-21	Five – Year Review. See Below.	Program Manager; Program Chair, Program Faculty, Dean, Science Division, VP, Instruction, Office of Effectiveness and Strategic Planning

Qualified faculty

Bellevue College projects an enrollment of 30 students (15 first-year & 15 second-year) during AY 2016-17, the first year of the B.S. in Computer Science program. The college anticipates achieving full-capacity by 2020-21, reaching a total capacity of 240 FTE in five years. To support yearly program growth, BC will need to add three new additional full-time equivalent faculty (FTEF) in Computer Science. The program expects to enlist one new faculty member for the AY 2016-17, another for AY 2017-18 and a third for AY 2018-19. These new faculty will teach select core and elective CS courses throughout the curriculum. Faculty teaching general education courses will teach these courses as part of their ongoing load, so no additional faculty will be required in areas outside Computer Science.

Faculty teaching in the program will be required to hold a minimum of a master's degree and maintain appropriate certification. To satisfy ABET accreditation, some faculty will be required to hold a Ph.D. in Computer Science.

Table XI below lists current CS and associated Faculty along with their credentials, rank and anticipated course/s taught. Anticipated new faculty positions appear in this table as well.

Table XI: Faculty Credentials

Faculty	Credentials	Status FT/PT	Course(s)
William Iverson	Ph.D. in Geophysics, University of Wyoming, Faculty in Computer Science	FT	CS 120 CS121 CS210 CS211 CS212
Frank Lee	M.S. in Mechanical Engineering, University of Washington	FT	CS 210

Winnie Li	M.S in Statistics, California State University. B.S in Computer Science and Engineering, University of California, Davis	FT	CS 210 CS 331 CS 460
Ryan Bauer	Ph.D. in Mathematics, University of Idaho	FT	Math 301
Danielle Jacobson	M.A.T., Mathematics, Central Washington University	FT	Math 270
Jen Townsend	M.S. in Mathematics and Statistics, Georgia Institute of Technology	FT	Math 270 Math 301 CS 410 CS 420 CS 460
Rick Duncan	M.S in Computer Science & B.S. in Computer Engineering, Mississippi State University.	PT	CS 210 CS211 CS 410 CS 411
Zubair Murtaza	MBA, University of Chicago. M.S Computer Engineering, Florida Atlantic University. B.S/M.S in Structural Engineering & B.S. in Mathematics, Computer Science.	PT	CS 210 CS211 CS212 CS 410 CS 455 CS 460
Full-Time Hire, 2016	Minimum: M.S. in Computer Science; Preferred: Ph.D. in Computer Science	FT	CS Courses
Full-Time Hire, 2017	Minimum: M.S. in Computer Science; Preferred: Ph.D. in Computer Science	FT	CS Courses
Full-Time Hire, 2018	Minimum: M.S. in Computer Science; Preferred: Ph.D. in Computer Science	FT	CS Courses

Selective Admissions Consistent with Open Door Institution

Above all, Bellevue College wishes to ensure that students admitted to its computer science program are academically prepared for success. Since computer science is a highly rigorous field of study, admission to the program must be selective to place students in the best position to succeed. To this end, a student's past academic performance will be particularly important in making admission decisions.

While academic performance will be central to the admissions decision, the College also knows that there are countless additional factors indicative of a student's true potential. Because it seeks students who can benefit from its academic opportunities and contribute to its rich and diverse culture, the College will use a holistic approach to its admissions process. To help the admissions

committee look beyond transcripts and GPAs, students will be asked to complete an activities list on their application as well as share their story via an essay. The activities list will help the admissions committee understand meaningful community activities, recognition and awards, employment, volunteer work, family activities, enrichment activities, and perhaps most important how they spend their time. The essay will enable students to describe what makes them unique and what they can contribute to the campus community. In using this holistic approach, the College will endeavor to navigate the balance between safeguarding student success and minimizing barriers to opportunity and achievement.

The College will admit students into the program for fall quarter only. Admitted students will join a cohort created by enrolling in CS 196, an enrichment series of one credit courses designed to familiarize students with fundamental concepts and program requirements. The college adopted the cohort model for the computer science program to improve academic performance, increase exposure to diverse ideas, create camaraderie and enhance persistence and completion[5] The cohort model will be reinforced by subsequent enrollment in the College's STEM to Stern program. The STEM to Stern program couples the CS Math curriculum with enhanced, wrap around two credit math courses that illuminate and reinforce math concepts. The STEM to Stern program also offers experiential learning throughout a student's academic experience. (See full description below)

Qualified applicants who meet the priority application deadline will receive first consideration for admission. If there are more program slots than applications, applicants who do not meet the priority deadline will be considered. If there are more qualified applicants than there are openings, the College will explore opening additional sections. If, however, there are more qualified applicants than there are openings, but not enough applicants to feasibly add additional sections, the college will admit students on the following criteria:

- Fifty to sixty percent of the open slots will be awarded on the basis of academic record and the quality of application materials. This will provide priority to students with a higher GPAs and noteworthy achievements and essays.
- The remaining percentage of cohort slots will be awarded to qualified applicants by lottery. This ensures that students with admissible, yet lower GPAs are not excluded from enrollment.
- When all slots are full, any remaining qualified applicants will be placed on a wait list and be considered for future terms.

[5] Barnett, B. G., & Muse, I. D. (1993).Cohort groups in educational administration: Promises and challenges. Journal of School Leadership, 3, 400- 415. See also; Bratlien, M. J., Genzer, S. M., Hoyle, J.R., & Oates, A. D. (1992). The professional studies doctorate: Leaders for learning. Journal of School Leadership, 2, 75-89. See also: Norris, C., & Barnett, B. (1994, October).Cultivating a new leadership paradigm: From cohorts to communities. Paper presented at the Annual Meeting of the University Council for Educational Administration, Philadelphia, PA. (ERIC Document Reproduction Service No. ED387877) See also: Yerkes, D. M., Basom, M., Barnett, B., &Norris, C. (1995, fall). Cohorts today: Considerations of structure, characteristics, and potential effects. The Journal of California Association of Professors of Educational Administration, 7, 7-19.

The program manager and program chair, working closely with Enrollment Services, will manage the details of the recruitment and admission process. The Program Manager, in conjunction with Enrollment Services outreach staff, will attend high school college fairs and community college transfer fairs around the Puget Sound. This will assist the program in drawing from a wide and diverse applicant pool.

To assure continued fairness and consistency in its recruitment and admissions process, the program will assess these policies annually. If the program determines that changes need to be made, it will consider student recruitment, student progress and retention, student diversity, and an appraisal of criteria by which student qualifications are measured.

Finally, to assure equity and pluralism in the recruitment and admission process, the Computer Science program will employ practices designed by the college's Office of Equity and Pluralism to attract a diverse student population. Directed by the Vice President of Equity and Pluralism, this office leads Bellevue College's efforts to "expand opportunities for persons of color, persons with disabilities, persons of various ethnic heritages, persons of different gender identities and orientations, and person with limited financial resources. This office will guide the Computer Science program in its efforts to:

- Recruit people of color who are BC program graduates and professionals to serve as role models and as members of the program's advisory committee. Such graduates and professionals will be asked to make presentations to currently enrolled associate degree students to encourage them to pursue the bachelor's degree;
- Engage in targeted marketing efforts to encourage persons of color or persons from under-served populations to apply to the program;
- Coordinate program diversity efforts with the institution's office of Multicultural Student Services;
- Apply best practices for identifying potential program hires from under-represented groups;
- Work with businesses and professional organizations to recruit their employees of color or their employees from under-served populations to enroll in this bachelor degree program, and/or to serve as members of the program's advisory board.
- Regularly assess recruitment/retention efforts from under-represented populations, and continually striving to improve the program's appreciation and respect for diversity.

Student enrollment

Given the program's admissions policies, the enrollment patterns within the College's existing applied baccalaureate programs and the robust enrollments within the College's current computer science courses, it is anticipated that this computer science program will enroll approximately 240

FTE students and graduate 60 students per year by AY 2020-21. (See Appendix III for evidence of robust enrollment data at BC and elsewhere)

Table XII below depicts enrollment projections for the program.

Table XII: Computer Science Program Enrollment Projections			
Year	Headcount	FTES	Graduates
2016-17	30	30	0
2017-18	75	75	0
2018-19	165	165	15
2019-20	210	210	30
2020-21	240	240	60
2021-22	240	240	60

Recruitment and Facilitation of Articulation Requirements

Bellevue College plans to work closely with other community colleges to distribute program information and entrance requirements widely. Building relationships with potential feeder programs will provide ample opportunity for students to make-up prerequisite courses not taken as part of their particular associate degree. In addition, program information will be shared broadly through statewide instructional, student services and workforce networks.

Appropriate student services plan

As a community college, BC offers a variety of student-focused support services that help students achieve success and accomplish their goals. Students in the computer science program will be supported by the same high-quality student services that all students receive. BC understands, however, that the demands of a four-year Bachelor of Science degree, especially one in a field as arduous as computer science, will require specialized services that address the distinct needs of these students.

Student Services Specific to Computer Science

The following programs and services undertake as their chief aim the concerns and needs of students pursuing a computer science degree.

Under-prepared Students: Students who are under-prepared to begin a B.S. degree in Computer Science have the opportunity to enroll in the appropriate pre-college Math, English and Science courses that will ready them to become competitive candidates for the program. The great advantage of housing a B.S. degree in Computer Science within the realm of the community college is that the community college, by design and funding, is expressly equipped to the bring under-prepared students “up to speed.”

STEM to Stern: STEM to Stern is a unique program initiated with funding from the National Science Foundation. The program, a concerted effort at retaining Science, Technology, Engineering & Math (STEM) students, is specifically designed for incoming first-year students who are embarking on science, technology, engineering and math (STEM) career paths. The STEM to stern program, a two-year series of credit classes, taken concurrently with a student's regular course load, provides STEM students with the strategies and skills to stay connected, stay on track with challenging math and science courses and stay focused on completing a STEM degree. BC's STEM to stern program has been a highly successful service assisting STEM majors to:

- Develop a network of contacts with STEM professionals and other STEM students
- Develop "STEM Smart" techniques that assist students in math and science classes
- Acquire professional skills that help students compete for internships and jobs
- Compete for Bellevue College NSF - STEM Scholars Network Scholarships
- Conduct research about STEM career opportunities
- Connect students with STEM clubs such as the BC Society for the Advancement of Chicanos and Native American in Science (SACNAS) and the BC Computer Science Club

General Student Services

In addition to those services specific to computer science, BC provides students a myriad of high-touch student services to advance their education. Those services that will be used most frequently by computer science baccalaureate students follow:

Academic Success Center (ASC): The ASC assists students in successfully completing their college courses through one-on-one and group tutoring, workshops, classes and open labs in reading, writing and math.

Computer Labs: BC provides a wide variety of specialized computer and learning labs to enhance learning and student success as well as a 200-computer open lab. Plans for a fully-dedicated Computer Science program lab are currently underway and a facility is expected to be completed before fall quarter 2016.

Credentials Evaluation: Full-time credentials evaluators have extensive experience evaluating transcripts from accredited institutions. They will evaluate incoming students for compliance with admission requirements and student records for all degree requirements when students near graduation. Bellevue College is committed to providing efficient time-to-degree for students, and makes every effort to accept prior learning when appropriate.

Disability Resource Center (DRC): The DRC provides assessment and accommodations for students with documented disabilities. They provide special course materials; coordinate testing for disabled students and assist faculty to provide appropriate accommodation.

Financial Aid: The financial aid office prepares and disburses federal, state, and institutional aid for all BC students. Students can monitor the process of their application online.

Job Placement: Providing help with career advancement and job placement will be priorities for the new B.S degree. An effective advisory board comprised of STEM management professionals will help to identify jobs. Through the internship and/or capstone courses, students will develop potential job contacts. The Center for Career Connections has been successful in helping students find jobs by providing career planning and job placement assistance and conducting career fairs. The Center for Career Connections, Program Chair, and STEM Advisory Committee will work closely to develop and nurture internship and job placements.

Multicultural Student Services (MCS): MCS offers advising and mentoring, tutoring, emergency financial assistance, and support for the college's multicultural student population.

Online Services: All students have online access to the bookstore, records and grades, registration, advising, faculty communication, and library services. As an example of integrated services, the library has added extensive online collections and resources. Library faculty have also developed upper-division research workshops for students in baccalaureate programs. The distance education office provides extensive technology assistance and student services for all online students.

Veteran's Administration Programs: The Veterans Affairs Office assists all eligible veterans, reservists, dependents, and VA chapter 31 students.

Electronic Online Services: To provide convenient access to all students, Bellevue College has numerous services available electronically, including: online registration each quarter; online tutoring; 24/7 access to librarians through "ask a librarian"; extensive research databases suitable for baccalaureate-level research; KHAN academy links; and degree audit and transcript request.

Evening/Weekend Services: For face-to-face connection with all students, many services have evening and/or weekend hours, including: the academic success center, the math lab, the writing lab, the science study center; counseling center; disability resource center's extended testing hours; financial aid; and the library.

Fully Dedicated, Baccalaureate Student Services

Bellevue College implemented its first applied baccalaureate degree in 2007, a second program in 2009 and a third in 2012. Another two new programs started in fall 2013. A sixth program came on board in winter 2015, and the seventh and eighth began in fall 2015. The College's ninth and tenth programs will embark this coming fall 2016. As more programs have been added, the College has continuously assessed its model of administration. This assessment has led the College to implement the following policies, procedures and services specific to baccalaureate programs, all of which will apply to the Computer Science program as well.

1. Each baccalaureate program provides faculty release time to enable a full-time faculty member to act as chair of the program. Program chair responsibilities comprise teaching an average of

two baccalaureate courses per quarter, managing the program, and working with the program's advisory committee. Specific administrative responsibilities include:

- curriculum development, revision, and implementation;
- advising of students;
- marketing the program to new students;
- conducting articulation with both two-year and graduate programs;
- initiating employer outreach;
- participating in college governance; and
- engaging in ongoing program assessment to maintain the program's currency

2. The college hires individual full-time, exempt program managers for each baccalaureate degree program. The Program Manager, a single point of contact for baccalaureate students, not only provides admissions, advising and administrative support for the program, but also works one-on-one with students to assist them with their educational planning and progress towards degree completion. Program managers are available for face to face appointments, or can work through email. In addition, in regular consultation with the program chair, the program manager will also:

    - provide information about the program to prospective applicants;
    - monitor student progress
    - guide students to other available student services to aid in their success
    - assist students with advising or course issues

    BC has found this program manager model highly effective in contributing to student retention and success. What's more, students throughout the various baccalaureate programs have indicated that they appreciate having a specific person to call upon for assistance.

3. Since retention and student success are the college's top priority, each student will have an individual schedule and advising plans. Students can use internet advising services and degree planning worksheets to access their information. The online degree planning tool helps faculty advisors and students evaluate, monitor and track the student's progress toward completion of a degree.

4. All self-support baccalaureate programs return a portion of the tuition paid to the college to provide program support to baccalaureate students. This policy has enabled additional FTE staff to be added in enrollment services to provide transcript evaluation for incoming applied-baccalaureate students. Similarly, the college also added a full-time librarian, dedicated

specifically to the bachelor's degree programs. These hires have provided effective and important institutional touch points for baccalaureate students. [6]

5. BC has hired a new Director of Applied Baccalaureate Development who, in addition to program development duties, has been tasked with improving student support services and program evaluation and assessment. This director is central to the efforts of hiring additional admission, evaluation, financial aid and library resources for baccalaureate programs

Commitment to build and sustain a high quality program

The B.S. degree in Computer Science program has been funded during the academic year 2015-16 with a $750,000 "start-up" budget proviso issued by the Legislature of the State of Washington. Beginning in the academic year 2016-17, the program will be run as a self-support program. Tuition for lower division courses, those 299 and below, will be set 102.75 per credit for resident students and 279.26 for non-resident students. Both resident and non-resident students receive a tuition discount after 10 units. Residents attending full-time, 15 credits, pay $1282.00 per quarter. Non-residents pay $3083.00 per quarter. Students taking upper division courses will pay at the self-support baccalaureate rate of 199.27 per credit. No discount occurs after 10 credits at the upper division course level. Full time tuition at the upper division is $2989 per quarter. See appendix IV for a table of applicable tuition rates.

The faculty are committed to develop and improve the skills of the graduates of this program in critical thinking, objective reasoning, adaptability, compassion, confidence, and respect. Faculty recognized that a variety of delivery methods must be utilized within the program to help the student develop into lifelong learners. Funds are established and earmarked to support curriculum development and updates.

Indirect funding has been included in the budget to cover the annual expenses associated with these expenses. Indirect is calculated at 8% in year zero and one, 12% in year two, 15% in years three and 20% in years four and five, growing as the program grows. These amounts may be adjusted should the amount collected be inadequate or be in excess of expenses incurred in marketing, enrollment services, library support and services, or finance. Bellevue College is committed to the long-term success of the new degree and will set aside funds to launch and fund the program until it collects adequate tuition to be fully self-sufficient.

Estimated program expenses and income are detailed in Table XIII, below. The table shows projections for enrollments, course sections, personnel, facilities, hardware, software, professional

[6] During the AY 2016-17, BC anticipates adding new FTE positions in Evaluations and Financial Aid, fully dedicated to managing Baccalaureate students. In conjunction with Student Affairs and the Office of Instruction, BC's Finance Office has been tasked with appraising the cost and benefits of hiring these positions during the upcoming budget cycle.

development, other direct costs and indirect costs. Also shown are funding and anticipated revenues. (Please see appendix VI for updated budgets)

Table: XIII Bellevue College BS CS Budget	*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Course Level*
STUDENTS		***2016***	***2017***	***2018***	***2019***	***2020***	
First Year		15	30	60	60	60	LOWER
Second Year		15	30	60	60	60	LOWER
Third Year			15	30	60	60	UPPER
Fourth Year				15	30	60	UPPER
Total Student FTE		30	75	165	210	240	
CS Section Count		3	12	23	31	33	
CS BS Full-Time Faculty Count		1	2	3	3	3	
CS Adjunct Section Count		-	-	-	7	9	
	Year 0	***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 4***	***Total***
Senior Personnel:							
Program Manager	20,415	56,650	57,500	57,500	57,500	57,500	307,065
Full-time faculty	17,185	68,738	139,411	213,084	221,957	221,957	882,332
Part-Time Sections		-	-	-	29,603	38,061	67,664
Stipends/ curriculum dev	17,600	20,000	20,000	20,000	-	-	77,600
Lab Tech 3 (Range 48) / YR3-4 2 lab tech.		52,085	52,866	105,732	105,732	105,732	422,147
Career Specialist. 0.5		21,630	21,954	21,954	21,954	21,954	109,446
Total Salaries and wages	**55,200**	**219,103**	**291,731**	**418,270**	**436,746**	**445,204**	**1,866,254**
Fringe Benefits:							
Program Manager	8,350	22,286	22,456	22,456	22,456	22,456	120,460
Full-time faculty	6,176	24,704	38,838	53,573	55,347	55,347	233,985
Part-Time Faculty		0	0	0	11,841	15,224	27,066
Stipends	1,670	6,000	6,000	6,000	-	-	19,670
Lab/Navigator		21,373	21,529	32,102	32,102	32,102	139,209
Office Asst.5		9,804	9,869	9,869	9,869	9,869	49,279
Total Benefits	**16,196**	**84,167**	**98,692**	**124,000**	**131,616**	**134,999**	**589,670**
** includes Health Insurance, Retirement, OASI, Med Aid/Ind Ins, and Unemployment*							
Total Salaries, Wages and Fringe Benefits	**71,396**	**303,270**	**390,423**	**542,270**	**568,362**	**580,203**	**2,455,924**
Equipment							
LAB Server/software	200,000	10,000	25,000	30,000	30,000	30,000	325,000

Remodel/ Furniture 2 classrooms	120,000	0	0	30,000	30,000	0	180,000
Total Equipment:	**300,000**	**10,000**	**25,000**	**60,000**	**60,000**	**30,000**	**505,000**
Travel:							
Conference		3,000	6,000	9,000	9,000	9,000	36,000
				-	-	-	-
E. Total Travel:	**-**	**3,000**	**6,000**	**9,000**	**9,000**	**9,000**	**36,000**
G. Other Direct Costs:							
Materials & Supplies	50,000	5,000	5,000	5,000	5,000	5,000	75,000
Workspace, computers, setup	100,000	2,000	2,000	2,000	2,000	2,000	110,000
Marketing	5,000	20,000	20,000	5,000	5,000	5,000	60,000
Professional Development faculty		1,150	2,300	3,450	3,450	3,450	13,800
Library subscriptions/resources	11,500	12,000	12,500	13,000	13,500	14,000	76,500
Accreditation Substantive Costs	6,000			-	-	-	6,000
Total Other Direct Costs	**172,500**	**40,150**	**41,800**	**28,450**	**28,950**	**29,450**	**341,300**
H. Total Direct Costs (A through G):	**563,896**	**356,420**	**463,073**	**591,570**	**666,312**	**648,653**	**3,338,224**
I. Indirect Costs:	**43,512**	**28,514**	**55,587**	**95,958**	**133,262**	**129,731**	**488,163**
J. Total Direct and indirect costs:	**609,008**	**384,933**	**518,810**	**735,678**	**799,574**	**778,384**	**3,826,87**
State Support/Self Support							
Tuition - lower division 15 credits/State Support rate		96,150	211,530	442,290	499,980	538,440	1,788,390
Tuition - upper division 15 credits/Self-Support rate		52,740	210,960	527,400	843,840	1,054,800	2,689,740
TOTAL Funding/Tuition	**750,000**	**148,890**	**422,490**	**969,690**	**1,343,820**	**1,593,240**	**4,478,130**
TOTAL COST LESS FUNDING/TUITION	**162,592**	**(236,043)**	**(96,320)**	**234,012**	**544,246**	**814,856**	**651,743**

Accreditation

Northwest Commission for Colleges and Universities (NWCCU)

In 2009, Bellevue College was granted general accreditation by the Northwest Commission of Colleges and Universities (NWCCU) to offer baccalaureate degrees. Subsequent to the NWCCU's decision, the college has received accreditation for ten individual bachelor's degree programs: a BAS in Data Analytics, a BAS in Healthcare Technology and Management, a BAA in Interior Design, a BAS in Information Systems and Technology, a BS in Nursing, a BAS in Radiation and Imaging Sciences, a BAS degree in Applied Accounting, a BAS in Molecular Biosciences, a BAS in Healthcare Management and Leadership and a BAS in Health Promotion Management. Baccalaureate degrees play an important role in Bellevue College's commitment to provide high quality, flexible, accessible education programs and to strengthen the economic life of its diverse community. As it did with its current slate of BAS degrees, the college will seek accreditation by the NWCCU for this Computer Science B.S. degree.

Accreditation Board for Engineering and Technology (ABET)

In addition to NWCCU accreditation, Bellevue College will seek accreditation from the Accreditation Board for Engineering and Technology (ABET). ABET accreditation evaluation is an 18 month, five step process. The process "is the culmination of a practice of ongoing self-assessment and continuous improvement, which assures confidence that ABET-accredited programs are meeting the needs of their student, preparing graduates to enter their careers, and responsive to the needs of their professions and the world."[7] The five steps are as follows:

- Readiness Review
- Request Evaluation
- Self-Study Report
- On-Site Visit
- Due Process

A program seeking accreditation begins the accreditation process after the program graduates its first class of students. Bellevue anticipates that the B.S. degree in Computer Science will graduate its first class in the spring of 2019. Completion of this B.S. degree proposal, approval by the SBCTC and accreditation by the NWCCU, coupled with early self-assessment studies will position the Computer Science degree to embark on the ABET accreditation process immediately following graduation of its first class of students.

[7] ABET Accreditation: http://www.abet.org/accreditation/get-accredited-2/

Pathway options beyond baccalaureate degree

Graduates of the B.S. degree in Computer Science who are interested in continuing their education will be well prepared to move forward into graduate school.

While all BS graduates can apply to any Master's degree program, Bellevue Colleges has had direct contact with four graduate programs that have indicated graduates of the Computer Science B.S. program will be eligible to apply for admission to their programs. These programs are:

- University of Washington, Bothell Computer Science
- Northeastern University: Master of Computer Science
- Seattle University, Master of Science in Computer Science
- Seattle University, Master of Science in Software Engineering (In addition to a B.S. degree, applicants must have two years of work experience to apply for this program)

Expert Evaluation of Program

Bellevue College received external reviews from two higher education subject matter experts in in the field of Computer Science and Software Systems. Their complete comments are included in the appendix V. The reviewers were:

Eric Larson, Ph.D.
Associate Professor
Computer Science and Software Engineering
Seattle University
Email: elarson@seattleu.edu
Phone: 206 296-5513

William Erdly, Ph.D.
Associate Professor
Computing and Software Systems
University of Washington, Bothell
Office: UWBB-245
Email: erdlyww@uw.edu

While expert review of the Computer Science program was highly favorable, the computer science development team made some specific adjustments based on the recommendations of the expert reviewers. The specific adjustments were as follows:

- Appendix III was added to the Proposal to clarify the enrollment projections. Appendix III shows enrollments for High School Dual credit, Computer Science course enrollments at Bellevue College and other Washington CTCs and BC's enrollments in AS-T track 2 programs. These various enrollments provide rationale for BC's enrollment projections.
- The CS 120 and 121 course series was revised. BC anticipated Expert insight on these courses and began revision prior to receiving feedback. Nevertheless, expert feedback

confirmed our changes. These courses are now CS 196: Special Topics in Computer Science – CS 210 Enrichment and CS 211 Enrichment. The college revised the course descriptions and visibly placed these courses in the core curriculum and the sample four-year progression table.

- A fourth graduate pathway was added to the Proposal. Seattle University's Master of Science in Software Engineering was recommended. As with all applicants to this program, students must acquire two years of applicable work experience after earning their B.S. degree to be eligible for the program.
- Faculty are reviewing learning outcomes for CS 351, 360 & 401. Adding subject matter on multi-core processors and parallel algorithms is likely.
- Faculty will undertake a review of a 5 year completion plan that will incorporate bridge math courses and a slower paced sequence of courses.
- The Program is adopting a stronger cohort model based on the revised CS 196 series (see above) and the implementation of the STEM to stern program. The 196 series and the STEM to stern program will serve as the cornerstone of this cohort model.
- Program faculty agree that more cutting-edge courses in software develop are needed, but think it wise to adopt such courses when additional faculty with specific expertise can be hired. The Proposal describes the intended hiring schedule for this additional faculty.
- BC has decided to continue to use the STEM advisory committee for the computer science program, but agrees that specific computer science expertise should added to this group. Discussions with the chairs of this committee have already occurred and a search for additional computer science members will be a priority.
- BC acknowledges the intense workload to identify and manage company sponsored projects as part of a full-year capstone course series. The budget includes allocation for a fully-dedicated manager who will work closely with BC's office of Career Connections to administer these projects. Both this manager and the office of Career Connections will be charged with conducting a contract/liability assessment to make roles and obligations clear.

Appendix I

CS 196: Special Topics in Computer Science: CS 210 Enrichment - (1 credit)

Outcomes :

- Special topics course outcomes will vary

CS 196: Special Topics in Computer Science: CS 211 Enrichment - (1 credit)

Outcomes :

- Special topics course outcomes will vary

CS 210: Fundamentals of Computer Science: – 5 credits

Introduces computer science and programming for CS majors. Students learn design and implementation of algorithms and programming in a structured, modular language, with emphasis on problem solving, program design, and style. Prerequisite: MATH&141 (or higher), or placement by assessment in MATH&142 or above, or entry code.

Outcomes:

- Solve computer programming problems using current industry standards in software engineering; editing, compiling, and executing code; which is structured in maintainable style with programmer comments (documentation).
- Define the concepts of data types, specifically the use of primitive data versus object, accessing and creating methods, their parameters passed, and returned.
- Use procedural decomposition to construct programming solutions using decision controls (if, else), repetitions (for, do while), and external file reading (secondary storage).
- Utilize simple data structures such as arrays and classes to solve complex problems, and use an Integrated Development Environment (IDE) to fix potential errors identified with code testing concepts.

CS 211: Fundamentals of Computer Science II: – 5 credits

Continues CS 210, with data structures algorithm analysis and inheritance. Students learn to create collections, lists, binary trees, and sets. Other topics include sets, generic data types, sorting, recursion, run-time complexity, and graphical user interfaces. Prerequisite: CS 210 or entry code.

- Create classes via inheritance, use their objects to demonstrate polymorphism of both interfaces and abstract classes; and explain the role of generic class templates within classes.
- Explain the principles of recursion versus repetition, and write recursive methods for a variety of tasks.

- Implement and contrast the uses of various data structures including arrays, sets, lists, collections, and trees.
- Recognize the use of Big-O notation to explain program performance in searching, sorting, recursion, and implementation of existing methods from a software API (Application Programming Interface).
- Compose programs that facilitate error handling using API standard Exceptions with try-catch blocks.
- Design programs using a Graphical User Interface (GUI) and event driven programming.

CS 300: Data Structures: – 5 credits

Description：

This class introduces the design, analysis and implementation of data structures, as well as fundamental algorithms for manipulating structures and solving problems by programming. Primary topics include trees, linked lists, stacks, queues, graphs, hashing, sorting and searching. Prerequisite: CS 211 or entry code.

Outcomes：

- Describe common applications for linked structures, stacks, queues, trees, and graphs.
- Demonstrate different methods for traversing trees.
- Compare alternative implementations of data structures with respect to performance.
- Design and implement appropriate data structures and algorithms.
- Analyze simple algorithms and discuss tradeoffs among data structures.
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

CS 320: Programing Languages: – 5 credits

Description：

This class introduces syntactic definitions, basic concepts, features, designs and implementation strategies of modern imperative (such as C++ or Java), functional (such as Scheme or ML), scripting (such as Perl, Python, or Ruby), and object-orientated programming languages. Primary topics focus on idiomatic uses of each language and features characteristic for each language such as variables, data types, data abstraction, scoping, parameter disciplines and exception handling. Prerequisite: CS 300 or entry code.

Outcomes：

- Evaluate imperative, functional, logic-based, and object-oriented programming paradigms and languages critically.
- Choose a suitable programming paradigm and language for a given problem or domain.
- Select and apply appropriate expressions and control structure for a given programming task.
- Evaluate different approaches to naming, storage binding, typing, scope, and data types.
- Use attribute grammars to describe the static semantics of small programming languages.
- Analyze and evaluate data and control abstractions of programming languages.
- Analyze design dimensions of subprograms, including parameter passing methods, subprograms as parameters, and overload subprograms.

CS 331: Database Systems: – 5 credits

Description：

This class introduces data management concepts and database systems, as well as database design with an interactive query language such as SQL or XQuery. Primary topics include representing information with relational, network, and hierarchical data models, manipulating data with interactive query language, database system architecture and development, flat tables, database security, integrity and privacy issues. Prerequisite: CS 300 or entry code.

Outcomes：

- Install, configure, and interact with a relationship database management system.
- Apply major components of the relational database model to database design.
- Apply Structured Query Language (SQL) for database manipulation.
- Choose appropriate database modeling techniques for single entity, 1:1, 1:M, and M:M relationships between entity classes and recursive relationships.
- Define, develop and process single entity, 1:1, 1:M, and M:M database tables.
- Discuss ethical computing concepts and practices to database design and implementation.

CS 341: Computer Networks: – 5 credits

Description：

This class introduces the fundamentals of data communications and computer network analysis, design and implementation. Primary topics include computer network architectures, UDP, TCP/IP protocol suite, network programming, data transmission, encoding systems, routing, switching, flow control, network-performance analysis and network security. Prerequisite: CS 300 or entry code.

Outcomes：

- Identify the different types of network devices and their functions within a network.
- Enumerate the layers of UDP, TCP/IP, and explain the function(s) of each layer.
- Apply in-depth study of local area networks and wide area networks in their access mechanisms, routing algorithms and performance evaluation methodologies.
- Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
- Design network protocols through experiments on a Ethernet LAN, network measurements, or through simulation models.
- Discuss deficiencies in existing protocols, and issues surrounding Mobile and Wireless Networks.

CS 351: Computer Architecture I: – 5 credits

Description：

This class introduces different hardware architectures, organizations and operations of various machines. Primary topics include number representation, CPU concepts, hardware/software interaction, hardwired control, microprogramming control, memory hierarchy, I/O organization, assembly language and pipeline. Prerequisite: CS 211 or entry code.

Outcomes：

- Discuss the role of the operating system in interfacing with the computer hardware.
- Evaluate the quantitative performance of computer systems and designs.
- Articulate the cost-performance issues and design trade-offs in designing and constructing a computer processor including memory.
- Use a set of hardware simulators to model a complex processor at the behavioral level.
- Design an interconnection networks and multiprocessors.
- Create an assembly language program to program a microprocessor system.

CS 352: Computer Architecture II: – 5 credits

Description：

This class introduces contemporary design and implementation of modern microprocessor computing systems. Primary topics include computer arithmetic and logic unit, combinational and sequential digital design, interrupts and interconnection hardware, control processors, memory hierarchy design and organization, and I/O system components interconnection. Prerequisite: CS 351 or better or entry code.

Outcomes：

- Demonstrate understanding of different instruction set architectures and their relationships to the CPU design.
- Analyze and evaluate CPU and memory hierarchy performance.
- Apply principles of operation of multiprocessor systems and parallel programming.
- Design and emulate of multiprocessors including cache coherence and synchronization.
- Improve performance through basic code optimization techniques.

- Work in teams to design and implement CPUs.
- Write reports and make presentations of computer architecture projects.

CS 356: Computer Security: – 5 credits

Description：

This class introduces foundations of modern computer security concepts, mechanisms and implementations to ensure data protection and security of computer systems. Primary topics include security principles, memory safety vulnerabilities, basic crypto concepts, web security, network security, access control, and techniques and tools for vulnerability detection and defense. Prerequisite: CS 341 and CS 360 or entry code.

Outcomes：

- Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe internet usage.
- Incorporate approaches to secure networks, firewalls, intrusion detection systems and intrusion acquisition.
- Use appropriate resources to stay abreast of the latest industry tools and techniques analyzing the impact on existing systems and applying to future situation
- Apply concepts of confidentiality, availability and integrity in Information Assurance, including physical, software, devices, policies and people. Analyze these factors in an existing system and design implementations.
- Examine secure software construction practices.
- Perform a basic security planning and risk analysis.

CS 360: Operating Systems: – 5 credits

Description：

This class introduces the design and implementation of modern, process oriented operating systems, as well as systems programming basics. Primary topics include operating system structure, processes, threads, synchronization, memory management, virtual memory, file systems, I/O subsystem and device management. Prerequisite: CS 351 or entry code.

Outcomes：

- Evaluate different process-scheduling algorithms and their performance trade-offs.
- Utilize underlying technologies that make contemporary operating systems work efficiently, and apply them to practical applications.
- Build processes that employ inter-process communication and synchronization mechanisms.
- Design, implement, modify, and analyze complex software systems.
- Discuss operating systems problems that are addressed in different systems.
- Analyze coarse estimations of access time to persistent storage devices.

CS 401: Algorithms: – 5 credits

Description：

This class introduces design, analysis and implementation of efficient computer algorithms. Primary topics include algorithms design techniques, such as divide-conquer, greedy and dynamic programming, searching, sorting, set manipulation, pattern matching, graph algorithms, time and space complexity analyses in the best, worst, and average cases, approximation methods and NP-completeness. Prerequisite: MATH 301 and CS 300 or entry code.

Outcomes：

- Compare major algorithms and data structures.
- Evaluate best, worst, and average cases running times of algorithms.
- Design efficient algorithms and evaluate their performances.
- Analyze the asymptotic performance of algorithms
- Empirically analyze performance algorithms with profiling tools.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering and science design situations.

CS 405: Numerical Methods – 5 credits

Description：

Numerical methods are techniques to approximate mathematical solutions using software. We will cover numerical methods for solving scientific and engineering problems, how to use these methods, and the accuracy of numerical solutions. We will use MATLAB and programming (C or Python) to implement, apply, and test numerical methods.

Prerequisite: CS 401, Algorithms

Outcomes：

- Calculate errors and accuracy, including floating point, round-off, and propagation errors

- Assess the efficiency (compute cycles) of a selected numerical method
- Write and implement numerical methods, including difference equations (derivatives, nonlinear equations), interpolation (linear and cubic), bisection methods, integration methods, lease squares fitting, and regression and correlation
- Compare and assess numerical methods
- Interpret numerical method options based on problem type, accuracy, and efficiency

CS 410: Software Engineering – 5 Credits

Description：

Software engineering provides a repeatable framework to handle requirements, specify, implement, and validate features, find and manage defects, and coordinate multiple shipping versions. Primary topics include history of software development and challenges, software lifecycles and scheduling, architectural design and analysis, design patterns, and data analysis/prediction. Prerequisite: MATH 270 and CS 320 and CS 401 or entry code.

Outcomes：

- Apply knowledge of mathematics, science, and engineering to software problems.
- Gather, analyze, and prioritize software requirements to develop a functional specification.
- Planning and scheduling with various software development processes, including waterfall, prototyping, iterative, and agile.
- Create and analyze architectural design.
- Use design patterns, coding standards, refactoring, and re-use to make team-coding more efficient.
- Validate software and create a test plan, track and prioritize defects.
- Ability to function on multi-disciplinary teams.

CS 411: Software Engineering Project Management – 5 Credits

Description：

This course builds on the concepts of CS 410 to dive deeper into popular development lifecycle, from waterfall to Agile to Kanban. Primary topics include planning, estimation, work tracking, defect tracking and prioritization, and predicting when software will be complete and high enough quality to ship. Prerequisite: CS 410 or entry code.

Outcomes：

- Apply knowledge of mathematics, science, and engineering to software problems.
- Gather, analyze, and prioritize software requirements to develop a functional specification.
- Evaluate different software development processes for different scenarios, with an emphasis on more modern techniques such as Agile and Kanban.

- Validate software and create a test plan, track and prioritize defects, including analysis of historical fix rate to predict bug glide paths.
- Ability to function on multi-disciplinary teams.
- Analyze data to predict when a product will be done, number of bugs, how expensive it will be, when it can ship, etc.
- Justify the use of software engineering techniques, which often have an initial cost, to management and decision makers.

CS 420: Theory of Computation: – 5 credits

Description：

This class introduces foundations of formal language theory, computability, and complexity. Primary topics include formal language grammars, finite state machines, Turing machines, computability theory, decidability, reducibility, NP-completeness and graph theory. Prerequisite: CS 300 and MATH 301 or entry code.

Outcomes：

- Demonstrate advanced knowledge of formal models of computation and its relationship to languages.
- Distinguish different computing languages and classify their respective types
- Design regular expressions, context-free grammars, or push-down automata to generate specified languages.
- Use basic concepts and explain implications of modern complexity theoretic approaches to advanced topics such as randomization, proof complexity, and quantum computing.
- Create proofs for statements regarding formal models of computation.
- Apply NP-completeness concepts to create proofs regarding the computational complexity of novel problems.

CS 455: Cloud Computing – 5 credits

Description：

Learn the economics and architecture of cloud computing, including the core techniques, algorithms, and design of distributed systems. Apply these techniques and build cloud services using Azure or AWS. Apply cloud software engineering principles to design, develop, test, and deploy a Software-as-a-Service (SaaS) application. Prerequisite: CS 320, Programming Languages

Outcomes：

- Understand cloud usage scenarios, consumer-provider relations, and economic benefits

- Examine and assess cloud concepts, including MapReduce, widely-use algorithms, scalability, infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS).
- Understand software engineering and agile principles for Cloud and SaaS pace of release, scale, security, analytics, and longevity.
- Design, develop, test, and deploy a Software-as-a-Service application using Ruby on Rails

CS 460: Machine Learning: – 5 credits

Description：

This class introduces concepts, techniques, and algorithms in machine learning and statistical pattern recognition, as well as applications of machine learning. Primary topics focus on supervised learning and unsupervised learning, including classification, dimensionality reduction, regression and clustering using modern machine learning methods. Prerequisite: CS 300 and MATH 270 or entry code. Recommended: MATH 208

Outcomes：

- Choose appropriate supervised, unsupervised, and semi-supervised learning algorithms
- Design and implement some basic machine learning algorithms.
- Plan and execute successful machine learning and data mining projects
- Utilize a dataset to fit a model to analyze new data
- Build an end-to-end application that uses machine learning at its core.
- Assess the model quality in terms of relevant error metrics for each task
- Combine different types of layers and activation functions to obtain better performance

CS 481: Senior Capstone I: – 3 credits

Description：

This class provides applied and practical experience for computer science students. Students work in teams to research the solution to a large-scale open-ended interdisciplinary computer science related design problem. Emphasis on the problem statement and developing a version 1 product. Students will continue to develop and improve the product in Capstone II and III. Prerequisite: CS 410 (Concurrent enrollment).

Outcomes：

- Integrate skills and knowledge acquired from different courses and experiences.
- Work productively in a team environment communicating appropriately with all team members.

- Develop a precise problem statement, propose a high level design that solves the problem, and organize a written project plan.
- Develop and implement a version 1 product that meets at least some of the customer requirements.
- Evaluate, develop and apply effective methods to manage project milestones and timelines.

CS 482: Senior Capstone II: – 4 credits

Description：

Students continue their work from CS 481 to further develop their project. Emphasis on improving the version 1 product by listening to user/customer feedback, implementing additional features, and fixing bugs. This is part 2 of a 3 quarter series. Prerequisite: CS 481.

Outcomes：

- Integrate skills and knowledge acquired from different courses and experiences.
- Work productively in a team environment communicating appropriately with all team members.
- Review, refine and adjust the project plan, and update the project's progress.
- Develop and implement the design using appropriate techniques and tools.
- Evaluate, develop and apply effective methods to manage project milestones and timelines.
- Validate and analyze results, including successes and areas for future improvement.
- Demonstrate technical competency in completing deliverables.

CS 483: Senior Capstone III: – 3 credits

Description：

Students continue their work from CS 482 to continue developing their project. Emphasis on validation of design, measuring quality and performance and presentation of the results. This is part 3 of a 3 quarter series. Prerequisite: CS 482.

Outcomes：

- Integrate skills and knowledge acquired from different courses and experiences.
- Work productively in a team environment communicating appropriately with all team members.
- Review, refine and adjust the project plan, and update the project's progress.
- Develop a professional report commensurate with the scope and complexity of the work.
- Measure and improve software reliability and performance
- Make oral presentation in a professional format.
- Demonstrate an in-depth and integrated understanding of the complexity of computer science or related discipline to peers, faculty and industry professionals.

CS 485: Computer Science Co-Op / Practicum: – 1-5 credits

Description：
Individual Applied Experience. Students undertake full-time or part-time supervised work experience with an agency, firm, or organization. Students develop a learning plan before the work project begins and submit a final written report. A written performance review by student's industry supervisor will be part of a student's final assessment. Pre-requisite: Approval of Computer Science Chair.

Outcomes：
- Utilize current technologies to solve real-world problems.
- Contribute to individual and/or team projects.
- Demonstrate effective communication with co-workers and supervisors.
- Demonstrate professional and ethical best-practices in the workplace.
- Integrate skills and knowledge acquired from different courses and experiences to build professional work experience.
- Evaluate and contrast professional software development with academic experiences.

MATH& 151: Calculus I: – 5 credits

Description:

Introduces the concepts of limits, derivatives, and integrals. Topics include techniques and applications of derivatives of algebraic and transcendental functions. Students begin working with antiderivatives. Either MATH& 151 or MATH& 148 may be taken for credit, not both. Fulfills the quantitative or symbolic reasoning course requirement at BC. Prerequisite: Placement by assessment or MATH& 142 with a C- or better, or Advanced Placement score of 2 or higher on AB or BC exam.

Outcomes:

- Calculate limits of functions using graphs, numerical data, and analytically.
- Define the derivative of a function and explain what that means in graphical and applied contexts.
- Use the general differentiation rules to calculate derivatives of polynomial, rational and common transcendental functions and combinations of those functions.
- Apply the ideas and techniques of derivatives to solve problems of maximum/minimum and rates of change.
- Use derivatives to describe the shapes of graphs of functions.

MATH& 152: Calculus II: – 5 credits

Description:

Continues the study of integration, emphasizing applications and special techniques. Students work with algebraic and transcendental functions. Fulfills the quantitative or symbolic reasoning course requirement at BC. Recommended: MATH& 151.

Outcomes:

- Explain what a definite integral represents both geometrically and formally.
- Model and use the ideas of integration to solve applied problems.
- Apply the Fundamental Theorem of Calculus to evaluate definite integrals.
- Select and apply integration techniques to calculate antiderivatives of functions.
- Model position/velocity/acceleration and exponential growth/decay problems with differential equations and to solve those differential equations.
- Implement numerical methods to approximate the values of definite integrals.

MATH& 153: Calculus III: – 5 credits

Description:

Emphasizes the study of infinite sequences and series including power series. Topics include plane analytic geometry, graphing in polar coordinates, and an introduction to vectors. Fulfills the quantitative or symbolic reasoning course requirement at BC. Recommended: MATH& 152.

Outcomes:

- Calculate and apply derivatives and integrals in the contexts of polar coordinates and parametric equations coordinates.
- Explain the meaning of the convergence and divergence of sequences and series.
- Determine the convergence or divergence of numerical series by applying a variety of convergence tests.
- Determine power series for common functions.
- Apply vector operations in two and three dimensions.

MATH 208: Introduction to Linear Algebra: – 5 credits

Description:

Introduces the vocabulary, algebra, and geometry of vector spaces in "R" and function spaces. Students use matrix methods and vectors to explore systems of linear equations and transformations. Also presents elementary theory of eigenvalues. Fulfills the quantitative or symbolic reasoning course requirement at BC. Recommended: MATH& 153.

Outcomes:

- Use matrix methods to set up, solve, and analyze linear systems for applied and general situations.

- Describe and solve problems using the ideas, properties, and vocabulary of vector spaces (e.g linear combinations, span, subspaces, linear independence, basis and a change of basis, dimension, orthogonality).
- Identify linear transformations using properties of linearity, convert linear transformations to matrix form, compute and analyze eigenvalues, and describe the related transformation spaces (including null space and range).

MATH 270: Probability and Statistical Models: – 5 credits

Description：

This class introduces probability theory and statistical models, inferences and applications. Topics include probability and independence, discrete and continuous random variables, univariate and multivariate distributions, sampling, estimation and model building, confidence intervals, hypothesis testing, regression analysis and more. Focus on real world examples from a variety of sources and using data analysis software such as MATLAB or R. Prerequisite: Math 152 with a C or better or entry code.

Outcomes：

- Model real world problems by an appropriate probability distribution.
- Calculate probabilities using appropriate rules, theorems, diagrams, or software tools.
- Formulate, fit, and apply appropriate statistical models. Assess and improve the fit of these models.
- Choose appropriate calculations for a confidence interval/hypothesis test: do so based on theory and also simulation (bootstrapping).
- Use technological tools such as MATLAB or R to manage and analyze data sets in various sizes and formats.
- Interpret statistical results and clearly state the conclusion in reports and presentations with close .attention to details.

MATH 301: Discrete Mathematics: – 5 credits

Description：

This class introduces basic discrete structures in mathematics, computer science and engineering fields. Topics include elementary logic, set theory, mathematical proof, relations, combinatorics, induction, recursion, sequence and recurrence, trees, graph theory. Prerequisite: Math 153 with a C or better or entry code. Math 208 preferred.

Outcomes：

- Evaluate, interpret, and reduce statements presented in Boolean logic and natural language. Apply truth tables and the rules of propositional and predicate calculus.

- Formulate and solve discrete mathematics problems involving permutations and combinations of a set, recursion, and other fundamental enumeration principles (including recursion).
- Construct proofs throughout the course using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
- Apply (and analyze) algorithms and use definitions to solve problems and prove statements in elementary number theory and graph theory.

Appendix II

BELLEVUE COLLEGE

Associate in Arts and Sciences Direct Transfer

Suggested courses for COMPUTER SCIENCE MAJORS using the AAS-DTA

90 Applicable College Level Quarter credits: Minimum Cumulative GPA 2.0 Required

Important Notes and Conditions

- A course can not be credited toward more than one distribution or skill area.
- The **BOLDED** numbers below are shared (cross listed) courses with other departments. These courses can count only **once** for credit [Example: AMST 160 is the same as POLS 160 and may only count as AMST **or** POLS]. Consult course catalog or meet with an advisor.
- "P" grade not allowed in Written Communication, Quantitative/Symbolic Reasoning, Humanities, Social Sciences, and Natural Sciences. Check with your intended transfer university for minimum grade requirements.
- Universities may have other specific admission requirements in addition to those of the transfer degree.
- Courses listed below are subject to change; visit *www.bellevuecollege.edu/programs/degrees/transfer* for the latest degree updates.

Written Communication: 10 credits

Complete both groups

Group A: English 101

Group B: Choose ***one*** from English 201 (Recommended), 235, 271 ***or*** 272

Quantitative/Symbolic Reasoning: 5 credits (see note #1)

MATH& 151 (Calculus I)

Humanities: 15 credits (see note #2)

Choose three different subjects from the following: Maximum 5 credits can be a performance/skills course (indicated by *)

American Studies 101, 102, **103**, 115, **160**, **180**, 200, **260**, 285, 286, 287, 288
Anthropology 208
Art 101, **103**, 105, 110*, 111*, 112*, 120*, 121*, 150*, 151*, 153*, 154*, 201, 202, 203, 205, 206, 221*, 222*, 225, 240*, 242*, 252*, 253*, 254*, 256*, 260*, 261*, 280*
Communication Studies 101, 115, 119, 120, 121, 131, 132, 133, 134, 136, 138, 141, 143, 144, 145, 146, 151, 161, 163, 201, 202, 210, 216, 220, 240, 241, 254, 256, 260, 261, 280, 285
Cultural & Ethnic Studies 100, 102, **120**, **121**, 140, 152, 210, 255
Dance 130*, 131*, 132*, 133* 140*, 141*, **151***, **152***, 201*, 202*, 203*
Drama 101, 151*, 152*, 153*, 154*, 155*, 161*, 200, 206*, 210, 212, 215*, 224, 251*, 252*, 253*, 254*, 256*, 280*, 281*, 284*, 285*
English 111, 112, 113, 114, 115, 131, 210, 215, 219, 220, 221, 223, 224, 225, 226, 227, 228, 229, 237, 238 239, 241, 244 245, 246, 247, 248, 249, 253, 254, 255, 263, 264, 265, 266, 276, 279
History 101, 102, 103, 110, 115, **120**, 146, 147, 148, 207, 209, 210, 211, 212, 214, 223, **230**, 236, 242, 245, 250, **261**, **280**
Humanities 210, 220, 224, 228, 230
Music 100*, 101*, 102*, 103*, 104*, 105, 106*, 107, 109*, 110, 111, 112, 113, 114, 115, 116, 117, 120*, 126*, 130*, 131*, 135*, 136*, 139*, 140*, 143*, 150, 151, 152, **153**, 156, 157, 200*, 203*, 205*, 206*, 210, 211, 212, 240*, 243*
Philosophy 101, 102, 112, 115, 122, 125, 160, **201**, **225**, 234, 235, 236, 237, 247, **248**, **260**, 265, 267

Only one single language for a maximum of 5 credits allowed in Humanities.

Arabic 121, 122, 123
American Sign Language 121, 122, 123, 221, 222, 223
Chinese 121, 122, 123, 221, 222, 223
French 121, 122, 123, 131, 132, 133, 221, 222, 223, 231, 232, 233
German 121, 122, 123, 221, 222, 223
Italian 121, 122, 123
Japanese 121, 122, 123, 221, 222, 223
Spanish 121, 122, 123, 221, 222, 223

Social Sciences: 15 credits

Choose three different subjects from the following:

American Studies 101, 102, **103**, 115, **160**, **180**, 200, **260**, 285, 286, 287, 288
Anthropology 100, 105, 106, 108, **180**, 204, 206, 208, 209, 210, 211, 212, 220, 222, 232, **234**, 235, 236
Business 101
Communication Studies 102, 230
Cultural & Ethnic Studies 100, 102, **105**, 109, **120**, **121**, 130, 140, 152, 200, 210, **241**, 255
Economics 100, 201, 202, **260**
Geography 100, 102, **105**, 200, 207, 250, 258, 277
History 101, 102, 103, 110, 115, **120**, 146, 147, 148, 207, 209, 210, 211, 212, 214, 223, **230**, 236, 242, 245, 250, **261**, **280**
Humanities 210, 220, 224, 228, 230
International Studies **105**, 150, 200, 201, 202, **204**, 227, 230, **234**, **261**, **280**
Philosophy 102, 112, 122, 160, **201**, **248**, **260**, 265
Political Science 101, 121, 122, 123, 125, 155, **160**, 175, **201**, 202, 203, 204, 220, 227, **230**
Psychology 100, 109, 110, 200, 203, 205, 209, 210, 220, **240**, 250, 257
Sociology 101, **105**, **120**, **121**, 122, 150, 201, 205, 210, 215, 220, 225, 230, **240**, 246, 248, 250, 252, 253, 254, 255, 256, 257, 258, 260, 262, 264, 265, 268, 270, 275

Natural Sciences: 15-16 credits

Choose three different subjects: One course with a lab component required (indicated by "L")

Complete All Groups (For Computer Science: One from each) (see note #3)

Group A: MATH& 152 (Calculus II)

Group B: PHYS 121 (Calculus-based physics; required by many CS programs)

Group C: Anthropology 205
Astronomy **100**, **101**(L), 201(L)
Biology 100(L), 108(L), 125, 150(L), 160(L), 162(L), 211(L), 212(L), 213(L), 241(L), 242(L), 260(L), 275 (L)
Botany 110(L), 113(L), 120(L)
Chemistry **100**, **105**(L), 121(L), 131(L), 161(L), 162(L), 163(L), 261(L) 262(L), 263(L)
Environmental Science 100, 207(L), 250(L)
Geography **106**, 205, 206(L)
Geology 101(L), 103(L), **106**, 208(L)
Meteorology 101, 211
Nutrition **130**
Oceanography 101(L), 110
Psychology 202

Electives: Additional courses for intended major: 30-32 credits

Courses should be planned with the computer science advisor as course requirements vary by specific university Computer Science or Computer Software Systems programs. Complete sufficient credits to meet the degree total. (see notes #4 and #5)

Computer Science 210 ***and*** 211 (fundamentals of CS I and II)

The following additional courses should be planned with the computer science advisor:

Physics 122 ***and*** 123
Mathematics 153 (calculus III), and ***either*** 254 ***or*** 208 ***or***
Business Administration 240 (Statistics)

Specific University Requirements†

Students are responsible for checking specific major requirements of the participating college or university early in their planning to be advised for additional requirements (e.g., GPA) and admissions procedures. *Lower-division requirements for participating colleges and universities' computer science programs may vary.*

1. Calculus I [Math& 151 at BC] is required for computer science as well as all science and engineering tracks.
2. Students will be required to choose courses that meet the BC General Education guidelines set by the college as set forth in the AAS-DTA degree.
3. A full year science lab (PHYS 121/122/123, CHEM& 161/162/163, or BIOL& 210/211/212) is required by most CS programs, although UW and SU require only PHYS 121. The science sequences should be completed at one institution.
4. Many CS programs require a full year engineering calculus requirement. UW Seattle also requires Math 254. WWU and EWU also require Math 208. UW-Bothell only requires through Math& 152, but adds on BA 240. UW-Tacoma only requires Math& 151, but adds on BA 240. Consult an advisor from the institution to which you wish to transfer.
5. UW-Seattle requires both CS 210/211 from the same institution to transfer as CSE 142/143.
6. All UW Programs have a Foreign Language entry requirement; two years of High School or two quarters in college of a single language. Some institutions, where CS is within the College of Arts and Sciences, require particular language proficiency for graduation.

Cultural Diversity

This degree has a set of BC General Education requirements including Cultural Diversity. For approved courses see page two of worksheet or visit *www.bellevuecollege.edu/programs/degrees/culturaldiversity/.*

**DTA = Direct Transfer Agreement*

AAS_DTA_for_CS PS 1-11

BELLEVUE COLLEGE

Associate in Arts and Sciences Direct Transfer

Suggested courses for COMPUTER SCIENCE MAJORS using the AAS-DTA

Advising Notes and Recommendations

- ✓/ Completion of this degree does not guarantee admission to any baccalaureate university. However, with careful planning and depending on your intended major, it may be possible to fulfill admissions and major program requirements with this degree.
- ✓/ This is a guideline to meet the degree requirements for students interested in transferring to a participating Washington State four-year college or university.
- ✓/ This worksheet is only for advising purposes. Official approval of credits for degree completion is subject to the Evaluations Office approval.
- ✓/ Consult with an academic advisor on a regular basis for degree completion planning. Contact the Advising Center to locate an academic advisor. Call (425) 564-2212 or go to *www.bellevuecollege.edu/advising/*.
- ✓/ Check with your intended transfer university/college advisor for specific admissions and major requirements that can be fulfilled with this degree.

Degree Requirements

- ✓/ Must earn a cumulative GPA of 2.00 in all coursework taken at BC, and in all courses applied to the degree.
- ✓/ A minimum 30 credits of the applied 90 must be completed at BC.

Prior College University Credits

- ✓/ For credits from other institutions, meet with a faculty advisor, curriculum advisor or counselor for an initial unofficial transcript review.
- ✓/ For an official review, submit Transfer Credit Evaluation Request form and an official transcript(s) in the prior institution(s) sealed envelope to Evaluations once registered for your first quarter.

Graduation Application Requirements

- ✓/ Students must apply for graduation. Submit your graduation application form two quarters prior to the expected graduation date and pay application fee.
- ✓/ **Application deadlines:**

  Fall: June 1
  Winter: October 10
  Spring: December 10
  Summer: March 15

Student Name: _____ SID#: _____

Prepared by: _____ Date: _____

Degree Requirements	Credit	Qtr/Yr	Grade	Transfer From *(If applicable)*
Written Communication: 10 credits				
Group A: ENGL& 101				
Group B: ENGL 201				
Intermediate Algebra Proficiency: Check box if fulfilled: ☐				
Provide method of fulfilling requirement:				
Quantitative/Symbolic Reasoning: 5 credits *(see note #1)*				
MATH& 151				
Humanities: 15 credits *(three different subjects, see note #2)*				
Social Sciences: 15 credits *(three different subjects)*				
Natural Sciences: 15-16 credits *(three different subjects, see note #3)*				
Lab: PHYS 121				
MATH& 152				
Electives: 30-32 *(additional courses should be planned with the computer science advisor, see notes #4 and #5)*				
CS 210				
CS 211				
MATH& 153†				
PHYS 122†				
PHYS 123†				
MATH 254 *or* 208†				
BA 240†				
Cultural Diversity: Check box if fulfilled: ☐ *(place course in one of the above distribution areas)*				
CREDIT TOTAL: 90				

†*See notes on reverse side.*

BC General Education & Cultural Diversity

The courses below meet the Cultural Diversity and can be used towards a distribution. Go to: *bellevuecollege.edu/catalog/degrees/gened/*

Group I: Choose ***one*** from the following:

American Studies **180**, 200; Anthropology 100, 106, **180**, 208, 206, 210, 220; Art **103**; Communication Studies 134, 280 Ethnic & Cultural Studies 100, 102, **105**, 109, 110, 111, 112, **120**, **121**, 130, 140, 152, 200, 207, 210, **241**; French 131, 132, 133, 231, 232, 233; Geography 200, 277; Philosophy 145; Psychology 250; Sociology 101, **120**, 121, 122, 201, 205, 210, 215, 230, 248, 253, 254, 257, 260, 262, 264, 268, 275

OR

Group II: Choose ***two*** from the following:

American Sign Language 121, 122, 123, 221, 222, 223; Anthropology **234**, 236; Arabic 121, 122, 123; Art 101; Chinese 121, 122, 123, 221, 222, 223; Communication Studies 115, 210, 285; Criminal Justice 101, 106, 109; Education 204; Ethnic & Cultural Studies 255; French 121, 122, 123, 221, 222, 223; Geography 100, 102, **105**, 207, 250; German 121, 122, 123, 221, 222, 223; History 101, 102, 103, 110, 115, **120**, 146, 147, 148, 212, 214, **230**, 242, 245, **261**, **280**; International Studies **203**, 227; Italian 121, 122, 123; Japanese 121, 122, 123, 221, 222, 223; Music 115, 116, 117; Nutrition 130; Philosophy **225**, 267; Political Sciences 121, 122, 123, 125, 175, 204, 227, **230**; Psychology 100, 257; Sociology 150, **240**, 246, 250, 252, 255, 256, 258, 265; Spanish 108, 121, 122, 123, 221, 222, 223

Appendix III

Table I shows FTE and Headcount enrollments for the Bellevue College's Running Start, College in the High School and Tech Prep programs, illustrating a substantial potential duel credit applicant pool. Tables II and III present potential transfer students from Bellevue College alone. Table II isolates this potential transfer population by degree completions in Bellevue College's AS-Transfer Track 2 engineering programs. Table III illustrates this potential transfer students by course enrollments within critical engineering and computer science programming courses. One observes in both sets of data a robust set of students from which to draw enrollments and built strong, self-sustaining program. Finally, Table IV offers data on potential transfer students from Community and Technical colleges other than Bellevue.

Table I

Bellevue College - (Recent historical data for Bellevue College's High School Programs[1])

Academic Year	Running Start		College in the High School		Tech/Prep	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
AY 2009-10	927	1,319	92	619	228	1,946
AY 2010-11	1,009	1,468	99	652	385	3,297
AY 2011-12	1099	1,573	101	633	121	841
AY 2012-13	1,138	1,592	132	889	128	916
AY 2013-14	1,252	1,740	149	986	158	1047
AY 2014-15*	1475	1759	7	60	N/A	N/A

Added information in yellow.

Notes: Tech Prep is transcripted only in the summer quarter proceeding the school districts' ending school year. Also only SBCTC Transcript data sets for summer quarter were used to complete this section.

*Running Start and College in the High School information for AY 2014 -15 include summer and fall quarters only. FTEs are adjusted accordingly. Tech Prep AY2014-15 information will not be available until AY 2015-16.

Source: SBCTC Annual Reports 2009-10 to 2013-14; SBCTC data warehouse: tables STUDENT, STU_CLASS, CLASS, TRANSCRIPTS from 2014-15.

[1] State Board for Community and Technical Colleges Website, compiled from annual reports , 2009-10, 2010-11, 2011-12, 2013-13. http://sbctc.edu/college/d_acad.aspx Data on FTE for Tech Prep programs compiled from: Bellevue College……

Table II

Timeframe: Academic years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15*.
*Information for academic year 2014-15 includes complete quarters of summer, fall and winter.
The current quarter (spring) information is incomplete since the quarter ends in June 2015.

Program Completions:

Number of Degrees and students

	Academic Year					
Degree Title	2014-15*	2013-14	2012-13	2011-12	2010-2011	Total
AS-Transfer Track 2	35	61	56	47	39	238
AS-T BIO E/CHEM E MRP	3	8	2	2	7	22
AS-T COMP E EE/MRP	6	4	5	7	5	27
AS-T OTHER ENGINEERING MRP	7	22	18	20	17	84
Total	51	95	81	76	68	371

Number of Students which earned a degree:

	Academic Year					
	2014-15*	2013-14	2012-13	2011-12	2010-2011	Total
Selected programs	51	95	81	75	68	370

unduplicated headcount

Table III - (Bellevue Students who have completed course work in critical courses with a grade of 2.0 or higher)

Possible Feeder Courses to BS in Computer Science with enrollments for students who earned a grade of 2.0 or better by Academic Year.

		Academic Year					
	Course ID	2014-15*	2013-14	2012-13	2011-12	2010-2011	Total
CS 200 level	CS 210	362	396	336	327	335	1756
	CS 211	191	216	193	172	120	892
	CS 212		23	17			40
	CS 250	12	18	22	26	95	173
	CS 299				1		1
ENGR& 200 level	ENGR&204		37	22	21	11	91
	ENGR&214	72	90	103	85	72	422
	ENGR&215	30	59	61	48	39	237
	ENGR&224		14	16	22	18	70
	ENGR&225	52	59	69	50	45	275
	Total	719	912	839	752	735	3957

Notes:
Unable to accurately determine number of students with program of study codes for AS track 2, chemical & bio-engineering, mechanical & other engineering, and electrical & computer engineering programs. Generally this information is placed on the student after evaluation for degree has been completed, not during enrollments.

Table IV

NUMBER OF CS PROGRAM COMPLETIONS/CREDENTIALS BY ACADEMIC YEAR, INSTITUTION (NOT HEADCOUNT)

CIP_TITLE	(All)				
		Academic Year			
CREDENTIAL	Institution	2012-13	2011-12	2010-11	Total
ASSOCIATE IN APPLIED SCIENCE - T - AAS-T	Bates Technical College	6	5	2	13
	Bellevue College	4			4
	Bellingham Technical College	6	2		8
	Clover Park Technical College	4	6	4	14
	Everett Community College	5	5	6	16
	Green River College	2	5	4	11
	Lake Washington Institute of Technology	1	1	1	3
	Olympic College	5			5
	Peninsula College	11	13	8	32
	Seattle Central College	13	16	9	38
	South Puget Sound Community College	2			2
	South Seattle College	1	8	5	14
ASSOCIATE IN APPLIED SCIENCE - T - AAS-T TOTAL		60	61	39	160
WORKFORCE DEGREE OTHER THAN THE AAS-T	Bates Technical College	14	6	9	29
	Bellevue College	51	69	65	185
	Bellingham Technical College	17	29	9	55
	Big Bend Community College			3	3
	Centralia College	12	9	7	28
	Clark College	17	18	8	43
	Clover Park Technical College	20	20	9	49
	Columbia Basin College	49	35	25	109
	Edmonds Community College	63	51	66	180
	Everett Community College	21	16	5	42
	Green River College	5	2	8	15
	Highline College	26	18	3	47
	Lake Washington Institute of Technology	66	74	80	220
	Lower Columbia College	5	9	5	19
	North Seattle College	9	8	3	20
	Olympic College	10	21	3	34
	Peninsula College	9	12	5	27
	Pierce / Fort Steilacoom	11	8	8	27
	Renton Technical College	36	50	39	125
	Shoreline Community College	13	5	18	36

	Skagit Valley College	17	22	17	56
	South Puget Sound Community College	46	42	32	120
	South Seattle College	12	14	4	30
	Spokane Community College	16	6	6	28
	Spokane Falls Community College	1	7	12	20
	Tacoma Community College	27	16	23	66
	Walla Walla Community College	6	3	3	12
WORKFORCE DEGREE OTHER THAN THE AAS-T TOTAL		579	570	610	1759[2]

[2] Table VI represents CIP codes completions in computer science, information technology, informatics, computer programming, information processing, information sciences, computer systems analysis, Microcomputer applications, digital media, computer graphics, computer systems network and telecom as well as some data entry and word-processing.

Appendix IV

Tuition 2015-2016

Lower Division Courses (299 & below)			**Upper Division Courses (300 & above)**		
Credits	**Resident**	**Non-Resident**	**Resident / Non-Resident (Self-Support)***	**Resident (State-Support)***	**Non-Resident**
1	$102.75	$279.26	$234.43	$234.43	$598.84
2	$205.50	$558.52	$468.86	$468.86	$1,197.68
3	$308.25	$837.78	$703.29	$703.29	$1796.52
4	$411.00	$1117.04	$937.72	$937.72	$2395.36
5	$513.75	$1396.30	$1172.15	$1172.15	$2994.20
6	$616.50	$1675.56	$1406.58	$1406.58	$3593.04
7	$719.25	$1954.82	$1641.01	$1641.01	$4191.88
8	$822.00	$2234.08	$1875.44	$1875.44	$4790.72
9	$924.75	$2513.34	$2109.87	$2109.87	$5389.56
10	$1027.50	$2792.60	$2344.30	$2344.30	$5988.40
11	$1078.40	$2850.68	$2578.73	$2354.25	$5999.05
12	$1129.30	$2908.76	$2813.16	$2364.20	$6009.70
13	$1180.20	$2966.84	$3047.59	$2374.15	$6020.35
14	$1231.10	$3024.92	$3282.02	$2384.10	$6031.00
15	$1282.00	$3083.00	$3516.45	$2394.05	$6041.65
16	$1332.90	$3141.08	$3750.88	$2404.00	$6052.30
17	$1383.80	$3199.16	$3985.31	$2413.95	$6062.95
18	$1434.70	$3257.24	$4219.74	$2423.90	$6073.60
19 & over	Residents pay $1,434.70 for 18 cr + $92.17 additional per credit beyond 18	Non-Residents pay $3,257.24 for 18 cr + $268.68 additional per credit beyond 18	Self-Support Bachelor's degree students pay $4,219.74 for 18 cr + $234.43 additional per credit beyond 18 16-17 tuition $199.98/credit, or $2989 for 15 credits	Bachelor's Program Residents in State-support programs pay $2,423.90 for 18 cr + $223.85 additional per credit beyond 18	Bachelor's Program Non-Residents pay $6,073.60 for 18 cr + $588.26 additional per credit beyond 18

Appendix V

COLLEGE OF
SCIENCE AND
ENGINEERING

901 12th Avenue
P.O. Box 222000
Seattle, WA 98122-1090

206-296-5513
elarson@seattleu.edu

February 18, 2016

Dear Bellevue College,

This letter serves as a review of the proposed Bachelor of Science degree in Computer Science (BSCS) at Bellevue College. I was asked to serve as an expert reviewer by Winnie Li, a faculty member at Bellevue College. I am an associate professor of computer science at Seattle University in my 12th year. I have served on my department's curriculum committee since 2004 and served as the chair since 2007. During my time as chair, the curriculum committee has designed two new programs: a Master of Science in Computer Science and a Certificate in Computer Science Fundamentals. In addition, I have served on the College of Science and Engineering's curriculum committee since 2005, serving as the chair from 2009-2014. In this committee, we have reviewed new Masters programs in structural engineering, systems engineering, and mechanical engineering.

To carry out this review, I received a draft of the Bachelor of Science in Computer Science Proposal on February 5th. I read the draft and organized my review in three sections: *curriculum*, *admission and enrollment*, and *faculty and services*. In general, I feel the proposed program has a solid computer science curriculum and reasonable enrollment goals. The program will need to hire several faculty with computer science expertise in order to be successful.

CURRICULUM

The program learning outcomes are reasonable and similar to learning outcomes for most BSCS programs, including Seattle University. The curriculum consists of 57 credits of core computer science courses, 15 credits of computer science electives, and 30 credits of math. Students also have to take 58 credits of general education requirements in communications, humanities, social science, and natural sciences.

The core computer science classes form a typical computer science curriculum and corresponds well to the recent ACM / IEEE CS 2013 curriculum guidelines. I particularly like the use of one credit seminars using robotics taught concurrently with the first two courses. This will motivate and excite students about computer science and hopefully make them more productive in these early courses. I also like the year-long capstone project that gives students the opportunity to work on teams and a large-scale software project; both are important when working in industry. The set of electives is a good start and I would expect this list to grow as more faculty are hired over the next three years.

I can personally attest to the rigor of the first two programming courses CS 210 and CS 211 that are part of the computer science degree. At Seattle University, we have had several students from Bellevue College transfer into the computer science program as juniors and these students have been well prepared for our junior-level courses. As noted in the proposal, Seattle University would be happy to accept graduating students in the Master of Science in Computer Science.

I have three recommendations regarding the curriculum. First, since students take a software engineering course concurrently during their first quarter of their capstone project, consider requiring students to use some sort of software engineering methodology in the second two quarters of the project. This will make the project more similar to a real-world project. Second, consider adding more software engineering electives such as design patterns and testing that expand on what was covered in the software engineering course (which seems ambitious). These will serve the students well in securing software development positions and being more effective after they hired. Third, consider having some exposure to parallel computing in one or more required courses. This is important with the proliferation of multi-core processors found in virtually all desktop computers today. Some possibilities: In CS 351, multi-core processors should be introduced as a design trade-off. In CS 360, the notion of multi-core computers can motivate multithreaded programs. In 401, a small section of the course can be devoted to the design and analysis of parallel algorithms.

The assessment activities listed in the proposal seems relevant and allow you to make appropriate adjustments to the program. However, more assessment based on students work (exams, homework, and projects) with respect to the program outcomes is necessary. This is especially important if you seek ABET accreditation as there is an expectation to ensure that graduating students are indeed meeting the program outcomes.

ADMISSION AND ENROLLMENT

The proposal indicates three pathways into the program: starting at Bellevue College as a freshman, transferring to Bellevue College (most likely as a junior), and starting at Bellevue College as a high school student via a running start or similar program. It appears that the department is still exploring the various running start mechanisms and I encourage the department to continue to explore these avenues. Students starting as freshmen must meet university admission requirements plus placement into Calculus I and English 101 Composition. Students that place into Calculus I should be prepared for the computer science program.

Students entering as transfer students are evaluated based on GPA, an essay, and past course work. In the state of Washington, it is common for students who transfer as a junior to have completed the first two programming courses. This means that all the remaining CS course requirements must be squeezed into two years. This can be daunting for inadequately prepared transfer students. Therefore, I agree with having a selective process for admitting transfer students. I recommend creating a two-year plan for transfer students, thinking about what courses they need as a junior so they can be effective team members in the capstone project as a senior. I also recommend tracking the performance of transfer students and fine-tuning the curriculum and/or admission criteria if needed.

Enrollment Services is largely responsible for recruiting and admissions. The department will assist by attending high school college fairs and community college transfer fairs. These efforts seem reasonable. The department will need to be involved in the recruitment especially in the early years of the program. Efforts to attract a diverse population are commendable. I also encourage the department to make a concerted effort to reach out to females interested in computer science.

The department plans to enroll 30 students in 2016-17 and ramping up to 60 students per year in five years. These numbers are hard to analyze as the proposal does not indicate how these numbers were derived. I also have two issues with Table XIII that warrant attention: First, the table does not outline how many students enter as freshmen and how many enter as transfer students. Second, it seems like the table is assuming a 100% completion rate; some attrition is inevitable. Given the rising popularity of computer science in recent years, it seems that an annual enrollment of at least 30 students is obtainable. If the popularity continues to grow, having 60 new students per year seems to be a reasonable goal. However, it is difficult, if not impossible, to predict whether the popularity of computer science will continue to rise. I would feel more confident with these projections with more data. One specific example would be the number of students currently in the computer science transfer program at Bellevue College that would elect to stay there if Bellevue College offered a four-year degree.

There are also several competing programs in the greater Seattle area. There are well-established computer science programs at Seattle University and UW-Bothell. UW-Seattle is also increasing the size of their popular computer science program. There are also programs close to Seattle such as Western Washington University in Bellingham and several schools in Tacoma and Olympia. One advantage for Bellevue College is the cost of tuition. Tuition at Bellevue College for one quarter is $1,282 resident / $3,083 non-resident which is significantly cheaper than UW-Bothell ($3,589 resident / $11,024 non-resident)[1] and Seattle University ($12,990)[2].

Another potential competitor is "community colleges" in the area that start offering four-year degrees similar to Bellevue College. I expect that one of the Seattle Colleges will start offering a BSCS degree within the next five years. There also will likely be increased competition from inexpensive online-only degrees but the popularity of these programs remains to be seen.

FACULTY AND SERVICES

Currently, there are six full-time and two part-time faculty members that teach in the computer science program. The department lacks expertise in computer science – only one of the full-time faculty members have a degree in computer science. There are several courses where there is no expertise in current faculty, including required courses in computer architecture, operating systems, programming languages, and operating systems. As such, hiring several faculty with experience in computer science, especially in the aforementioned areas, is necessary. Be forewarned that with computer science enrollments increasing nationwide, many colleges and universities are hiring computer science faculty members and hiring is very competitive. Consequently, you may need to offer higher salaries than what has been budgeted for (which appears to be around $69,000).

Bellevue College offers the assortment of services typically found at a four-year college such as an academic success center, a disability resource center, computer labs, and a job placement center. I concur with the proposal to have a fully-dedicated computer science computer lab as it is necessary to have different software than what is found on the university computer labs. As noted in the budget, there needs to be at least one lab technician to maintain this dedicated computer lab. The department should work closely with the job placement center to make sure that students find suitable job contacts and that technology companies are properly represented at career fairs.

[1] Source: http://opb.washington.edu/content/quarterly-tuition-and-fees

[2] Source: https://www.seattleu.edu/undergraduate-admissions/finances/tuition

The advising and program manager model has worked well at Bellevue College so it makes sense to replicate this model within the computer science department. One key aspect is that the program manager is focused on monitoring student success which leads to better retention. The proposal makes a brief reference to a BC Computer Science Club. An active student club helps build community within the program. The club offering programming that is interesting and relevant to students in the major such as talks from people in industry, job-hunting tips (such as a resume writing workshop), and technology tutorials.

CONCLUSION

In conclusion, the newly proposed computer science program has a strong curriculum and reasonable enrollment goals. The program will provide a high-quality education that is affordable which should attract students, especially since computer science enrollments are on the rise. The largest deficiency with the program is the lack of faculty with computer science expertise. The department is planning to address this deficiency by hiring three faculty members over the next three years.

If you have any further questions regarding this review, please let me know.

Sincerely,

Eric Larson
Associate Professor of Computer Science
Seattle University

External Review of Proposal for the Development of a Bachelor of Science (B. S.) in Computer Science at Bellevue College (to commence in Autumn, 2016)

Reviewer: William Erdly, Ph. D. Associate Professor, (Founder) Computing & Software Systems Division; School of STEM, University of Washington Bothell)

Date of Review: February 24, 2016

Overview: Bellevue College (BC) proposes the creation and delivery of a Bachelor of Science Degree in Computer Science commencing Autumn, 2016 to help address the high demand for access to quality computer-science related degree programs in the State of Washington. I am pleased to see support from the legislature to help launch additional degree options for residents of our state – especially since this area of study is critical for the continued economic success of our region. The applicability of this proposed degree across all industry, government, and non-profit sectors is clear as it applies to areas ranging from programming to development of information infrastructure. The proposal provides a variety of pathways into the degree program which is indeed a strength and consistent with the mission of CTC's. This degree appears complementary to the variety of CS-related degree programs that are offered in the region – certainly providing another avenue of choice to address demand. It may also serve as an important bridge to a variety of graduate degrees currently being offered in the region.

Review Notes:

Starting a new computer science four-year degree is highly complex and comes with many challenges and opportunities. The following are insights worth considering as they relate to the specifics of the BC proposal:

1) Degree prerequisites – and providing access to diverse student populations

Creating systems to encourage and support access for diverse student populations will be critical. I was pleased to see coordination between Enrollment Services, Office of Equity and Pluralism, and Multicultural Student Services to ensure that effective recruiting and admissions processes are in place. One area of concern is that the successful completion of math prerequisites is a well-known barrier to accessing computer science programs; my suggestion is to put strong student support services/mentoring programs in place to support students with interests in computing. This is especially important since there is such an intense set of math prerequisites for this degree. When we first designed the CSS Program at UWB, I worked directly with (then BCC) math faculty to create an innovative "math bridge course" that combined core, "computing-related" mathematical principles and statistics to help gain interest in, and prepare students for, transfer to our junior-level program. I did track these students and they did better, on average, than those who took a more traditional mathematics sequence – and the students came from diverse groups. Of course, then we only required Calculus I, II, and Introductory Statistics (a non-calculus version) – your proposed program has much more math intensive prerequisites thus posing a greater challenge. Also, it is important that faculty are involved in the admissions process – especially to review the preparation of students for such an intensive program – and to ensure coordination between admissions and faculty expectations of student

readiness. Programs for underprepared students and use of the STEM to Stern program are critical – and appear well-described and integrated into the proposal.

2) Course sequencing

The current course sequencing is complex -- as is the challenge for many STEM-related disciplines. Examining how to reduce the complex, linear sequencing of the math core as well as the CS Core will be important to help ensure student progress and efficient use of limited faculty resources. The proposed courses are difficult – and students may get out of synch with available courses (for a wide variety of reasons). This is particularly challenging during the start-up of a new four-year program where you have limited faculty resources and are launching a new degree. Perhaps some form of a "cohort approach" might be helpful until courses are more readily available (i.e. offered) more frequently. Some degree completion plans are provided; however, more nuances in student needs will likely appear as this moves forward to implementation.

3) Capstone considerations

Implementing a capstone project process is indeed challenging as well as highly beneficial to students. The emphasis on sponsored projects is important to student success; however, the time and effort by faculty and staff to identify and manage such activities may be intense. Also, developing some sort of a contract/liability assessment is often needed so that the student, industry, and faculty obligations are clear. Having such a mechanism in place is important for so many reasons. I like the fact that your capstone project is spread out over three quarters as this allows time to work through a problem in detail – and affords the opportunity to leverage appropriate software engineering approaches to the problem at hand. Are there adequate lab/collaborative development spaces available to support the capstone – especially given the focus on core CS/CE-related technologies and architectures?

4) Software engineering considerations

The following items may reflect my "software engineering bias," but should be considered in preparing modern-day software engineers. Plus, these methods may help prepare students for employment within the software and/or related industries:

> a) It was very interesting to see a more traditional, computer science degree being proposed at this time. It appears that the existing faculty are especially well-suited to launch this type of degree. As the degree expands though, I highly encourage the inclusion of more application-specific courses in areas such as human-computer interaction, knowledge representation, "big data/analytics," data visualization, mobile application development, or other industry-specific types of courses. The proposal indicates some initial electives in areas such as cloud computing, machine learning, networking, and security which provide a good start; however, students and employers are looking for a wide variety of technical skills and knowledge areas to complement their interests/immediate needs. Also, strong electives provide students with a way to see how their CS core courses/content are translated into practice. The more experience with this, the better, as there is a difficult transition from academia into industry that our students need to be

prepared for. Another avenue for creating interesting electives might be to examine electives from other degree programs where there is a strong synergy such as interactive media, communications, psychology, health, and, of course, other STEM-based disciplines. One of the challenges with this recommendation is that junior- and senior-level courses may not be available at the community college level to support more advanced electives.

b) Can/will core software engineering methods and principles be infused into the Core CS Courses (See Table 2 in the proposal)? I only see one software engineering course (CS 410: Software Engineering) and one elective (CS 411: SE Project Management). I find that when students only gain their software engineering knowledge through just one or two courses, this new knowledge has a very short "half-life." I think as your curriculum further develops, figuring a way out to deliberately incorporate software engineering methods/practices into your other courses would be innovative and highly beneficial to your students. My worries stem from experience with courses deemed as "programming courses" that do not leverage the important software engineering methodologies as they have "little time" to barely cover the technical content of their specific course. Another challenge is that programming and software engineering are taught separately (and by different faculty) further separating the importance of the synergies needed to develop strong software engineers. This issue is encountered in most CS-related degrees.

c) What efforts will be placed on developing effective software teams and communication – written and oral? Are there some recommended pathways/options that might be provided to students as they take their general education requirements that might address these needs?

5) Assessment Strategy

The assessment strategy (annual and five-year) seems well-developed, and having a strong set of measurement instruments that provide the levels and types of feedback necessary to evaluate the intricacies of this degree will be important. This type of work takes time and resources so hopefully there are support structures in place to accomplish these important tasks. Successful completion of this strategy will serve well in ABET accreditation -- and implementing ABET-related activities/data collection from the onset will be very helpful! Leveraging the current STEM Advisory Committee is important; however, you might consider a specific CS-related industry committee (or subcommittee of your STEM Advisory Committee) to assist with the specialized CS needs.

6) Faculty hiring plan and growth strategy

The faculty plan has strong existing faculty with most coming from a math or CS/CE specialization. The course development work and new deployment of junior- and senior-level computer science courses, along with an effective capstone experience will be challenging – so faculty will be stretched. I was unclear as to the specific teaching load requirements for each member of the faculty, but understand that it is much higher on average than that of traditional four-year institutions. Also, having more variability in the knowledge domains of faculty in future hires may help ensure both depth and breadth of the student experience. It looks like there are three full-time hires – these hires will be critical.

Growth to 240 FTE students by the 2020/2021 is aggressive – especially as the proper balance of faculty need to be in place to support the degree, and that there is a well-prepared pool of students that meet the requirements for admission -- and systems are in place to ensure student success. Class size considerations will be important as junior- and senior-level courses are typically smaller in size. Having access to support from student mentors, graders, IT support, and/or lab support may become critical.

Summary:

Overall, I support the development and implementation of this new degree program. It will indeed be challenging for the CTC's to move into the four-year degree space as described above – but well worth pursuing. I encourage working with the regional four-year colleges to further develop pathways into graduate programs – and even collaborate on important industry projects. Also, students may benefit from joint CTC/four-year college research funding in areas such as STEM-education – and community-based research partnerships. Having faculty from other universities serve as advisors during the start-up process is recommended. These types of collaborations are of benefit to all.

For further questions or discussion of this review and recommendations, please let me know.

Appendix VI

Appendix VI was added to this Degree Proposal on April 15, 2016. This appendix addresses thoughtful and important questions raised by SBCTC reviewers about Bellevue College's (BC) projected budget for its proposed computer science degree program. In addition, this appendix tackles SBCTC questions about a variety of student success issues, including curriculum, the computer science direct transfer agreement/major related program (CS DTA/MRP), minimum GPA requirements, faculty credentials, credential and evaluation services and disabled student services. BC created this appendix to give these questions a full and focused response.

Budget Questions:

1. **The SBCTC expressed concern that the proposed budget did not reflect: cost of living allowances (COLAs); on-going stipends for faculty after AY 18; a 15% upper-division tuition reduction scheduled for AY16-17; and possible student attrition.**

   Following our written remarks in this appendix, four revised versions of the budget appear that undertake the SBCTC's specific concerns. (See pp. 10-13) The content of these various budgets are described below. In addition, BC provides Excel versions of each budget in a separate file that make accessible the various formulas used to calculate values.

   a. The first budget shows COLAs for staff as well more accurate, on-going stipends for faculty. No reduction in tuition or student attrition is presented in this budget. (NOTE: Faculty increases already appeared in the budget)
   b. The second budget displays the aforementioned changes as well as the 15% tuition reduction.
   c. The third and fourth budgets depict all of the previous changes, plus 5% and 10% student attrition rates respectively.

   Three key points need mention with respect to these budgets. First, BC agrees with the SBCTC that the contingency budgets are in order and should be an integrated part of it plan. Second, the bottom line for years 1 & 2, years showing losses, remains constant. Losses in year 1 and 2 did not get prohibitively larger with each version of the budget. BC, therefore, remains committed to providing bridge loans to finance the initial "start-up" phase of the program. Third, although total income falls off with each subsequent version of the budget, the program is still projected to support itself fully by year 3.

2. **The SBCTC expressed confusion about the proposed budget's alignment of projected graduation rates and projected enrollments as well as confusion about the calculation of tuition revenues, especially calculations of upper and lower division revenues in year 1 and in years 4 & 5.**

   BC understands the confusion. CTC colleges developing Baccalaureate programs have been working within the confines of the two-by-two BAS model in which there is a clear distinction between the professional/technical AA degree lower division curriculum and the BAS upper

division 300 and 400 level curriculum. Under this two by two model, firm notions of progression, graduation and applicable tuition charges exist. It is important to keep in mind, however, that BC is proposing a four year model in which students will enroll in a mix of lower division and upper division courses simultaneously. This means, for example, that a sophomore will take 100/200 level courses as well as 300 level courses during the same quarter. What's more, this mix of lower and upper division courses will continue throughout a student's four-year program, with the ratio of upper division to lower division courses increasing as students make progress. The sample academic plan in the proposal shows how this mixing of lower and upper division course plays out. (See p. 12)

While the implications of this mixed schedule are minor for progression, graduation and understanding tuition revenues, BC wishes to clarify for the SBCTC some of their specific concerns about these issues.

Graduation:

Why only 60 graduates in 2022 when enrollments appear to grow rapidly from year 2 to year 3?

It is projected that enrollments will increase rapidly from year 2 to year 3 – from 75 to 165. The bulk of this increase arises from 60 new freshman and 30 new transfer students. Because the proposed program is a four year program, these students will need to complete three or four years before graduating. Eventually total enrollments are projected to reach 240 students, 60 students per class, providing for 60 graduating seniors a year.

Tuition charges:

a. How can there be upper division tuition charges in year 1 without upper division students?

   Although the budget tables and enrollment tables show only first and second year students in year one, it is important to note that second year students enroll in upper division courses as a part of their curriculum plan. This accounts for the calculation of upper division tuition.

b. Why does lower level tuition rise between budgetary years 4 & 5 when the number of lower level students remains constant at 120?

   While the number of lower level students remains constant, the total number of students in the program increases from 210 to 240 students. Since all students undertake a mixed schedule of lower and upper division courses, including seniors, the total number of lower division courses being taken by the student population as a whole increases. This accounts for the increase of lower division revenues from years 4 to 5.

3. **The SBCTC asked if the Career Specialist 0.5 position listed in the budget and the OA5 position listed in the fringe benefits was the same position.**

   Yes. The Career Specialist 0.5 and the OA5 position are one in the same.

4. **The SBCTC wondered why marketing expenses were projected to be less in year 0 than in year 1**

   Since the program cannot advertise, recruit, or advise students until it receives SBCTC approval and NWCCU accreditation, and since such approvals cannot happen any earlier than May, 2016, it is anticipated that the lion's share of marketing expenses will be incurred in the new fiscal year – during the summer and fall of 2016. This accounts for the greater marketing expenses in year 1 than in year 0.

5. **The SBCTC wonders why indirect costs are projected to increase, not decrease over time.**

   As student enrollments in the program increase over time, so too will the impact on facilities and services throughout the institution. The proposed computer science program, although not yet approved, has already required power, networking and server upgrades as well as renovations to classrooms. As the computer science program grows over the next 5 years, additional facility changes will be necessary. All of these facility changes, BC believes, will increase overhead costs.

   In addition, BC is acutely aware of the increased impact that current baccalaureate programs are having on student services across the college. As mentioned in footnote 6 on page 29 of this proposal, BC anticipates adding a fully dedicated baccalaureate credentials evaluator to the student affairs division. What's more, the College believes additional baccalaureate personnel, beyond the evaluator, will be needed in the near future. One SBCTC Reviewer clearly articulated such needs when he/she noted that BC will likely have to increase support for disabled student services. BC agrees, and since the baccalaureate programs, including the computer science program, will be expected to fund a variety of new student services, the total overhead costs for these programs are expected to rise before eventually leveling off.

6. **The SBCTC inquired about BC's plan to cover the losses in years 1 & 2.**

   As with its other baccalaureate programs, BC is committed to providing new start-up programs with "bridge loans" during the first two years. This commitment will extend to the new computer science program.

Student Success Questions: (Part I)

7. Clarify how Bellevue will accept students who transfer with a CS –DTA/MRP?

BC will honor the CS-DTA/MRP as other Washington State university program do. Students will transfer 90 credits to the program and receive third year status. At entry, these students will have finished their general education requirements completely. During the third and fourth years, they will undertake the 300 and 400 level courses. A sample schedule for CS – DTA/MRP students follows:

Table - Computer Science - Sample 4 Year Plan
CS DTA/MRP

	FALL		WINTER		SPRING	
First-Year	Course	Credits	Course	Credits	Course	Credits
	Calculus 151	5	Calculus 152	5	Calculus 153	5
	English 101 Composition	5	CS 210	5	CS 211	5
	Hum or SS	5	Hum or SS	5	Hum or SS	5
Second-Year	Physics 121	6	Physics 122	6	Chemistry or Biology	6
	Math 270 Probability and Statistics	5	Math 208 Linear Algebra	5	Hum or SS	5
	English 201	5	Hum or SS	5	Hum or SS	5
Third-Year	Math 301 Discrete Math	5	CS 320 Programming Lang	5	CS 331 Database Systems	5
	CS 300 Data Structures	5	CS 351 Computer Arch I		CS 360 Operating Systems	5
	CS Elective	5	Free Elective	5	CS Elective	5
Fourth-Year	CS 410 Software Engr. & Dsgn.	5	CS 401 Algorithms	5	Free Elective	5

CS 481 Senior Capstone I	4	CS 482 Senior Capstone II	4	CS 483 Senior Capstone III	4
Free Elective	5	CS Elective	5	Free Elective	5
				TOTAL	**180**

8. **The SBCTC reviewers pointed out that the program is not "necessarily targeted at technical degree students"**
   While it is true that Engineering and Engineering Technical students will not seamlessly transfer to the computer science program with 90 units, it is also true that many will transfer more than the requisite general education courses. Because these students have opportunities to take higher level math, physics programming and networking courses, they may accumulate transfer credits beyond the general education courses. What's more, running start or prof/tech high school students who take, for example, Cisco Networking courses may transfer up to 20 units, giving them a substantial head-start on the computer science curriculum.

9. **The SBCTC noted that actual computer science faculty expertise is "a little thin" at this point in time.**

   This is a fact. Although it has an excellent computer science transfer program, BC knows that it must hire new computer science faculty. The first job search for a new, tenure-track computer science faculty opened in March and closed in April. A hiring committee has been formed. Interview questions and a teaching demonstration have been designed. Nineteen candidates have submitted applications. The committee will vet the applications in the next weeks and schedule interviews for May.

10. **The SBCTC asked for clarification on a minimum GPA for admission.**

    BC decided to forgo setting a minimum GPA for the time being. The College intends to approach admissions holistically, reviewing transcripts, CADR distribution requirements, and student essays. BC believes that this is the best approach to navigate between Scylla and Charybdis – between open access and student success within a highly rigorous program. As the program grows, BC will reevaluate this decision.

11. **The SBCTC asked "will credential evaluators in Enrollment Services have final review of the transcript evaluation for graduation?"**

    No. BC expects to hire a new, fully-dedicated baccalaureate credentials evaluator in the near future. This position will take the lead on transcript evaluation, but will share responsibility of final transcript evaluation for graduation with the program faculty.

Student Success: (Part II)

Much has happened since the submission of the BC's original proposal in February, 2016. The passage of State Senate Bill 5928 notwithstanding, BCs computer science development team has persisted, albeit quietly behind the political scenes, in its efforts to enhance the curriculum and the prospect of student success. This effort is clearly evidenced by a succession of continuous improvement actions taken in March and April, after submission of the original proposal. Among these actions, four stand out.

a. BC convened a meeting of its STEM advisory board to review and vet the curriculum as submitted to the SBCTC.
b. BC submitted its proposal to Ed Lazowska, Bill and Melinda Gates Professor of Computer Science at the University of Washington. Professor Lazowska provided BC a third Expert Review.
c. BC convened an industry focus group, consisting of eight young, computer science professionals who are employed at Microsoft, Amazon and Google and who graduated with B.S. degrees in Computer Science within the last 5 years or so
d. BC hired a Program Manager to facilitate connections between the computer science program and Student Services as well as to shape the proposed admissions, advising and student success plans into effective policy.

Together, these efforts have provided BC with invaluable feedback about its proposed program. This feedback can be summarized as follows:

First, the various reviewers – all in their own way – suggested student success would be enhanced by fully integrating experiential learning into the curriculum. Several made the case that encouraging students to join the cohort STEM to STERN program (See page 26) would not only offer experiential opportunities, but also improve student success by providing a cohort learning community. In response to this feedback, BC has designed a sample curriculum plan using the STEM to STERN model and is working with program faculty to examine the plan's strengths and weaknesses. The sample plan follows below:

Table

Bellevue College

Computer Science – STEM to Stern Sample 4 Year Plan

	FALL Course	Credits	WINTER Course	Credits	SPRING Course	Credits
Year 1	Pre-Calculus 2	5	Calculus 1	5	Calculus 2	5
	Math Enrichment	2	Math Enrichment STEM to Stern Course	2	Math Enrichment STEM to Stern Course	2

	Hum or SS	5		CS 1	5		CS 2	5
	English Composition	5		CS 120	1		CS 121	1
	STEM to Stern (Cohort)	2		STEM to Stern (Cohort)	2		STEM to Stern (Cohort)	2
Year 2	Data Structures	5		Database Systems	5		Programming Lang.	5
	Calculus 3	5		Prob. & Stat.	5		Hum or SS	5
	Hum or SS	5		Physics 1	6		Physics 2	6
	STEM to Stern (Cohort)	1		STEM to Stern (Cohort)	1		STEM to Stern (Cohort)	1
Year 3	Linear Algebra	5		Chemistry or Biology	6		Discrete Math	5
	Computer Arch I	5		Algorithms	5		Operating Systems	5
	Hum or SS	5		Software Engineering	5		CS Elective	5
Year 4	Senior Capstone I	3		Senior Capstone II	4		Senior Capstone III	3
	Hum or SS	5		Tech Writing	5		CS Elective	5
	CS Elective	5		CS Elective	5		Hum or SS Elective	5
	Hum or SS	5					Hum or SS Elective	5
							Total	**189**

Second, the reviewers emphasized the importance of making the curriculum nimble and flexible. All felt that creating an agile curriculum, one responsive to the needs of industry was more important, for example, than adhering to the requirements of ABET accreditation. The group of young professionals, in particular, could not stress enough that their academic programs had been too theoretical at times. What they needed, instead, were skills to adapt quickly to an ever-changing work environment that demanded practical solutions to pressing problems. Professor

Lazowska recommended the development of concentrations, 3 to 4 course specializations that could be quickly adjusted to what was "hot" in the market place. He argued that this flexibility would serve students better than the rigidity of the ABETs mandatory course coverage requirements. In response, BC's development team has opened discussions about ABET accreditation and made plans for possible concentrations in Data Science, Security and Human-Computer Interaction. Plans for such concentrations will influence significantly our on-going faculty searches and hiring efforts.

Finally, the hiring of the new program manager has brought invaluable insight and experience to the creation of this new program. This manager comes to BC with 16 years of experience in administering the University of Washington's mechanical engineering program. Her knowledge of rigorous and competitive four year, Bachelor of Science programs provides BC with an expertise in recruitment, admission and student success that it lacked. The program manager has already begun plans for program marketing, recruitment and admission.

Conclusion:

Bellevue College believes that this appendix represents a good faith effort to address the SBCTC's questions about its proposed computer science program. It wishes to applaud the SBCTC for its thorough and comprehensive reading of the proposal and it hopes that the SBCTC will, in turn, recognize BCs concerted effort to continuously improve the program. Bellevue College looks forward to prospect of speaking with the SBCTC about its plan for a Bachelor of Science in Computer Science at its upcoming May meeting.

Bellevue College BS CS Budget 1

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
STUDENTS		2016	2017	2018	2019	2020	
First Year		15	30	60	60	60	LOWER
Second Year		15	30	60	60	60	LOWER
Third Year			15	30	60	60	UPPER
Fourth Year				15	30	60	UPPER
Total Student FTE		30	75	165	210	240	
CS Section Count		3	12	23	31	33	
CS BS Full-Time Faculty Count		1	2	3	3	3	
CS Adjunct Section Count		0	0	0	7	9	

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 4	Total
Senior Personnel:							
Program Manager	20,415.00	56,650.00	57,783.00	58,938.66	60,117.43	61,319.78	*315,223.88*
Full-time faculty		68,738.00	139,411.00	213,084.00	221,957.00	221,957.00	*865,147.00*
Part-Time Sections		0.00	0.00	0.00	29,603.00	38,061.00	*67,664.00*
Stipends/ curriculum dev	17,600.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	*67,600.00*
Lab Tech 3 (Range 48) / YR3-4 2 lab tech.		52,085.00	52,866.00	105,732.00	105,732.00	105,732.00	*422,147.00*
Career Specialist. 0.5		21,630.00	21,954.00	21,954.00	21,954.00	21,954.00	*109,446.00*
Total Salaries and wages	**$ 38,015.00**	**$ 209,103.00**	**$ 282,014.00**	**$ 409,708.66**	**$ 449,363.43**	**$ 459,023.78**	**$ 1,847,227.88**
Fringe Benefits:							
Program Manager	8,350.00	22,286.00	22,512.60	22,743.73	22,979.49	23,219.96	*122,091.78*
Full-time faculty		24,703.60	38,838.20	53,572.80	55,347.40	55,347.40	*227,809.40*
Part-time faculty		0.00	0.00	0.00	11,841.20	15,224.40	*27,065.60*
Stipends	1,670.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	*16,670.00*
Lab/Navigator		21,373.00	21,529.20	32,102.40	32,102.40	32,102.40	*139,209.40*
Office Asst. .5		9,804.00	9,868.80	9,868.80	9,868.80	9,868.80	*49,279.20*
Total Benefits	**$ 10,020.00**	**$ 81,166.60**	**$ 95,748.80**	**$ 121,287.73**	**$ 135,139.29**	**$ 138,762.96**	**$ 582,125.38**
* includes Health Insurance, Retirement, OASI, Med Aid/Ind Ins, and Unemployment							
Total Salaries, Wages and Fringe Benefits	***$ 38,015.00***	***$ 290,269.60***	***$ 377,762.80***	***$ 530,996.39***	***$ 584,502.72***	***$ 597,786.74***	***$ 2,429,353.25***
Equipment							
LAB Server/software	250,000.00	10,000.00	25,000.00	30,000.00	*30,000.00*	*30,000.00*	*375,000.00*
Remodel 2 classrooms	300,000.00	0.00	0.00	0.00	*0.00*	*0.00*	*300,000.00*
FF&E 2 classrooms		0.00	0.00	0.00	*0.00*	*0.00*	*0.00*
Total Equipment:	***$ 550,000.00***	***$ 10,000.00***	***$ 25,000.00***	***$ 30,000.00***	***$ 30,000.00***	***$ 30,000.00***	***$ 675,000.00***
Travel:							
Conference		5,000.00	5,000.00	*5,000.00*	*5,000.00*	*5,000.00*	*25,000.00*
				0.00	*0.00*	*0.00*	*0.00*
E. Total Travel:	***$ -***	***$ 5,000.00***	***$ 5,000.00***	***$ 5,000.00***	***$ 5,000.00***	***$ 5,000.00***	***$ 25,000.00***
G. Other Direct Costs:							
Materials & Supplies		5,000.00	5,000.00	*5,000.00*	*5,000.00*	*5,000.00*	*25,000.00*
Workspace, computers, setup	100,000.00	2,000.00	2,000.00	*2,000.00*	*2,000.00*	*2,000.00*	*110,000.00*
Marketing	5,000.00	20,000.00	20,000.00	*5,000.00*	*5,000.00*	*5,000.00*	*60,000.00*
Professional Development faculty		1,150.00	1,150.00	*2,300.00*	*2,300.00*	*2,300.00*	*9,200.00*
Library subscriptions/resources	11,500.00	12,000.00	12,500.00	*13,000.00*	*13,500.00*	*14,000.00*	*76,500.00*
Accreditation Substantive Costs	6,000.00			*0.00*	*0.00*	*0.00*	*6,000.00*
Total Other Direct Costs	***$ 122,500.00***	***$ 40,150.00***	***$ 40,650.00***	***$ 27,300.00***	***$ 27,800.00***	***$ 28,300.00***	***$ 286,700.00***
H. Total Direct Costs (A through G):	***$ 710,515.00***	***$ 345,419.60***	***$ 448,412.80***	***$ 593,296.39***	***$ 647,302.72***	***$ 661,086.74***	***$ 3,416,053.25***
I. Indirect Costs:	***$ 17,486.90***	***$ 96,187.38***	***$ 129,726.44***	***$ 188,465.98***	***$ 206,707.18***	***$ 211,150.94***	***$ 849,724.82***
Rate 46% on salary & wage expenses.							
(estimated college rate for use of building/utilities/operations staff (HR/payroll/custodial)							
J. Total Direct and indirect costs:	**$ 728,001.90**	**$ 441,606.98**	**$ 578,139.24**	**$ 781,762.38**	**$ 854,009.90**	**$ 872,237.68**	**$ 4,265,778.07**
State Support/Self Support							
Tuition - lower division 15 credits/State Support rate		96,150.00	211,530.00	442,290.00	499,980.00	538,440.00	1,788,390.00
Tuition - upper division 15 credits/Self-Support rate		52,740.00	210,960.00	527,400.00	843,840.00	1,054,800.00	2,689,740.00
	750,000.00						750,000.00
TOTAL TUITION/P	**750,000.00**	**148,890.00**	**422,490.00**	**969,690.00**	**1,343,820.00**	**1,593,240.00**	**5,228,130.00**
TUITION LESS TOTAL EXPENSES	**$ 21,998.10**	**$ (292,716.98)**	**$ (155,649.24)**	**$ 187,927.62**	**$ 489,810.10**	**$ 721,002.32**	**$ 962,351.93**

Bellevue College BS CS Budget 2

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
STUDENTS		2,016	2,017	2,018	2,019	2,020	
First Year		15	30	60	60	60	LOWER
Second Year		15	30	60	60	60	LOWER
Third Year			15	30	60	60	UPPER
Fourth Year				15	30	60	UPPER
Total Student FTE		30	75	165	210	240	
CS Section Count		3	12	23	31	33	
CS BS Full-Time Faculty Count		1	2	3	3	3	
CS Adjunct Section Count		-	-	-	7	9	

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 4	Total
Senior Personnel:							
Program Manager	20,415	56,650	57,783	58,939	60,117	61,320	*315,224*
Full-time faculty		68,738	139,411	213,084	221,957	221,957	*865,147*
Part-Time Sections		-	-	-	29,603	38,061	*67,664*
Stipends/ curriculum dev	17,600	10,000	10,000	10,000	10,000	10,000	*67,600*
Lab Tech 3 (Range 48) / YR3-4 2 lab tech.		52,085	52,866	105,732	105,732	105,732	*422,147*
Career Specialist. 0.5		21,630	21,954	21,954	21,954	21,954	*109,446*
Total Salaries and wages	**$ 38,015.00**	**$ 209,103.00**	**$ 282,014.00**	**$ 409,708.66**	**$ 449,363.43**	**$ 459,023.78**	**$ 1,847,227.88**
Fringe Benefits:							
Program Manager	8,350	22,286	22,513	22,744	22,979	23,220	*122,092*
Full-time faculty		24,704	38,838	53,573	55,347	55,347	*227,809*
Part-time faculty		-	-	-	11,841	15,224	*27,066*
Stipends	1,670	3,000	3,000	3,000	3,000	3,000	*16,670*
Lab/Navigator		21,373	21,529	32,102	32,102	32,102	*139,209*
Office Asst. .5		9,804	9,869	9,869	9,869	9,869	*49,279*
Total Benefits	**$ 10,020.00**	**$ 81,166.60**	**$ 95,748.80**	**$ 121,287.73**	**$ 135,139.29**	**$ 138,762.96**	**$ 582,125.38**
* includes Health Insurance, Retirement, OASI, Med Aid/Ind Ins, and Unemployment							
Total Salaries, Wages and Fringe Benefits	***$ 48,035.00***	***$ 290,269.60***	***$ 377,762.80***	***$ 530,996.39***	***$ 584,502.72***	***$ 597,786.74***	***$ 2,429,353.25***
Equipment							
LAB Server/software	250,000	10,000	25,000	30,000	*30,000*	*30,000*	*375,000*
Remodel 2 classrooms	300,000	-	-	-	-	-	*300,000*
FF&E 2 classrooms		-	-	-	-	-	-
Total Equipment:	***$ 550,000.00***	***$ 10,000.00***	***$ 25,000.00***	***$ 30,000.00***	***$ 30,000.00***	***$ 30,000.00***	***$ 675,000.00***
Travel:							
Conference		5,000	5,000	*5,000*	*5,000*	*5,000*	*25,000*
				-	-	-	-
E. Total Travel:	***$ -***	***$ 5,000.00***	***$ 5,000.00***	***$ 5,000.00***	***$ 5,000.00***	***$ 5,000.00***	***$ 25,000.00***
G. Other Direct Costs:							
Materials & Supplies		5,000	5,000	*5,000*	*5,000*	*5,000*	*25,000*
Workspace, computers, setup	100,000	2,000	2,000	*2,000*	*2,000*	*2,000*	*110,000*
Marketing	5,000	20,000	20,000	*5,000*	*5,000*	*5,000*	*60,000*
Professional Development faculty		1,150	1,150	*2,300*	*2,300*	*2,300*	*9,200*
Library subscriptions/resources	11,500	12,000	12,500	*13,000*	*13,500*	*14,000*	*76,500*
Accreditation Substantive Costs	6,000			-	-	-	*6,000*
Total Other Direct Costs	***$ 122,500.00***	***$ 40,150.00***	***$ 40,650.00***	***$ 27,300.00***	***$ 27,800.00***	***$ 28,300.00***	***$ 286,700.00***
H. Total Direct Costs (A through G):	***$ 720,535.00***	***$ 345,419.60***	***$ 448,412.80***	***$ 593,296.39***	***$ 647,302.72***	***$ 661,086.74***	***$ 3,416,053.25***
I. Indirect Costs:	***$ 17,486.90***	***$ 96,187.38***	***$ 129,726.44***	***$ 188,465.98***	***$ 206,707.18***	***$ 211,150.94***	***$ 849,724.82***
Rate 46% on salary & wage expenses.							
(estimated college rate for use of building/utilities/operations staff (HR/payroll/custodial)							
J. Total Direct and indirect costs:	**$ 738,021.90**	**$ 441,606.98**	**$ 578,139.24**	**$ 781,762.38**	**$ 854,009.90**	**$ 872,237.68**	**$ 4,265,778.07**

State Support/Self Support							
Tuition - lower division 15 credits/State Support rate		96,150	211,530	442,290	499,980	538,440	1,788,390
Tuition - upper division 15 credits/Self-Support rate		44,835	179,340	448,350	717,360	896,700	2,286,585
State Budget Proviso	750,000						750,000
TOTAL TUITION/P	**750,000**	**140,985**	**390,870**	**890,640**	**1,217,340**	**1,435,140**	**4,824,975**
TOTAL EXPENSE LESS TUITION	**$ 11,978.10**	**$ (300,621.98)**	**$ (187,269.24)**	**$ 108,877.62**	**$ 363,330.10**	**$ 562,902.32**	**559,196.93**

Bellevue College BS CS Budget 3

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
STUDENTS		2,016.00	2,017.00	2,018.00	2,019.00	2,020.00	
First Year		15	30	60	60	60	LOWER
Second Year		15	29	59	57	57	LOWER
Third Year			14	28	54	54	UPPER
Fourth Year				13	26	51	UPPER
Total Student FTE		30	73	160	197	222	
CS Section Count		3	12	23	31	33	
CS BS Full-Time Faculty Count		1	2	3	3	3	
CS Adjunct Section Count		0	0	0	7	9	

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 4	Total
Senior Personnel:							
Program Manager	20,415.00	56,650.00	57,783.00	58,938.66	60,117.43	61,319.78	*315,223.88*
Full-time faculty		68,738.00	139,411.00	213,084.00	221,957.00	221,957.00	*865,147.00*
Part-Time Sections		0.00	0.00	0.00	29,603.00	38,061.00	*67,664.00*
Stipends/ curriculum dev	17,600.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	*67,600.00*
Lab Tech 3 (Range 48) / YR3-4 2 lab tech.		52,085.00	52,866.00	105,732.00	105,732.00	105,732.00	*422,147.00*
Career Specialist. 0.5		21,630.00	21,954.00	21,954.00	21,954.00	21,954.00	*109,446.00*
Total Salaries and wages	**$ 38,015.00**	**$ 209,103.00**	**$ 282,014.00**	**$ 409,708.66**	**$ 449,363.43**	**$ 459,023.78**	**$ 1,847,227.88**
Fringe Benefits:							
Program Manager	8,350.00	22,286.00	22,512.60	22,743.73	22,979.49	23,219.96	*122,091.78*
Full-time faculty		24,703.60	38,838.20	53,572.80	55,347.40	55,347.40	*227,809.40*
Part-time faculty		0.00	0.00	0.00	11,841.20	15,224.40	*27,065.60*
Stipends	1,670.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	*16,670.00*
Lab/Navigator		21,373.00	21,529.20	32,102.40	32,102.40	32,102.40	*139,209.40*
Office Asst. .5		9,804.00	9,868.80	9,868.80	9,868.80	9,868.80	*49,279.20*
Total Benefits	**10,020.00**	**81,166.60**	**95,748.80**	**121,287.73**	**135,139.29**	**138,762.96**	**582,125.38**
* includes Health Insurance, Retirement, OASI, Med Aid/Ind Ins, and Unemployment							
Total Salaries, Wages and Fringe Benefits	***$ 48,035.00***	***$ 290,269.60***	***$ 377,762.80***	***$ 530,996.39***	***$ 584,502.72***	***$ 597,786.74***	***$ 2,429,353.25***
Equipment							
LAB Server/software	250,000.00	10,000.00	25,000.00	30,000.00	*30,000.00*	*30,000.00*	*375,000.00*
Remodel 2 classrooms	300,000.00	0.00	0.00	0.00	*0.00*	*0.00*	*300,000.00*
FF&E 2 classrooms		0.00	0.00	0.00	*0.00*	*0.00*	*0.00*
Total Equipment:	***550,000.00***	***10,000.00***	***25,000.00***	***30,000.00***	***30,000.00***	***30,000.00***	***675,000.00***
Travel:							
Conference		5,000.00	5,000.00	*5,000.00*	*5,000.00*	*5,000.00*	*25,000.00*
				0.00	*0.00*	*0.00*	*0.00*
E. Total Travel:	***0.00***	***5,000.00***	***5,000.00***	***5,000.00***	***5,000.00***	***5,000.00***	***25,000.00***
G. Other Direct Costs:							
Materials & Supplies		5,000.00	5,000.00	*5,000.00*	*5,000.00*	*5,000.00*	*25,000.00*
Workspace, computers, setup	100,000.00	2,000.00	2,000.00	*2,000.00*	*2,000.00*	*2,000.00*	*110,000.00*
Marketing	5,000.00	20,000.00	20,000.00	*5,000.00*	*5,000.00*	*5,000.00*	*60,000.00*
Professional Development faculty		1,150.00	1,150.00	*2,300.00*	*2,300.00*	*2,300.00*	*9,200.00*
Library subscriptions/resources	11,500.00	12,000.00	12,500.00	*13,000.00*	*13,500.00*	*14,000.00*	*76,500.00*
Accreditation Substantive Costs	6,000.00			*0.00*	*0.00*	*0.00*	*6,000.00*
Total Other Direct Costs	***122,500.00***	***40,150.00***	***40,650.00***	***27,300.00***	***27,800.00***	***28,300.00***	***286,700.00***
H. Total Direct Costs (A through G):	***$ 720,535.00***	***$ 345,419.60***	***$ 448,412.80***	***$ 593,296.39***	***$ 647,302.72***	***$ 661,086.74***	***$ 3,416,053.25***
I. Indirect Costs:	***17,486.90***	***96,187.38***	***129,726.44***	***188,465.98***	***206,707.18***	***211,150.94***	***849,724.82***
Rate 46% on salary & wage expenses.							
(estimated college rate for use of building/utilities/operations staff (HR/payroll/custodial)							
J. Total Direct and indirect costs:	**$ 738,021.90**	**$ 441,606.98**	**$ 578,139.24**	**$ 781,762.38**	**$ 854,009.90**	**$ 872,237.68**	**$ 4,265,778.07**

State Support/Self Support							
Tuition - lower division 15 credits/State Support rate		96,150.00	207,684.00	434,598.00	479,468.00	511,518.00	1,729,418.00
Tuition - upper division 15 credits/Self-Support rate		44,835.00	170,373.00	421,449.00	648,613.00	798,063.00	2,083,333.00
	750,000.00						750,000.00
TOTAL TUITION/P	**750,000.00**	**140,985.00**	**378,057.00**	**856,047.00**	**1,128,081.00**	**1,309,581.00**	**4,562,751.00**
TOTAL EXPENSE LESS TUITION	**$ 11,978.10**	**$ (300,621.98)**	**$ (200,082.24)**	**$ 74,284.62**	**$ 274,071.10**	**$ 437,343.32**	**$ 296,972.93**

Bellevue College BS CS Budget 4

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	
STUDENTS		2,016.00	2,017.00	2,018.00	2,019.00	2,020.00	
First Year		15	30	60	60	60	LOWER
Second Year		15	28	54	54	54	LOWER
Third Year			14	27	49	49	UPPER
Fourth Year				13	24	44	UPPER
Total Student FTE		30	72	154	187	207	
CS Section Count		3	12	23	31	33	
CS BS Full-Time Faculty Count		1	2	3	3	3	
CS Adjunct Section Count		0	0	0	7	9	

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 4	Total
Senior Personnel:							
Program Manager	20,415.00	56,650.00	57,783.00	58,938.66	60,117.43	61,319.78	315,223.88
Full-time faculty		68,738.00	139,411.00	213,084.00	221,957.00	221,957.00	865,147.00
Part-Time Sections		0.00	0.00	0.00	29,603.00	38,061.00	67,664.00
Stipends/ curriculum dev	17,600.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	67,600.00
Lab Tech 3 (Range 48) / YR3-4 2 lab tech.		52,085.00	52,866.00	105,732.00	105,732.00	105,732.00	422,147.00
Career Specialist. 0.5		21,630.00	21,954.00	21,954.00	21,954.00	21,954.00	109,446.00
Total Salaries and wages	**$ 38,015.00**	**$ 209,103.00**	**$ 282,014.00**	**$ 409,708.66**	**$ 449,363.43**	**$ 459,023.78**	**$ 1,847,227.88**
Fringe Benefits:							
Program Manager	8,350.00	22,286.00	22,512.60	22,743.73	22,979.49	23,219.96	122,091.78
Full-time faculty		24,703.60	38,838.20	53,572.80	55,347.40	55,347.40	227,809.40
Part-time faculty		0.00	0.00	0.00	11,841.20	15,224.40	27,065.60
Stipends	1,670.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	16,670.00
Lab/Navigator		21,373.00	21,529.20	32,102.40	32,102.40	32,102.40	139,209.40
Office Asst. .5		9,804.00	9,868.80	9,868.80	9,868.80	9,868.80	49,279.20
Total Benefits	**10,020.00**	**81,166.60**	**95,748.80**	**121,287.73**	**135,139.29**	**138,762.96**	**582,125.38**
* includes Health Insurance, Retirement, OASI, Med Aid/Ind Ins, and Unemployment							
Total Salaries, Wages and Fringe Benefits	**$ 48,035.00**	**$ 290,269.60**	**$ 377,762.80**	**$ 530,996.39**	**$ 584,502.72**	**$ 597,786.74**	**$ 2,429,353.25**
Equipment							
LAB Server/software	250,000.00	10,000.00	25,000.00	30,000.00	30,000.00	30,000.00	375,000.00
Remodel 2 classrooms	300,000.00	0.00	0.00	0.00	0.00	0.00	300,000.00
FF&E 2 classrooms		0.00	0.00	0.00	0.00	0.00	0.00
Total Equipment:	**550,000.00**	**10,000.00**	**25,000.00**	**30,000.00**	**30,000.00**	**30,000.00**	**675,000.00**
Travel:							
Conference		5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	25,000.00
				0.00	0.00	0.00	0.00
E. Total Travel:	**0.00**	**5,000.00**	**5,000.00**	**5,000.00**	**5,000.00**	**5,000.00**	**25,000.00**
G. Other Direct Costs:							
Materials & Supplies		5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	25,000.00
Workspace, computers, setup	100,000.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00	110,000.00
Marketing	5,000.00	20,000.00	20,000.00	5,000.00	5,000.00	5,000.00	60,000.00
Professional Development faculty		1,150.00	1,150.00	2,300.00	2,300.00	2,300.00	9,200.00
Library subscriptions/resources	11,500.00	12,000.00	12,500.00	13,000.00	13,500.00	14,000.00	76,500.00
Accreditation Substantive Costs	6,000.00			0.00	0.00	0.00	6,000.00
Total Other Direct Costs	**122,500.00**	**40,150.00**	**40,650.00**	**27,300.00**	**27,800.00**	**28,300.00**	**286,700.00**
H. Total Direct Costs (A through G):	**$ 720,535.00**	**$ 345,419.60**	**$ 448,412.80**	**$ 593,296.39**	**$ 647,302.72**	**$ 661,086.74**	**$ 3,416,053.25**
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Rate 46% on salary & wage expenses.							
(estimated college rate for use of building/utilities/operations staff (HR/payroll/custodial)							
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State Support/Self Support							
Tuition - lower division 15 credits/State Support rate		96,150.00	205,120.00	419,983.20	462,673.80	488,442.00	1,672,369.00
Tuition - upper division 15 credits/Self-Support rate		44,835.00	167,384.00	398,134.80	597,202.20	717,360.00	1,924,916.00
State Budget Proviso	750,000.00						750,000.00
TOTAL TUITION/P	**750,000.00**	**140,985.00**	**372,504.00**	**818,118.00**	**1,059,876.00**	**1,205,802.00**	**4,347,285.00**
TOTAL EXPENSE LESS TUITION	**$ 11,978.10**	**$ (300,621.98)**	**$ (205,635.24)**	**$ 36,355.62**	**$ 205,866.10**	**$ 333,564.32**	**$ 81,506.93**