

Bachelor of Applied Science in Data Analytics

September 2013



Form C: Cover Sheet New Degree Program Proposal

Program Information

Program Name: Bachelor of Applied Science – Data Analytics

Institution Name: Bellevue College

Degree: BAS

Level: Bachelor

Type: Science

CIP Code: 52.1302 Business Statistics

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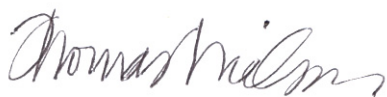
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9/13/2013

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Date

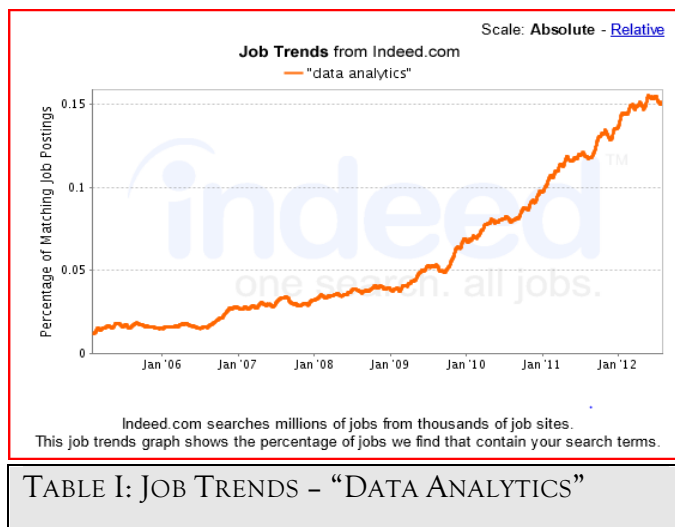
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Introduction

Bellevue College's Bachelor of Applied Science in Data Analytics (BAS in DA) will prepare graduates for employment in the rapidly emerging discipline of data analytics, which comprises analyzing and interpreting the large datasets now available to businesses, nonprofit organizations, sustainable resource developers, and more. Graduates will be prepared to work as data analysts, data technicians, and, in some circumstances, data managers, in a wide range of organizations and industries.

As noted in the statement of need for this degree, modern data analytics brings together tools and techniques from business, communication, graphic arts, information technology and statistics to collect, mine, interpret and represent large datasets to illustrate concepts and inform decisions. In this age of data driven decision-making, more and more organizations need analytics professionals, yet degrees to prepare individuals as data analysts are still rare. Bellevue College's applied bachelor's degree will help fill the growing need for data analysts. The degree will be appropriate for graduates of BC's two-year technical degrees in Applied Accounting, Business Management, Information Systems (business intelligence and database tracks), and Sustainable Business; students from Washington community and technical colleges who have similar business and IT-focused technical associate degrees, transfer students from other institutions of higher learning, and incumbent workers needing to add advanced skills.



Bellevue College's proposed Bachelor of Applied Science in Data Analytics will bridge the gap between the statistician and business professional. Opportunities for employment are rapidly growing in this baccalaureate-level job market, and there is currently no bachelor's degree that has been specifically designed to include the unique mix of knowledge and skills desired by employers. The rising trend line in Table I, above, indicates a sharp increase in job postings with key words “data analytics” over the past seven years.¹

¹ <http://www.indeed.com/jobtrends?q=data+analytics&l=09.26.12>

Baccalaureate Level Rigor

Program Learning Outcomes

Bellevue College has carefully designed the overall curriculum scope, as well as individual courses, to help students gain the knowledge, skills and abilities they need to be successful data analysts. Successful graduates of the program will meet all course and program learning outcomes.

Program graduates should be able to:

1. Use technical tools and statistical knowledge to answer questions using data;
2. Plan and organize multiple projects to meet deadlines;
3. Apply data analytics within business contexts;
4. Communicate effectively in multiple contexts and a variety of formats.

Course preparation for students transferring with a technical associate's degree

Students with technical degrees in accounting, business, and some types of information technology are well prepared for the BAS in Data Analytics. Table II, below, provides detail:

TABLE II: ENTRY REQUIREMENTS FOR DATA ANALYTICS DEGREE		
Prerequisites	Notes	Credits
Associate degree in business (management, marketing, sustainable, etc.) or accounting, or information technology (database or business intelligence)	Courses must include: College level statistics (MATH& 146, MATH 130, or equivalent; English Composition (ENG& 101 or equivalent); two sciences, including one earth, space or physical and one with lab; level-one Excel proficiency, and familiarity with databases; one humanities or social science course	90
Cumulative GPA of 2.0	In all college courses	
General education courses	At least 30 credits, as outlined in Table III, general education requirements	Included in 90 above

General Education Components of the degree

Bellevue College has planned carefully to ensure that general education credits and courses meet state guidelines for general education within applied baccalaureate degrees.² Over the course of the degree, the state requires that general education credits include a minimum of: ten credits of written communication skills, including English composition; five credits of quantitative skills; ten credits of humanities; ten credits of social science, including a

² http://www.sbctc.edu/college/e_appliedbaccalaureates.aspx 07.01.2013

communication studies course; and ten credits of natural science, including at least one life sciences course and one course with a lab.

All BAS in Data Analytics degree graduates will have taken 60 credits of general education, 30 credits of which are typically satisfied at the associate-degree level as confirmed by entrance pre-requisites. The remaining 30 credits are satisfied at the upper division level by courses in economics, philosophy, math, and communication studies. General education requirements in the Data Analytics degree are outlined in Table III, below. Course numbers with an ampersand symbol (&) are common course numbers at all Washington State community and technical colleges. Course numbers without the ampersand symbol refer to Bellevue College Courses.

TABLE III: GENERAL EDUCATION REQUIREMENTS IN DATA ANALYTICS BAS			
Subject	Credits	Met by pre-requisite	Met in baccalaureate
Communication Skills (Eng. Comp. required)	10	ENGL& 101 English Composition	
			CMST 340 Applied Organizational Communication
Quantitative Skills (college level math)	5	MATH& 146 Intro to Statistics, MATH 130, or equivalent	
Humanities	10	Student choice	
			PHIL 375 Ethics in Information Technology
Social Science	10	Student choice	
			ECON 4XX Econometrics
Natural Sciences (one lab, one life)	10	Student choice	
		Student choice	
Other, allocate per program	15		Upper division statistics series, upper division analytics courses
Total required	60		

Junior/senior level coursework

The BAS in Data Analytics is being designed with working students in mind. The majority of courses are taught through a hybrid model in which degree candidates spend some class time face to face with the instructor and some class time online. All students take the same core data analytics courses, as well as general education courses in communication studies, economics, mathematics and philosophy. Total program credits are 180.

TABLE IV: BELLEVUE COLLEGE DATA ANALYTICS JUNIOR/SENIOR COURSEWORK	
Baccalaureate courses	Credits
Core data analytics courses	
BA 240: Statistical Analysis	5
DA 310: Introduction to Data Analytics	5
DA 320: Data Acquisition and Management	5
DA 410: Multivariate Analysis	5
DA 420: Predictive Analytics	5
DA 430: Marketing Analytics	5
ISIT 330: Business Intelligence Applications	5
ISIT 334: Data Visualization	5
ISIT 434: Web Analytics	5
DA 4XX: Elective	5
DA 480/485 Internship I / II	Variable 1-5 (2-10)
DA 475: Capstone Project	Variable 2-5
Total Core	54-65
General education	
BUS& 101 or BUSIT 103 Intro to Business or SQL Fundamentals	5
CMST 340: Applied Organizational Communication	5
ECON 4XX: Econometrics	5
ENG& 235: Technical Writing	5
PHIL 375: Ethical Issues in Information Technology	5
MATH 341 and 342 - applied statistical methods, I&II	10
Humanities or social science if needed	5-10
Total General Education	35-45
Total BAS DA coursework	90-110

As noted above, students attending fulltime, which is typically three courses or 15 credits each quarter, finish the program in six quarters. Students attending part-time finish the program in nine quarters or more, depending on the number of credits they carry.

TABLE V: SAMPLE FULL-TIME DATA ANALYTICS STUDENT SCHEDULE			
First (junior) year			
Fall	Winter	Spring	Summer
Intro to Business or SQL Fundamentals	Applied Statistics I	Applied Statistics II	Internship (optional)
Statistical Analysis	Business Intelligence Applications	Applied Organizational Communication	Humanities or social science, if needed
Introduction to Analytics	Data Acquisition and Management	Data Visualization	
Second (senior) year			
Fall	Winter	Spring	Summer
Web Analytics	Technical Writing	Econometrics	
Multivariate Analysis	Predictive Analytics	Internship/Capstone	
Ethics in Information Technology	Marketing Analytics		

Program evaluation criteria and process

Assessment for the proposed Business Data Analytics 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. It 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.

Until the first five-year program review occurs, staff will evaluate the Data Analytics 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. Table VI summarizes assessment mechanisms.

Industry will engage in recommendation and review of the curriculum and program elements through the program advisory committee. This is a new advisory committee, being established with professionals from the field. The advisory committee's role 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 VI: 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	<ul style="list-style-type: none"> • Effectiveness of curriculum & teaching methods in courses • Effectiveness of program in skills & knowledge progression
Field studies evaluation by students and by employers	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Student retention • Student course success • Student progression through program • Correlation of student success and training/ job experience prior to entry
Survey of Data Analytics program faculty	<ul style="list-style-type: none"> • 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 nine months after graduation	<ul style="list-style-type: none"> • Effect of program completion on career • Effectiveness of program in meeting job expectations • Wage and career progression
Survey of employers of program graduates nine months after graduation	<ul style="list-style-type: none"> • Effectiveness of program in meeting job expectations • Observed increased skills and performance • Perceived strengths and weaknesses of current program
Oversight by Advisory Committee – provides ongoing support and program review	
Data Analytics Program Advisory Committee	<ul style="list-style-type: none"> • Completeness & relevance of curriculum to employer needs • Trends in field, technologies, practices and job markets
Survey of faculty satisfaction — assesses adequacy of program support and faculty training	
Survey of program faculty	<ul style="list-style-type: none"> • Effectiveness of institutional & program resources & support • Preparedness to teach the curriculum
Impact on two-year programs — assesses impact of Analytics program on existing degrees in business, accounting and IT	
Survey and/or focus group of students enrolled in two-year degree programs	<ul style="list-style-type: none"> • Impact of Data Analytics program on the quality of the 2-year degrees • Impact on faculty availability and support • Impact on institution & program resources & support • Impact on culture
Survey of faculty teaching the two-year associate degree programs	<ul style="list-style-type: none"> • Impact of Data Analytics program on the quality of the 2-year degree • Impact on faculty availability and support • Impact on institution & program resources & support • Impact on culture

Experts from business, data analytics, information technology, and specialty areas have already been engaged, and will continue to be engaged throughout the full curriculum development and implementation phase to ensure rigor of the content and learning methodologies. Subject matter experts with experience in data analytics and higher education have assessed the overall curriculum and the courses to ensure rigor, consistency and quality.

Qualified faculty

Bellevue College projects 20 FTE enrollment during year 1 of the BAS in Data Analytics, with full capacity achieved by 2017 with FTE of 35. To support this number of students, the program will need one new full-time equivalent faculty (FTEF) in 2014. 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 Data Analytics. Total FTEF dedicated to the program will be 1.7.

Faculty teaching in the program will be required to hold a minimum of a master's degree and maintain appropriate certification.

TABLE VII: FACULTY PROFILES			
Faculty Name	Credentials	Status	Course(s)
New faculty member - 2014	MS or above	To be hired	Data analytics courses
Hurst, Stephanie	MA, Speech Communication	Fulltime tenured	Advanced communication course(s)
Kato, Miranda	EdD, Human Resource Management	Adjunct Faculty	Business courses, Capstone course
Li, Xiao (Winnie)	MS, Statistics	Fulltime tenured	Data analytics courses
Oleson, Katherine	MA, Communication	Fulltime tenured	Advanced communication course(s)
Payne, William (Russ)	PhD, Philosophy	Fulltime tenured	Philosophy course
Stiehl, Chace	PhD, Economics	Fulltime tenured	Department chair – will staff econometrics course
Unwin, Sylvia	MS, Computer Science	Fulltime tenured	Information systems and technology courses
Villines, Andria	MS, Mathematics	Fulltime tenured	Advanced statistics series
Woo, Judy	PhD, Business	Fulltime tenured	Business courses
Yarborough, Steve	MA, English	Fulltime tenured	Department chair – will staff technical writing course

Selective Admissions Consistent with Open Door Institution

Although the new degree will employ a selective admissions process, it will be consonant with the college's open door philosophy. Qualified applicants who meet the priority due date will receive first consideration. If there are more program slots than applications, applicants who do not meet the priority due date will be considered.

Should there be more qualified applicants than there are openings in the program, the college will first consider offering additional course sections, if feasible. For example, if there were 50 qualified applicants and 25 openings, the college would consider adding a cohort, if appropriate faculty are available, so that all qualified students would be admitted.

If there are more qualified applicants than there are openings, but not enough applicants to add an additional section, or another section is not feasible, the college will admit some students and place the remainder on a wait list, based on the following criteria:

1. Fifty-percent of the cohort slots will be awarded based on GPA, rank ordered, i.e., 3.8, 3.78, 3.6.
2. The remaining fifty percent of cohort slots will be awarded by lottery, from the remainder of qualified applicants.
3. Any remaining qualified applicants will be placed on a wait list.
4. If additional program slots become available, admission will be determined by lottery from the wait list, so all students will have equal opportunity to be admitted.

The program will assess this process each year and determine if changes need to be made, based on student progress and retention, diversity of student group, and other factors as they emerge.

The bachelor's program will employ practices implemented by the college's Office of Equity and Pluralism to attract a diverse student population to the college. These include:

- Recruit people of color who are BC program graduates and professionals to serve as role models, serve on the advisory committee and make presentations to currently enrolled associate degree students to encourage them to pursue the bachelor's degree;
- Engage in targeted marketing and through mailed marketing materials to encourage persons of color and from underserved 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 hires from underrepresented groups;
- Work with businesses and professional organizations to develop additional strategies to attract a diverse student body from workers in their employment ranks who do not have a bachelor's degree; and,

- Regularly assess recruitment/retention efforts with regard to underrepresented populations, and continually monitor and strive to improve the program's culture of appreciation and respect towards diversity.

Once the degree is approved, the Bellevue College Foundation will begin discussions with local businesses to create program scholarships to assist those that could otherwise not attend. Students will also be able to apply for existing BC scholarships that serve financially disadvantaged students and students of color.

Student enrollment

Based on the enrollment patterns of Bellevue College's existing applied baccalaureate programs, it is expected that about two-thirds of the students will attend full-time. Of those attending part-time, the majority will carry ten credits per quarter and finish within seven quarters.

TABLE VIII: BAS IN DATA ANALYTICS ENROLLMENT PROJECTIONS					
Year	1 2014-15	2 2015-16	3 2016-17	4 2017-18	5 2018-19
Headcount	20	38	48	63	78
FTEs	16	32	38	52	64
Graduates	0	10	10	20	30

Serving place-bound working adults

The program has been designed specifically to serve place-bound, working adults and will be taught as a low-residency, hybrid delivery model. As previously mentioned, synchronous connection through a computer and video camera will be available in campus-based courses for those who cannot commute to the college. This model has worked well for the college's BAS in Radiation and Imaging Sciences, now in its seventh year.

Recruitment and Facilitation of Articulation Requirements

Through wide distribution of the entrance prerequisites to all feeder programs in the state, students will have ample opportunity to take any prerequisite courses that are not required as part of their associate degree. In addition, information will be shared by statewide lists of Instructional and Student Services Vice-Presidents and Workforce Deans.

BC staff plan to meet this fall with the feeder colleges to discuss admission requirements, which will also be disseminated through the above-mentioned networks. Recruitment will be conducted at the community and technical colleges, through the Bellevue College website, and at area businesses.

Appropriate student services plan

As a community college, one of BC's strengths is the variety of student-focused support services that help students achieve success in accomplishing their goals. Students in the Data Analytics program will be supported by the same high-quality student services that all students receive.

As Bellevue College has added new applied baccalaureate degrees, the college has focused on integrating support for baccalaureate students across the institution. For example, additional FTE have been added in enrollment services to provide transcript evaluation for incoming applied-baccalaureate students. Similarly, program advisors for applied baccalaureate degrees assist students who wish to continue to master's degrees with that transition. Beginning in academic year 2013-14, the library has added 1FTE librarian assigned specifically to the bachelor's degree programs, which provides another institutional touch point for students. All self-support baccalaureate programs return a portion of the tuition paid to the college to provide program support to baccalaureate students.

Access to student services

We project that at least 50% of students in the Data Analytics program will be working. These students will be taking hybrid-delivery classes, and a typical full-time student would come to campus perhaps twice each week. In order to ensure access to program advising, the program manager will be available for appointments close to class time, in addition to availability by email. The program manager is the single point-of-contact for students, from before admission, through the program, and into transition to master's degrees for those who wish to continue to graduate school. This single-point-of-contact model has worked well in Bellevue College's other applied baccalaureate degrees, and the college plans to continue it for future degrees.

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.

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

The following services will be those most frequently used by baccalaureate students.

Student Advising, Retention and Success: The model that has worked well for the college's baccalaureate programs and will be used for the new degree is an imbedded program manager who works one-on-one with students to facilitate their success. The manager assists students with their educational planning and progress towards degree completion while supporting the program chair and faculty who conduct academic advising.

Each student will have an individualized schedule and advising plan. 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. Student retention and student success are the college's top priorities. Students appreciate and respond to having a specific person they can go to for assistance. Program faculty will work with students who need additional assistance to develop personalized student success strategies.

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.

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 BAS. An effective advisory board comprised of regional data analytics employers will help to identify jobs. Through the required internship and 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.

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 applied

baccalaureate programs. The distance education office provides extensive technology assistance and student services for all online students.

STEM to Stern Cohort: The STEM to Stern cohort, originally funded through the National Science Foundation, has been institutionalized by the college. The program was designed to provide ongoing membership in a STEM community to students from historically underrepresented groups. Cohort members meet once weekly for presentations by professionals in STEM fields, are assigned a professional mentor, and complete numerous learning modules together, on topics ranging from study skills to interviewing techniques.

TRiO: Students who are first-generation college, low-income, or have a documented disability receive academic and personal support. Services include tutoring, study skills, advocacy, and laptop computer lending. The Department of Education has approved extension of this program to all bachelor's degree students who fit eligibility criteria.

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

Appropriate staff and administration

Bellevue College implemented its first applied-baccalaureate degree in 2007, a second program in 2009, a third in 2012, and has two new programs currently admitting students for a fall 2013 start. We have been assessing and adjusting the model for program administration as more programs are added, which has led to the following:

Program chair responsibilities are typically filled by full-time faculty members (see Table VII). In addition to managing the program, the BAS in Business Data Analytics chair will teach two courses per quarter, providing valuable connection to and insight into many aspects of the program. Administrative responsibilities for the faculty program chair 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.

The advising section in the student services plan states that educational planning will be handled locally from within the program by the Program Manager. The Program Manager will also:

1. provide information about the program to prospective applicants;
2. monitor student progress;

3. guide students to other available student services to aid in their success;
4. assist students with advising or course issues.

The Program Manager position is a full-time exempt position. It will also provide administrative support for the program, its chair and the faculty. This model has worked well in the college's existing baccalaureate programs.

TABLE IX: ADMINISTRATION AND STAFF			
Name	Title	Responsibilities	Admin Effort %
TBD	Program Chair	Manage BAS program, conduct program assessment, hire faculty, oversee budget, market program, oversee admissions, implement recommendations of advisory committee (33% administration; 66% instruction)	33%
Ehmke-Reedy, Shanon	Program Manager	Provides administrative support to chair, faculty and students Provides student services assistance to applicants and students to promote student success	100%
Total Staff FTE			1.33

Commitment to build and sustain a high quality program

The BAS in Data Analytics program will be funded as a self-support program. The tuition will be set at the same level as state-funded applied bachelor's degree programs, which for 2013-2014 is \$245.45 per credit.

Many courses will be structured as hybrid, with much instruction and student course work taking place online. Students will come to campus one or two days each week, depending on their schedule, for interactive learning. This inverted classroom model is not only convenient for working adults; research shows that using classroom time for content engagement rather than purely for lectures leads to better student engagement and learning outcomes.³ Course meetings will be scheduled at convenient times for working students and not during peak campus use times, so no new facilities or classrooms will be required for the program. Specialized instructional resources will include library subscriptions to analytics periodicals and software licenses for statistical and data visualization programs. Funding has been included in the budget to cover the annual expenses associated with these resources. 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 X, below.

³ National Center for Academic Transformation: <http://www.thencat.org/Monographs/IncSuccess.htm>
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TABLE X: BAS DATA ANALYTICS: ESTIMATED PROGRAM EXPENSES						
	Year 0 (FY 13)	Year 1 (FY 14)	Year 2 (FY 15)	Year 3 (FY16)	Year 4 (FY17)	Year 5 (FY18)
Administrative Salaries (1 FTE)	24,250	48,500	48,500	48,500	48,500	49,955
Full-time Faculty Salaries (1 FTE year 1 and beyond)	28,750	57,500	58,500	58,500	59,500	60,000
Part-time Faculty Salaries	0	30,000	30,000	30,000	30,000	30,000
Curriculum Development Stipends	11,000	11,000	4,000	4,000	4,000	4,000
Benefits	21,760	49,980	47,940	47,940	48,280	48,945
Goods and Services	0	5,000	5,000	5,000	5,000	5,000
Travel	1000	3,000	3,000	3,000	3,000	3,000
Equipment	0	30,000	5,000	3,000	3,000	5,000
Indirect		18,798	24,233	29,991	30,192	41,180
Total Costs	86,760	253,778	226,173	229,931	231,472	247,080
ESTIMATED DATA ANALYTICS PROGRAM INCOME						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Self-Support Tuition and Fees	0	147,960	220,905	380,000	520,000	640,000
Bridge Loan	86,760	106,000	5,300			
PROGRAM REINVESTMENT AFTER EXPENSES AND INDIRECT						
Balance to re-invest	0	182	32	150,069	288,528	392,920

Program specific accreditation

Data Analytics degrees are very new. At this point, the college does not have plans to seek program specific accreditation, as there is no appropriate accrediting body. If, at some point in the future, an appropriate program specific accreditation becomes an advantage for these programs and their graduates, the college will assess the potential benefits. The college will advise students of individual certifications that may be of benefit to them, such as [Google Analytics](#).

Pathway options beyond baccalaureate degree

Graduates of the Business Data Analytics program who are interested in obtaining a graduate degree will be well prepared for masters in data analytics, business administration, and information technology. Dr. Leo Irakliotis of Western Governors University has stated that graduates would be eligible for any of WGU's existing Information Technology master's degrees, as well as for two new degrees: MS in Analytics and MS in Computer Science.

Expert evaluation of program

Bellevue College has selected two experts to provide external review. Dr. Eric Suess of California State University East Bay and Dr. Leo Irakliotis of Western Governors University. See Appendix II for complete comments.

In response to feedback from the external reviewers, Bellevue College 1) changed the sequencing of courses to make content flow more smoothly; 2) reduced the required credits of internship; 3) added information on unstructured data analysis and other advanced topics to the introductory data analytics courses, and 4) changed the title of the statistics course series to reflect the applied nature of the courses. In addition, as faculty develop the complete courses over the next year, they will work together to assess the type, level and quantity of quantitative skills required for successful completion of the degree, admission to a graduate program, and employment. Dr. Irakliotis suggested that the quantitative bar might be set too high, while Dr. Suess suggested it might need to be higher to prepare students for certain graduate degrees. Faculty will work to balance the needs of employers with the requirements for graduate school with the goal of meeting the needs of both and providing the broadest opportunities for students.

Appendix I: Course Descriptions

BA 240: Statistical Analysis – 5 credits

Surveys techniques used in decision-making and research. Topics include descriptive and inferential statistics, probability, central tendency, variability, normal and t-distributions, hypothesis testing, and regression. Material has applications in business, health care, etc. Prerequisite: MATH 138 or MATH& 141 with a C or better, or entry code.

Course outcomes:

- Present, calculate and interpret:
 - mean, median and mode
 - standard deviation, standard error, variance
 - applications of probability, normal and t-distributions, bell curve analysis
 - confidence intervals and sampling error
 - hypothesis testing
 - z-scores, t-tests, p-values
 - correlation, simple linear regression, time series analysis
 - chi-square
- Analysis of variance
- Multiple regression
- Analyze and evaluate research methodology e.g. gathering of information, sampling, inaccuracies, presentation of information and bias, misleading pitfalls
- Research, locate and evaluate of various data sources via internet, secondary, tertiary resources, original research publications
- Define and classify variable types, discrete variable formats, binomials
- Analyze and appropriately apply statistical procedures to data and types of variables
- Estimate population parameters with confidence intervals
- Identify hypothesis setups, appropriate comparisons, type I and II errors
- Describe and apply the roles of statistics as descriptors versus inferences, prediction
- Illustrate applied examples and procedures in different fields e.g. bio-med, business, economics, engineering, health professions, nursing, psychology, sociology, social work, others
- Synthesize procedures, concepts, applications
- Interpret and apply meaningfulness of statistics in research studies
- Demonstrate use of a statistical package e.g. Excel, SPSS, SAS, Minitab or other
- Self assess writing for evidence sequence, focus, organization, style and mechanics
- Work effectively in teams

BUS& 101 Introduction to Business – 5 credits⁴

Examines the role of business in a modern economy: growth, structure, organization, and relationship to the environment. Students investigate the objectives, functions, and management of business firms. Other topics include problems of organization, decision-making, and controls.

Course outcomes:

- Define pertinent business vocabulary

⁴ Taken first quarter by students who have not previously taken this course or its equivalent.

- Identify contemporary business concepts, principles and practices.
- Exhibit knowledge of the functions of business such as management, organization, human relations, marketing, financing and ethics.
- Analyze local and global business enterprises and environments in which they exist.
- Demonstrate an ability to work with a team to develop a business plan.
- Exhibit proficiency in analyzing information found in business publications.

BUSIT 103: SQL Fundamentals – 5 credits⁵

Students learn the fundamentals of database structure and SQL (Structured Query Language). They learn techniques useful for querying databases and they learn to apply their skills in realistic scenarios extracting data and organizing it into meaningful information. Students gain experience with database servicers and client tools. Recommended: Familiarity with spreadsheets or databases.

Course outcomes:

- Explain the structure of tables in a relational database
- Explain how tables in a relational database relate to one another
- Create well structured tables
- Write SQL queries to retrieve data from a database
- Write SQL to join tables
- Write SQL to sort data appropriately
- Write SQL to filter data using logical operators and complex expressions
- Write SQL using subqueries
- Explain strategies for improving query performance
- Import data into a database from a variety of sources
- Export data from a relational database into a variety of formats
- Use client tools to work with a database server

CMST 340: Applied Organizational Communication – 5 credits

Examines and applies communication concepts and theory to an organizational setting. Students self-assess, analyze, develop and practice skills to effectively communicate in a diverse work environment. Topics include listening, teamwork, decision making, conflict management, collaboration, verbal and nonverbal communication, presentation skills, audience adaptation, organizational communication, and intercultural communication. Prerequisite: Acceptance to the program or permission of instructor. Recommended: CMST 220, CMST 230, or CMST 280

Course outcomes:

1. Self-assess one's own communication behaviors and effects.
2. Demonstrate the types of language and nonverbal communication that promote effective communication within a specific organizational culture.
3. Demonstrate collaborative behaviors in a diverse group.
4. Analyze how organizational structure culture influence interaction.
5. Demonstrate intercultural competence in an organizational setting.
6. Demonstrate active listening and communication effectiveness.
7. Apply appropriate approaches for effective conflict management in a variety of settings.
8. Demonstrate effective teamwork and decision-making.

⁵ Taken first quarter in program by students with no information technology background, i.e., students transferring from business management or sustainable business programs.

9. Deliver presentations that apply elements of effective public speaking.
10. Demonstrate appropriate audience adaptation in a variety of communication situations.

Data Analytics 310: Introduction to Analytics – 5 credits

Data analytics is a body of methods that helps to describe facts, detect patterns, develop explanations, and test hypotheses. In this course students will be introduced to the nature and importance of data management, data analysis and data representation and generalization, including the common statistical and technological tools and their applications in real world decision-making and research. Students will examine how data analysis technologies can be used to improve decision-making in business, administration, and policy as well as in the sciences, health care and education. Students will also learn the fundamentals of database management systems and data mining. This course emphasizes quantitative and technology based analysis of real world problems as well as report writing and presentation skills. Prerequisite: MATH 130, 138 or MATH& 141 with a C or better, or entry code.

Course outcomes:

- Identify the relationship between data analytics and business decision-making process
- Analyze and evaluate research methodologies
- Identify the most common statistical tools of data analytics
- Identify the most common technological tools used in data analytics such as Excel, Minitab, S-Plus, SAS, or R
- Define fundamentals in database management systems and data mining
- Evaluate business problems and determine suitable analytical methods
- Use statistical software such as Excel or R to manage data sets in various sizes and formats
- Interpret results and clearly state the conclusion in reports and presentations with close attention to details

Data Analytics 320: Data Acquisition and Management – 5 credits

In this course students will learn core concepts of contemporary data collection and its management. The course will focus on collecting data ethically from a variety of sources, such as databases, sensors, experiments, and surveys, as well as assessing data quality. Students will also learn techniques to clean data, process data, combine data from different sources, store data and maintain data while keeping in mind privacy and security issues. The focus will be on real world examples from a variety of sources and using statistical software such as Excel, SAS, or R. Students should expect to produce reports and presentations. Prerequisite: DBA 310 or entry code.

Course outcomes:

- Classify data collection methods
- Identify types of data and sources
- Assess data quality and implications
- Plan, organize and evaluate methods to prepare raw data for business problems
- Use statistical software, such as Excel, SAS or R to select appropriate data source and appropriate amount of data
- Identify and apply fundamental principles in data mining.
- Apply appropriate techniques to clean, process, combine, store and maintain data.
- Identify ethical and security concerns in data collection and storage

Data Analytics 410: Multivariate Analysis – 5 credits

This class will focus on various statistical methods for analyzing more than one outcome variable and understanding the relationships between variables. Topics may include MANOVA, repeated measures design, discriminant functions, factor analysis, canonical correlation, and cluster analysis. The focus will be on real world examples from a variety of sources and using statistical software such as SAS or R. Students should expect to produce reports and presentations. Prerequisite: DBA 320 and Math 342 or entry code.

Course outcomes:

- Identify the common multivariate analysis methods, and their advantages and limitations.
- Evaluate the relevant aspects of a real world data set and choose an appropriate type of multivariate analysis method
- Formulate, fit, and apply models using statistical software such as SAS or R
- Perform model assessment and improvement
- Interpret results and clearly state conclusions in reports and presentations with close attention to detail and showing knowledge of data extraction and evaluation methods from previous classes

Data Analytics 420: Predictive Analytics – 5 credits

Predictive analytics finds previously undetected trends/patterns in large data sets to help identify business risks and opportunities. Students will study the process of formulating business objectives, data selection, preparation, and partition to successfully design, build, evaluate, and implement predictive models for a variety of practical business applications. The topics include a variety of predictive models such as classification and decision trees, machine learning, regressions, time series and survival analysis. The focus will be on real world examples from a variety of sources and using statistical software such as SAS or R. Students should expect to produce reports and give presentations. Prerequisite: DBA 320 and Math 342 or entry code.

Course outcomes:

- Identify the common predictive analytics techniques, and their advantages and limitations.
- Identify common predictive models and classifiers and their applications.
- Evaluate the relevant aspects of a real world data set and choose an appropriate type of predictive analytics technique
- Build machine learning model such as decision trees, ensemble modeling etc.
- Formulate, fit, and apply the model using statistical software such as SAS or R
- Perform model assessment and improvement
- Interpret results and clearly state conclusions in reports and presentations with close attention to detail.

Data Analytics 430: Marketing Analytics – 5 credits

Marketing analytics focuses on measuring, managing, and analyzing marketing performance to maximize effectiveness and efficiency. This course introduces a quantitatively oriented view of marketing strategy and provides tools and methods to leverage data to inform marketing strategies. Topics may include competitive analysis, segmentation, targeting and positioning, the marketing mix and mix response analysis, demand models and optimal pricing, models of consumers' choice, models for new product development, lean analytics, and customer retention and acquisition. The focus will be on real world examples from a variety of sources and using statistical software such as

Excel, SAS, or R. Students should expect to produce reports and give presentations. Prerequisite: DBA 320 and Math 342 or entry code

Course outcomes:

- Identify the common marketing strategies, and their advantages and limitations.
- Identify common mathematical/statistical models used in marketing analytics
- Apply mathematical/statistical models to support marketing decisions
- Choose appropriate metrics and analysis technique for a real world scenario
- Formulate, fit, and apply the appropriate model using statistical software such as SAS or R
- Evaluate the consequences of marketing decisions systematically and analytically.
- Interpret results and clearly state conclusions in reports and presentations with close attention to detail and showing knowledge of data extraction and evaluation methods from previous classes

DA 475: Data Analytics Capstone Project - Variable 2-5 credits

In this integrative learning course, students will engage in planning, designing, implementing and presenting a project demonstrating the attainment of business analytics program learning outcomes, as well as professional competencies and career readiness.

Course outcomes:

- Design, develop, and implement a project following systematic methods acquired from the program
- Collaborate with a business sponsor, business liaison, and coaches to define the scope of the project
- Apply skills and knowledge attained from the program to address real and complicated business issues relevant to the sponsor organization
- Develop a written report commensurate with the scope and complexity of the project
- Present the project/deliverable orally to the sponsor audience, which may include business sponsor(s), business liaison(s), and subject matter experts.

DA 480: Data Analytics Internship I - Variable 2-5 credits

Data Analytics Internship I provides students with opportunities to enhance learning through hands-on experiences and close collaboration with an experienced data analyst. Through internship, students will not only relate knowledge they acquired from courses to real-world business settings but also have a chance to reflect on their career goals and skills sets against the employer's job expectations.

Course outcomes:

- Identify career objectives, strengths and skill sets
- Develop internship objectives
- Identify potential employers for internship opportunities
- Prepare career portfolio and resume for internship interviews
- Develop performance measures reflecting performance objectives articulated by potential employer/mentor
- Solicit performance feedback from business mentor(s)
- Develop skill improvement plan based on internship experience and self-assessment.

DA 485: Data Analytics Internship II - Variable 2-5 credits

Data Analytics Internship II provides students with opportunities to further explore the work and life of a data analyst in a specific business field of the student's interest. Through internship, students will perform the tasks of an analyst under the supervision of an experienced business mentor.

Course outcomes:

- Assess career objectives, strengths, and skill sets against the skill improvement plan identified in Internship I.
- Develop internship objectives
- Identify potential employers for internship opportunities prepare career portfolio and resume for internship interviews
- Develop performance measures reflecting performance objectives articulated by potential employer/mentor
- Solicit performance feedback from business mentor(s)
- Develop new skill improvement plan based on internship experience and self-assessment.

ECON 4XX: Econometrics – 5 credits

This course introduces theory and applications of Econometrics that are used in economics, business, finance, and many other disciplines. Students will learn to construct econometric models using real world empirical data, to conduct hypothesis testing and forecasting in econometrics, and to estimate and interpret the parameters of those models. Students should expect to create technical reports and present findings.

Course outcomes:

- Choose from appropriate econometric tools
- Apply econometric software to modeling, estimation, inference, and forecasting in the context of real-world economic problems
- Perform model assessment and improvement in econometric context
- Critically evaluate results and conclusions by others using econometric tools
- Competently use software such as Microsoft Excel, Eviews or Stata in an econometric context

ENGL& 235: Technical Writing – 5 credits

Focuses on the development of professional skills in research, design, and communication of technical information. Emphasis on audience analysis, clear and effective writing style, and use of visual elements, by creating documents in a variety of professional report formats, such as memos, proposals, progress reports, completion reports, and instruction manuals. Computer use is required. Fulfills a written communication course requirement at BC. Prerequisite: ENGL& 101 or equivalent course from another college with a C- or better.

Course outcomes:

- Write documents such as summaries, instruction manuals, analyses, proposals, and research reports, using accepted professional formats
- Design a research strategy to solve a specific problem for a specific client
- Conduct secondary and primary research
- Propose a clearly reasoned, convincingly supported solution to a client's problem
- Paraphrase, summarize, and quote information with integrity and document sources accurately, following the accepted form for the field of inquiry
- Design visually effective documents and presentations

- Revise and edit to improve clarity, economy, and rhetorical effectiveness

ISIT 330: Business Intelligence Applications – 5 credits

Students learn about business intelligence applications and appropriate application architecture for a variety of scenarios. The benefits of BI and the possibilities for organizational change are discussed. Students use current BI tools to develop realistic solutions. Current trends are discussed, as is the growing role of “big data.”

Course outcomes:

- Analyze the role of Business Intelligence (BI) in organizations
- Analyze the components of a Business Intelligence solution
- Evaluate the applicability of various BI solutions for an organization
- Evaluate the benefits an organization may derive from various types of BI solutions
- Analyze the role of a data warehouse
- Create reports from data in a data warehouse using current reporting software tools
- Analyze the various types of analytic data repositories and the advantages of each
- Create multi-dimensional databases to allow for ease data analysis
- Create reports from data in a multi-dimensional database using current reporting software tools
- Analyze the capabilities of analytic software tools
- Create interactive data visualizations and analyze data from a variety of sources using current analytic software tools
- Analyze the role of performance management in an organization
- Evaluate the benefits of performance management

ISIT 334: Data Visualization Tools and Techniques – 5 credits

This course introduces the theory and concepts related to effective display of data with a focus on quantitative data. Students learn the principles of preparing effective visualizations and the tools to create such visualizations. Students use analytic tools to create visualizations.

Course outcomes:

- Analyze a variety of data visualization techniques and their applicability to various scenarios
- Analyze the characteristics of an effective data visualization
- Select an appropriate visualization technique for a data analysis scenario
- Create an appropriate interactive visualization for a data analysis scenario using software tools
- Analyze the capabilities of data visualization software including analytic software, reporting software and spreadsheet software
- Create a variety of data visualizations using analytic tools
- Create a variety of data visualizations using reporting tools

ISIT 434: Web Analytics – 5 credits

Students learn techniques for analyzing data generated by web traffic and social media sites. Students learn the importance of such data to an organization and they learn what analytic measures are

available and applicable. Students also learn how to implement web data collection and analytic tools for web sites. Prerequisite: ISIT 330 Business Intelligence Applications, experience with web programming

Course outcomes:

- Analyze the types of information web traffic can provide
- Formulate how web and social media data is important to an organization
- Utilize current tools to collect web traffic data
- Analyze traffic data collected from a web-site
- Create appropriate reports/visualizations of web traffic data
- Appropriately interpret reports produced by analytic tools
- Analyze traffic data for patterns identifying visitor behavior
- Present analysis results to stake-holders
- Suggest web-site improvements based upon analysis of web-site traffic
- Implement analytic tools for web-site data collection
- Apply web analytics tools to web-sites to solve real-world business problems

MATH 341: Applied Statistical Methods I – 5 credits

This class covers probability theory and applications including trees and Venn diagrams, conditional probability, contingency tables, independence and Bayes theorem. It will cover random variables and sampling distributions (binomial, Poisson, normal, exponential, geometric and hypergeometric) and their use in Confidence Intervals and hypothesis testing such as t-tests, z-tests, one and two sample mean and proportions, chi-squared; ANOVA. The focus will be on real world examples from a variety of sources and using statistical software such as Excel, Minitab, SAS or R. Students should expect to produce reports and presentations. Prerequisite: MATH 146 or BA 240 or entry code.

Course outcomes:

- Formulate a real world problem into the appropriate statistical model
- Calculate probabilities using the appropriate rule, table or diagram
- Classify the sampling distributions and calculate probabilities
- Choose appropriate calculations for a confidence interval or a hypothesis test
- Perform calculations with and without technological tools
- Perform appropriate ANOVA model
- Interpret results and clearly state conclusions in reports and presentations with close attention to detail

MATH 342: Applied Statistical Methods II – 5 credits

This class will focus on various types of linear models including simple and multiple regression, and log-linear models, as well as stepwise regression, logistic regression, and analysis of variance/covariance. The focus will be on real world examples from a variety of sources and using statistical software such as Excel, Minitab, SAS or R. Students should expect to produce reports and presentations. Prerequisite: BDA 320 and MATH 341 or entry code.

Course outcomes:

- Identify various general linear models and their characteristics, advantages and limitations
- Evaluate the relevant aspects of a real world data set and choose an appropriate type of regression model for data sets of various sizes and formats
- Formulate, fit, and apply the models using statistical software such as SAS or R

- Perform model assessment and improvement
- Interpret results and clearly state conclusions in reports and presentations with close attention to detail and showing knowledge of data extraction and evaluation methods from previous classes

PHIL 375: Ethical Issues in Information Technology – 5 credits

Investigates ethical problems relating to information technology through ethical theory and case studies. Involves in-depth and original research and discussion of ethical issues including privacy, control of information and intellectual property rights.

Course outcomes:

- Explain and evaluate ethical principles and the philosophical arguments that bear on them.
- Apply ethical principles to a broad range of issues in information technology including intellectual property rights, privacy, freedom of expression and information security.
- Recognize and develop strategies for dealing with varying cultural perspectives on IT related ethical issues
- Apply ethical principles in detailed case studies
- Evaluate arguments for and against proposed solutions to ethical dilemmas in information technology.

Appendix II: External Expert Review

Bellevue College received external reviews from two subject matter experts in higher education. Their complete comments are included following their bios, below. Comments are in *italics*.

Dr. Leo Irakliotis, Dean, College of Information Technology, Western Governors University, M.S. Physics, Ph.D. electrical and computer engineering. Dr. Leo Irakliotis is a data scientist and architect with more than 15 years of experience as a university professor, program director, dean, and consultant. He is currently the Dean of the College of Information Technology at Western Governors University. Prior to that he was the Dean of the Graduate School for Computer and Information Sciences at Nova Southeastern University. In 1997 he joined MCI Telecommunications where he worked as an executive engineer in research and development. From 1997 until 2009 Irakliotis was a member of the Department of Computer Science at the University of Chicago where he served as the Director of the Professional Programs, a founding fellow of the Computation Institute, and associate chairman. His research focuses on parallel database system implementation with high-density optical storage, data modeling and data mining techniques for high-frequency data, medical informatics, and technology and public policy issues.

The proposed program is well developed and balanced. The courses seem to be well crafted and in the right direction. My sole concern is whether this proposal is too aggressive in terms of quantitative skills. This is a question that you can answer better than myself, because you understand the demographic and talent you will serve with the proposed degree.

To answer your specific questions:

Is the baccalaureate curriculum heading in the right direction?

Absolutely yes. In fact your proposed curriculum is one of the most balanced and well developed I have seen.

If there are any major elements missing?

I did not see any content about analytics on unstructured data sets (e.g., text or images). Maybe such content is included under broader course objectives in the proposed curriculum. Recognizing that it is impossible to develop an all-inclusive degree program, I would recommend that you consider including some discussion on unstructured data sets or provide an explicit rationale for its exclusion. I do not consider this a major element missing; however it is a good issue to address either by including some discussion on the topic or by articulating its exclusion.

Have we included any courses that you think are unnecessary?

The proposed curriculum is balanced very well. The courses seem to complement each other. My only concern is "PHIL 375: Ethical Issues in Information Technology". The elements of this course may be diffused in other courses and if so, there may be no need for a separate course on ethical issues. Nonetheless, this is not a major issue.

At WGU, what master's degrees would this curriculum prepare students to enter?

My estimation is that students graduating from the proposed BAS will be able to enroll in any of the existing MS in IT program at WGU. Final determination of transferability is subject to an analysis that will be conducted by our registrar's office. I am confident however that your graduates can easily enroll to any of our existing MS in IT.

Furthermore, I expect that graduates of the proposed BAS will be qualified to enroll in two new MS in IT programs we anticipate to launch in the next 12-18 months:

MS in Analytics;
MS in Computer Science.

With respect to your final question about the most appropriate name for the program, my personal preference is "Data Analytics".

Overall I believe that Bellevue has developed an extremely thorough and well-balanced curriculum in Data Analytics. It's promising and I am confident it will be successful.

Dr. Eric A. Suess is Chair & Professor of the Department of Statistics and Biostatistics, with a joint appointment with Department of Engineering, at California State University, East Bay. He has a Ph.D. in Statistics from the University of California, Davis, an M.S. in Statistics from CSU East Bay, and a B.A. in Statistics and Economics from UC, Berkeley. He has published numerous articles and Directed Development of the Masters of Professional Science in Biostatistics program through a Sloan Foundation grant.

1. *If the baccalaureate program appears to be heading in the right direction*

Yes. The core curriculum and electives (as I see them) seem to be on target, from what I know about this new field. I do think it would be useful to identify what the core curriculum is
Core: Statistical Analysis>Adv Stat I>Adv Stat II>Multivariate Analysis>Predictive Analytics
Intro to SQL>BI Applications>Data viz>Econometrics>Web Analytics>Marketing Analytics
Intro to Analytics>Data Acquisition and Management>Tech Writing>Applied
Org>Internship>Ethics

I do not know what the Capstone is exactly.

I do think some of the courses could be reorganized to have a better flow.

Also, I think Adv Statistics I and II is inappropriately named. Nothing in these classes are advanced topics in my opinion.

I commented on the Econometrics course seeming out of place in this program. It would be better to be called something like Time Series Analysis and Forecasting.

2. *If there are any major elements missing*

I do not see reference to any modern commonly used software for data science. These might include SPSS, Revolution Analytics, R, weka, knime, Rapid Minter, etc.

Also there are a number of Microsoft programs that could be used. PowerPivot comes to mind. And Excel 2013 seems to be much better and more useful than before. Introduction to data flows, i.e., twitter feed, might be more clearly placed in some course description

3. If we have included any courses you think are unnecessary

Econometrics seems to be out of place

Do you have books selected for each class? Many of the course titles do not seem to be clearly related to a textbook, from my knowledge of these topics. If books have not been selected yet, effort should be made now to identify the books that could be used.

Courses:

For MATH 341/342, the statistics courses, remove “advanced” from titles, as these topics are not yet advanced; advanced would be graduate level course.

DA 310 – in the introduction to the field of analytics, mention marketing and web analytics.

DA 410 may be too heavy on content and too advanced re: math skills. Students would need linear algebra.

Could change to a multiple regression course. In that case, look for overlap with MATH 342, or could split predictive analytics course into two courses

Terms:

DA 310/BA 240 – the term “technology tool” is vague – technology can mean many things –

DA410 – make term consistent – you use multivariate analytics and multivariate analysis- it’s analysis.

For all courses, when listing multiple software products, list licensed products prior to open source products, i.e., SAS prior to R.

Sequencing:

Why two internships? 5 credits per internship too much – should be 2 credits maximum.

Internship II should be after the marketing/web analytics courses to be of value to students.

PHIL 375 – could move to last quarter

ECON 4XX – could move later in degree to enable teaching marketing and web analytics earlier

Capstone could be taught the same quarter as internship, preferably Spring quarter in Senior year.

4. At CSU East Bay, what master’s degrees would this curriculum prepare students to enter?

MS Statistics program requires a year of Calculus through multiple integrals. If these courses are completed during this program, then the next step would be an MS in Statistics. I cannot speak to preparation to other MS programs specifically.