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**MEMORANDUM**

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| <b>ATTENTION</b> | Senate                                                                                                                    | <b>DATE</b>  | January 16, 2013 |
| <b>FROM</b>      | Jon Driver, Vice-President, Academic and Provost, and Chair, SCUP                                                         | <b>PAGES</b> | 1/1              |
| <b>RE:</b>       | Beedie School of Business: Full Program Proposal for a Certificate in Business Analytics and Decision Making (SCUP 13-04) |              |                  |

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At its January 9, 2013 meeting SCUP reviewed and approved the Full Program Proposal for a Certificate in Business Analytics and Decision Making within the Beedie School of Business, effective Fall 2013.

**Motion:**

That Senate approve and recommend to the Board of Governors the Full Program Proposal for a Certificate in Business Analytics and Decision Making within the Beedie School of Business, effective Fall 2013.

encl.

c: A. Gemino

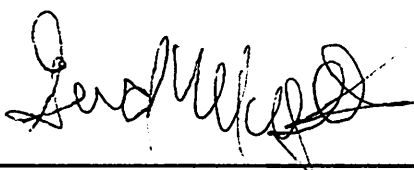


OFFICE OF THE ASSOCIATE VICE-PRESIDENT, ACADEMIC AND  
ASSOCIATE PROVOST

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**MEMORANDUM**

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| <b>ATTENTION</b> | Senate Committee on University<br>Priorities                        | <b>DATE</b>  | December 7, 2012                                                                    |
| <b>FROM</b>      | Gordon Myers, Chair<br>Senate Committee on Undergraduate<br>Studies | <b>PAGES</b> | 1/1                                                                                 |
| <b>RE:</b>       | Beedie School of Business (SCUS 12-51)                              |              |  |

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Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of December 6, 2012, gives rise to the following recommendations:

**Motion:**

That SCUP approve and recommend to Senate the Full Program Proposal for the Certificate in Business Analytics and Decision Making within the Beedie School of Business.

The relevant documentation for review by SCUP is attached.

**Program Proposal**  
**Certificate in Business Analytics and Decision Making (BADM)**  
**Beedie School of Business**  
**Simon Fraser University**  
**Fall 2013**

**Executive Summary**

The Beedie School of Business seeks permission to offer a *Certificate in Business Analytics and Decision Making* for undergraduate business students. The proposed certificate will be earned through a combination of courses currently offered in different “concentrations” of the undergraduate business program plus a new project-based experiential capstone course.

“Business Analytics” is an emerging term that describes the use of large amounts of data and advanced computational techniques to inform complex decisions. The diverse academic disciplines that form the foundation of Business Analytics include Statistics, Data Management, Data Mining, and Decision Theory. Although the term Business Analytics suggests an emphasis on business-specific problems, the underlying “evidence-based” approach is generic. Business Analytics has been applied in many non-business decision contexts including environmental policy development and public health.

As in many business schools, the tools and techniques that comprise Business Analytics are taught within the established concentrations of the Beedie undergraduate program. Few students, including those who elect multiple concentrations, currently have the opportunity to develop proficiency in the entire range of Business Analytics activities such as multidimensional data modeling, statistical inference, and stochastic optimization. However, recent improvements in the usability of the sophisticated tools used for Business Analytics have reduced the requirement for strict specialization. The availability of powerful-but-accessible tools makes it feasible for students to develop broad competencies in domains that were previously restricted to technical specialists.

The objective of the proposed certificate is thus to provide undergraduate business students with a means to develop practical skills in analytics and evidence-based decision making without impacting their ability to focus within a conventional area of concentration. Students who earn the Certificate in Business Analytics and Decision Making will be better equipped to meet the increasing complexity of decision making in business, government, and the not-for-profit sector. Moreover, as a beneficial side effect, students who earn the certificate will leave SFU with a credential that is both rare and valuable.

**1. Credential to be awarded, including the level and category of the degree and the specific discipline or field of study;**

Certificate in Business Analytics and Decision Making, Bachelor of Business Administration program.

**2. Location of program, including justification for program site**

SFU, Burnaby campus

**3. Faculty(ies), Department(s), or School(s) offering the certificate;**

The Beedie School of Business

**4. Anticipated program start date**

Fall 2013

**5. Description of proposed program**

**a) Aims, goals and/or objectives**

The objective of the proposed certificate is to provide students with a comprehensive and multi-disciplinary overview of evidence-based decision making within the well-established structure of a conventional undergraduate business program. The certificate program will combine rigorous academic study of advanced analytical theory with significant exposure to complex, real-world problems and hands-on experience with sophisticated software.

The development of specialized skills and knowledge in decision making will help make those who earn the SFU Certificate in Business Analytics and Decision Making students better leaders and managers.

**b) Anticipated contribution to the mandate and strategic plan of the institution**

The proposed certificate in Business Analytics and Decision Making is an innovative, demand-driven initiative that brings students, faculty, and practicing decision makers together to address complex decision problems. In this way, the certificate can contribute to several strategic objectives of SFU, specifically: responding to students' needs, putting students on the cutting-edge of technological development, and providing meaningful opportunities for university-community engagement. Each of these contributions is described below in terms of the *President's Agenda 2010/11*:

1. A University of Choice for Undergraduate Students (Theme 1: High Quality Student Experience): Business Analytics is a field of both intense employer interest and stimulating intellectual challenge. At its core, it deals with important theoretical issues, such as the nature of knowledge and the problem of induction; however, the approach and methods advocated in Business Analytics are seen to deliver enormous practical value. By developing innovative and challenging programs that create significant economic opportunities for its graduates, SFU can demonstrate its responsiveness to the needs of its students.

2. Teaching, Research, Engagement – A Truly Comprehensive University (Theme 2: Teaching and Learning in a Research University): The Business Analytics and Decision Making fields possess well established theoretical foundations and are supported by mature technological tools. At the same time, both analytics and decision-making are fertile areas for research and innovation. For example, some of the best tools for data manipulation, visualization, statistical analysis, and data mining are university-based open source. These open source tools provide opportunities for so-called “open innovation” by anyone with ideas—practitioners, faculty, or students.
3. A National Model of University-Community Engagement: A key element of the proposed certificate is the experiential capstone, which will require students to tackle difficult real-world projects from sponsor organizations within the community. Although such student engagements are normally small in scale and typically (though not always) limited in impact, they provide a means for the university to push new ideas and techniques out into the community. The pace at which many of these ideas and techniques have evolved mean that, in many cases, students have much to offer practicing decision makers.

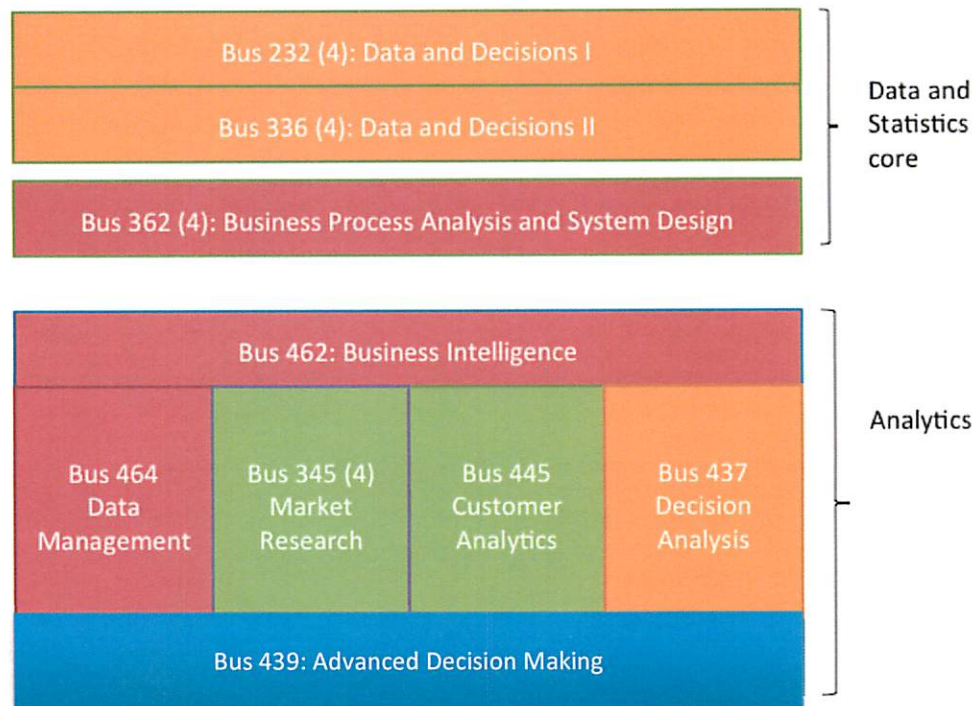
**c) Target audience**

The target audience is undergraduate business students in any of the conventional concentrations who would like to supplement their functional concentration with a better understanding of Business Analytics and Decision Making.

**d) Content and summary of requirements for graduation**

Course Requirements

The Certificate in Business Analytics and Decision Making consists of nine courses (31 course units), as shown in the figure below. Of these 31 units, 8 units from Data and Decisions I (Bus 232) and Data and Decisions II (Bus 336) form the “Statistic core” of the certificate. These two courses also form part of the core requirement for all undergraduate business students



Of the remaining 23 credits, some may count towards a students' concentration. For example, Business Process Analysis and System Design (Bus 362), Business Intelligence (Bus 462) and Data Management (Bus 464) can be used to satisfy the requirements of the Management Information System (MIS) concentration. Other courses can be used to satisfy upper-division requirements of the Marketing and Technology and Operations Management concentrations. In general, however, completion of the Certificate in Business Analytics and Decision Making will require students to take additional course outside of their concentration. Indeed, this is one of the fundamental objectives of the certificate: to encourage students to improve their decision making knowledge by taking a set of interrelated courses from different concentrations. In most cases, completion of the certificate will require an additional four or five courses outside of the student's area of concentration.

The capstone course, Advanced Decision Making, (labeled Bus 439 above) is a new course for students enrolled in the Business Analytics and Decision Making certificate. The purpose of the course is to provide a structured environment for the completion of a major decision making project. Students will be required to work together in small teams on projects within the community. One of the expectations of the Business Advisory Board is that their firms will provide small project opportunities for the capstone course. Class time will be split between "consulting practices" material and small group sessions with the instructor to address specific challenges arising in the projects.

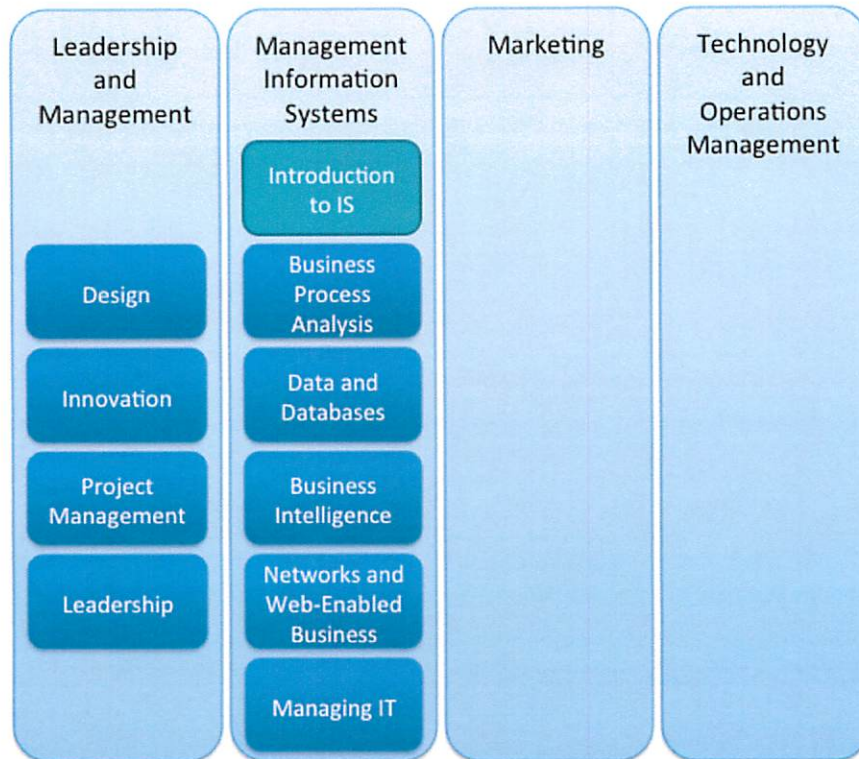
### Relationship to the Business Technology Management Certificate

The Beedie School of Business recently received approval for an undergraduate certificate in Business Technology Management (BTM). The BTM and Business Analytics certificates are very different programs in response to different external requirements.

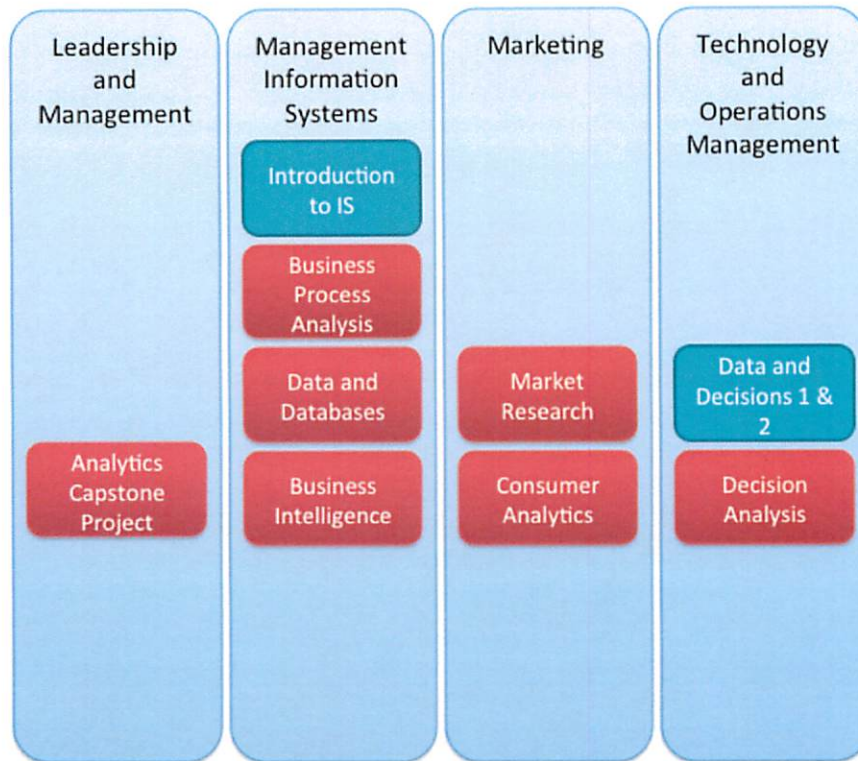
The BTM certificate was the Beedie School of Business's response to the call from the Canadian Coalition for Tomorrow's Information, Communication, and Technology Skills (CCICT) for a standardized Information, Communication, and Technology (ICT) curriculum across Canada. The purpose of the BTM curriculum is to develop the next generation of leaders and managers in the information technology field. This dual managerial and technical focus means that the learning objectives identified by CCICT entail more course credits than are currently required for the Management Information Systems (MIS) concentration. The Beedie School of Business's BTM certificate provides students with the means and incentive to fulfill the requirements of the Canada-wide BTM curriculum.

Like the BTM certificate, the proposed certificate in Business Analytics and Decision Making also involves intensive use of information technology. However, the objective of the Business Analytics certificate is to develop deep technical skill in a specific ICT-enabled discipline: evidence-based decision-making. Accordingly, the proposed curriculum for the Business Analytics and Decision Making certificate cuts across the traditional functional boundaries within the business school.

The differences between the two certificates can be illustrated graphically. The first figure shows the course requirements for the BTM certificate. The courses consist of the entire MIS concentration plus closely related courses in leadership, innovation, and design (mandatory core course are shown in a different color).



The second figure shows the course requirements for the proposed Business Analytics certificate. The Business Analytics certificate combines data management courses from the MIS concentration, data analysis courses from the Marketing concentration, and decision-making courses from the Technology and Operations Management concentration.



#### Breadth, Writing, and Quantitative Requirements

The proposed Certificate in Business Analytics and Decision Making will be offered as a supplement to the conventional concentration within the Beedie School of Business undergraduate program. As such, all certificate students will satisfy SFU's breadth, writing, and quantitative requirements as part of their normal concentration requirements.

#### Co-Operative Education and the Experiential Component

Experiential learning is an important part of the proposed certificate and the project-based capstone course (denoted Bus 439 above) is a central part of the program. However, the analytics-specific capstone project and opportunities for co-operative education should be seen as independent. Participation in co-operative education program is an option for any qualified student in the Beedie School of Business and is generally encouraged. However, participation in the co-op program is not a requirement for the proposed certificate.

#### **e) Delivery method**

Since the program is based upon existing courses and programs, the standard delivery methods already in place for on-campus education will be used. The experiential component requirements will be met by through the semester long capstone course in which students tackle a challenging real-world decision problem under the supervision of the course coordinator.

**f) Linkages between the learning outcomes and the curriculum design, including an indication whether a work experience/work place term is required for degree completion.**

A design committee consisting of faculty from multiple disciplines plus several adjunct faculty with experience in the analytics field identified several critical learning outcomes for a certificate in Business Analysis and Decision Making. The sources of these learning outcomes include:

1. The steps in well-established normative process models of decision making (e.g., Dewey, Simon).
2. Examination of the curricula of other graduate and undergraduate programs in Business Analytics.
3. Examination of the training curricula of major analytics tool vendors (e.g., IBM, SAS, Microsoft).
4. Discussions with business organizations in the Vancouver area with experience with Business Analytics.

The courses outlined above are the result of an explicit mapping process from critical learning outcomes to existing courses. In some cases, minor gaps were identified that could be filled with small changes to existing course material.

In the case of the experiential learning component, a new project-based analytics capstone course (Bus 439 above) was added.

**g) Distinctive characteristics**

Although we expect the supply of programs in Business Analytics to increase in response to well publicized demand, there are currently relatively few programs of this type. Of the programs we know about in early 2012, the proposed Certificate in Business Analytics and Decision Making is distinctive in the following ways:

1. **Undergraduate:** Many of the best known and established specialty programs in Business Analytics are at the graduate level. (e.g., the Masters of Science in Analytics at North Carolina State University, Bentley MBA with Analytics focus).
2. **Rigorous, focused, and comprehensive:** The courses outlined above provide the proposed certificate with significant breadth and depth relative to other programs. For example, the “Managerial Analytics Certificate” offered by the Kellogg School of Management requires only four courses and only one of these (“Empirical Methods”) is specific to the practice of Business Analytics.
3. **Decision-focused:** Some program in analytics (e.g., the MSA at NC State and SFU’s graduate program in Bioinformatics) focus on advanced analytical techniques. Although such a technical emphasis is appropriate for analytical specialists, the focus of the proposed certificate is on decision makers and the advantages of evidence-based decision making. As a result, the focus of the program is broader and the potential pool of candidates is larger (due to the lack of highly specialized prerequisites).

**h) Anticipated completion time in years or semesters**

As noted above, students who currently elect a single concentration in Marketing, Technology and Operations Management (TOM), or Management Information Systems (MIS) should expect to take four additional semester courses (including the project-based analytics capstone, Bus 439). Students who elect to take two concentrations (e.g., Marketing and MIS) may require only one additional course plus the project-based capstone.

**i) Enrolment plan for the length of the program**

Participating undergraduate students will have Business attached to their program plan, either through a major, joint major, or honors.

**j) Policies on student evaluation**

Per general regulations of the University, and the Beedie School of Business.

**k) Policies on faculty appointments (minimum qualifications)**

Continuing faculty will hold a PhD or equivalent.

**l) Policies on program assessment**

All academic units at SFU are subject to external review every seven years. AACSB and EQUIS accreditation require additional assessment of assurance of learning, community involvement, and attainment of mission every 5 years.

**m) Level of support and recognition from other post-secondary institutions, (including plans for admissions and transfer within the British Columbia post-secondary education system) and relevant regulatory or professional bodies, where applicable.**

This certificate is optional for any student already accepted into the Beedie School of Business.

**n) Evidence of student interest and labour market demand**

*There will be a shortage of talent necessary for organizations to take advantage of big data. By 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions.*

Recent bestsellers, such as *Competing on Analytics* and *Supercrunchers*, assert that decision makers are increasingly expected to support their decisions with rigorous empirical analysis. A recent McKinsey study (cited above) outlines how the increased use of “big data” and analytics will “underpin new waves of productivity growth and consumer surplus”. However, the same study points to an emerging skills shortage.

The Beedie School of Business conducted in-depth interviews in 2009 with organizations in the Vancouver area with experience with and interest in Business Analytics. These organizations include ICBC, Worksafe BC, Telus, RBC, Angus Reid Strategies, the Market Research and Intelligence Association, the Beedie School of Business Career Management Centre, SAP Business Objects (tool vendor), and SAS (tool vendor).

The interviewees expressed strong support for an SFU program in Business Analytics that combined rigor with a broader set of decision-making and communication skills. A follow-on survey of individuals involved in analytics in a range of industries and geographic locations was administered by Angus Reid Strategies on behalf of SFU. Of the 75 respondents to the question, “Would you hire graduates from existing university analytics program?” just over half responded “likely” or “very likely”.

**o) Summary of resources required and available to implement the program**

The bulk of the courses required for the certificate already exist and are offered regularly. The one exception is the capstone course, which is a new course and will require one full course credit for teaching, administration, and project marking.

**p) Brief description of any program and associated resources that will be reduced or eliminated when the new program is introduced (if applicable)**

None

**q) List of faculty members teaching/supervising, what percentage of their teaching will be devoted to the program, and their areas of specialization**

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<sup>1</sup> “Big data: The next frontier for innovation, competition, and productivity,” McKinsey Global Institute, May, 2011, [http://www.mckinsey.com/Insights/MGI/Research/Technology\\_and\\_Innovation/Big\\_data\\_The\\_next\\_frontier\\_for\\_innovation](http://www.mckinsey.com/Insights/MGI/Research/Technology_and_Innovation/Big_data_The_next_frontier_for_innovation)

Current faculty in the Beedie School of Business who will teach courses in this Certificate include (but are not limited to):

- Michael Brydon, Associate Professor, Management Information Systems
- Payman Jula, Assistant Professor, Technology and Operations Management
- Robert Krider, Professor, Marketing
- Jason Ho, Associate Professor, Marketing
- Nilesh Saraf, Associate Professor, Management Information Systems
- Peter Tingling, Assistant Professor, Management Information Systems

**r) For a program where the intention is to charge a premium fee, a budget developed in collaboration with the dean of the faculty**

Not applicable – not a program. No change in existing fees.

**s) Related programs in your own or other British Columbia post-secondary institutions.**

None as of January, 2012

**6. Contact information of the institutional contact person in case more information**

Dr. Andrew Gemino, Associate Dean, Undergraduate,  
Beedie School of Business, 778 782 3653  
gemino@sfu.ca

**7. In addition, attach the documentation used for internal approval; alternatively, provide a link to a website where this information is available. Normally, the Senate materials describing the FPP may be used for this purpose and will be provided by the office of the AVPA to the DQAB.**

In the May 22, 2012 UCC meeting, the UCC committee members from the Beedie School of Business, passed a motion of creating a Certificate Business Analytics and Decision Making. Minutes of the meeting are securely located on the Beedie School of Business website.

**SUPPORTING DOCUMENTS:**  
Calendar Language (attachment)