

**Cover/Signature Page - Abbreviated Template/Abbreviated Template with Curriculum**

Institution Submitting Request: *University of Utah*  
 Proposed Title: *Graduate Certificate in Business Analytics*  
 Currently Approved Title: *N/A*  
 School or Division or Location: *David Eccles School of Business*  
 Department(s) or Area(s) Location: *Marketing and Operations and Information Systems Departments*  
 Recommended Classification of Instructional Programs (CIP) Code<sup>1</sup> (for new programs): *52.1301*  
 Current Classification of Instructional Programs (CIP) Code (for existing programs): *N/A*  
 Proposed Beginning Date (for new programs): *08/24/2016*  
 Institutional Board of Trustees' Approval Date: *MM/DD/YEAR*

**Proposal Type (check all that apply):**

Regents' General Consent Calendar Items		
<i>R401-5 OCHE Review and Recommendation; Approval on General Consent Calendar</i>		
SECTION NO.		ITEM
5.1.1	<input type="checkbox"/>	Minor*
5.1.2	<input type="checkbox"/>	Emphasis*
5.2.1	<input type="checkbox"/>	(CER P) Certificate of Proficiency*
5.2.3	<input checked="" type="checkbox"/>	(GCR) Graduate Certificate*
5.4.1	<input type="checkbox"/>	New Administrative Unit
	<input type="checkbox"/>	Administrative Unit Transfer
	<input type="checkbox"/>	Administrative Unit Restructure
	<input type="checkbox"/>	Administrative Unit Consolidation
5.4.2	<input type="checkbox"/>	Conditional Three-Year Approval for New Centers, Institutes, or Bureaus
5.4.3	<input type="checkbox"/>	New Center
	<input type="checkbox"/>	New Institute
	<input type="checkbox"/>	New Bureau
5.5.1	<input type="checkbox"/>	Out-of-Service Area Delivery of Programs
5.5.2	<input type="checkbox"/>	Program Transfer
	<input type="checkbox"/>	Program Restructure
	<input type="checkbox"/>	Program Consolidation
5.5.3	<input type="checkbox"/>	Name Change of Existing Programs
5.5.4	<input type="checkbox"/>	Program Discontinuation
	<input type="checkbox"/>	Program Suspension
5.5.5	<input type="checkbox"/>	Reinstatement of Previously Suspended Program
	<input type="checkbox"/>	Reinstatement of Previously Suspended Administrative Unit

*\*Requires "Section V: Program Curriculum" of Abbreviated Template*

**Chief Academic Officer (or Designee) Signature:**

I certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

\_\_\_\_\_  
**Signature**

**Date:** *MM/DD/YEAR*

**Printed Name:** *Name of CAO or Designee (Ruth Watkins – Signature will be collected after BoT Approval)*

<sup>1</sup> CIP codes must be recommended by the submitting institution. For CIP code classifications, please see <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>.

**Program Request - Abbreviated Template**  
**David Eccles School of Business**  
**Graduate Certificate in Business Analytics**  
**08/19/2015**

**Section I: Request**

*The University of Utah* requests approval to offer a *Graduate Certificate in Business Analytics* effective *Fall 2016*. This program has been approved by the institutional Board of Trustees on *Date*.

The proposed *Graduate Certificate in Business Analytics* is designed to provide students with the technical competence and business orientation necessary to successfully compete in the rapidly growing market for analytics and data science professionals. Enterprises in the private and public sectors are all in need of executives, analysts and specialists with training in these important areas. A 2009 article in the *New York Times*<sup>2</sup> stated, "In field after field, computing and the Web are creating new realms of data to explore — sensor signals, surveillance tapes, social network chatter, public records and more." The article goes on to say, "'We're rapidly entering a world where everything can be monitored and measured,' said Erik Brynjolfsson, an economist and director of the Massachusetts Institute of Technology's Center for Digital Business. 'But the big problem is going to be the ability of humans to use, analyze and make sense of the data.'"

The *Graduate Certificate in Business Analytics* is intended to train existing graduate students in the David Eccles School of Business in data analytics, particularly as applied to big data and the internet. The certificate is also intended to make such training available to students outside the business school and non-degree students, particularly working professionals who want to deepen their understanding of the application of data and analytics to business problems.

The proposed graduate certificate is comprised of 2 core courses (4.5 credit hours) and approximately 5 elective courses (13.5 credit hours) for a total of 18 credit hours (minimum). The program is expected to commence in Fall Semester, 2016 and is proposed in conjunction with the *Master of Science in Business Analytics Degree*. The graduate certificate program is also expected to be a feeder program into the MSBA degree program and students who start in the certificate program may ultimately decide to switch into the MSBA program after completing their first semester.

### **College Review**

This proposal was approved by the Master's Program Committee on *November 5, 2015* and by the College Council on *November 24, 2015*. It was approved by the full faculty of the David Eccles School of Business on *December 1, 2015*.

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<sup>2</sup> "For Today's Graduate, Just One Word: Statistics," *New York Times*, August 5, 2009. <http://www.nytimes.com/2009/08/06/technology/06stats.html>. Note that the article was written more than 5 years ago, emphasizing the need for the MSBA degree to be established as soon as possible.

## Section II: Need

Enterprises in the private and public sectors need employees who know how to gather, store and analyze data to make informed decisions. As the Labor Market Demand section will elaborate, the demand for analytics professionals with both business and data science knowledge has been growing rapidly in the state of Utah and the rest of the nation. The courses in this graduate certificate program integrate quantitative and business knowledge in real-world oriented contexts. No other program in the state, to our knowledge, provides students with the skills needed to frame relevant business problems, translate those problems into analytics problems, determine the necessary data, create relevant models, use the models to compare alternative solutions, and ultimately make and communicate fact-based business decisions to company management.

While we believe the proposed certificate is unique in the state of Utah, the growing demand for graduates with analytics know-how has led to several new programs at other reputable schools in the United States and (to a lesser degree) across the world. The proposal is a necessary move to stay competitive with the other programs in the nation and to meet market and student needs.

To emphasize the need for the program, we include excerpts from a recent email from one of our professional MBA alumni. His message underscores the desire of organizations to hire people well versed in business analytics as well as the relative dearth of individuals with the requisite skills. We believe the new program will help remedy the deficiency described by the alumnus.

Dear Ute Friends,

I recently attended a non-profit benefit here in Atlanta for an organization called Computers for Youth (CFY). During the conference I was able to mingle with executives and professionals from many fortune 500 organizations. As I sat down next to my sponsor, a recruiter for me at att.com, she introduced me to a table full of people, many of whom were also recruiters within the analytics industry.

We conversed for the better part of 3 hours about the digital analytics industry and its rapid growth. After the benefit proceedings I found myself speaking with a lead recruiter from Cox Media/AutoTrader/Manheim whose entire portfolio was dedicated to analytics talent placement. He asked me some very pointed questions. "Why doesn't the University of Utah have a robust analytics program? After all isn't Utah the home of analytics as we know it? Aren't there a ton of analytics companies there?"

Granted, it has been several years since I completed my PMBA at the U. But in that time, I've seen the analytics industry explode. It is entirely possible that the opportunities to which I will refer to learn analytics have increased as a curriculum at the U. Perhaps I'm just missing it. But even today as I look through the list of possible majors I don't see "Analytics", "Business Intelligence", "Digital Analytics", "Data Systems Management", "Data Sciences" or "Implementation of Analytics" as possibilities. We may be missing an enormous opportunity and one that should rightfully belong to the University of Utah.

Today, as the markets become almost entirely digital recruiters and hiring managers alike are in need of technology savvy teammates. They are seeking people with very unique skill combos in

today's market such as basic programming of HTML, JavaScript and CSS mixed with statistics, SQL, data management and business management to place in these roles.

Hiring managers are currently required to provide intensive on-the-job training to develop understanding of the tools and methods used in our industry. It's very strange. It would seem to me that if the market is clamoring for these skills sets, educational entities would benefit by preparing future graduates with those skills and opportunities.

With this reference point, I write to you as a voice in the market and as an ally. The analytics industry will continue to grow for a long time to come. Many campuses across the globe have already begun to add this specific coursework to their curriculum; a few have been at it for a while and are well ahead of the game. But none in my estimation should be able to do this better than the University of Utah.

To compete with these schools, to prepare students to fill these roles will require more than incidental or peripheral contact with the topics mentioned above .... COMMERCE IS CHANGING TO ECOMMERCE. We should be molding our curriculum to reflect that. Technology will be huge part of commerce for the foreseeable future and digital analytics is at the center of that technology. We need multiple analytics tracks available at the David Eccles School of Business to support this burgeoning industry.

As a Ute graduate twice over, I take great pride in the quality of education and my experience at my Alma-mater. I consider my past professors, school administrators, facilities and classmates second to none. I hope this communication will be received well, as insight coming from a proud member of our team and Ute community. I humbly request your assistance to get this through the right channels such that analytics may be added as multiple programs of study as soon as possible at the University of Utah. Go Utes!

The following sections provide additional evidence that highlight several reasons for providing a new *Graduate Certificate in Business Analytics* at the University of Utah.

### **Labor Market Demand**

In March of 2015, the U.S. Department of Commerce released an economic brief in which they addressed the growing importance of data in the economy. One of the key findings of the report was the observation that data related jobs not only pay higher wages, but also represent a significant driver of occupational growth. Occupations where working with data is either central to or an important part of the job, currently account for over half of the workforce and this percentage is expected to grow. Not surprisingly, business and financial operations account for more data related jobs than any other occupational category (approx. 34% of all jobs).<sup>3</sup>

A recent report by McKinsey & Company highlighted the significance of big data as a pillar of competitive advantage. The report also noted that organizations are expected to face significant challenges in recruiting individuals with the necessary skills to take advantage of big data. The report estimates that "by 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical

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<sup>3</sup> [http://www.esa.doc.gov/sites/default/files/the-importance-of-data-occupations-in-the-us-economy\\_0.pdf](http://www.esa.doc.gov/sites/default/files/the-importance-of-data-occupations-in-the-us-economy_0.pdf)

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".<sup>4</sup> Left unaddressed, this shortage could have significant negative implications for Utah's future economic growth and development.

Besides the evidence from national sources, we also have strong anecdotal evidence that local organizations are excited and ready for a certificate in analytics. On July 17, 2015, we held a focus group with representatives from Adobe, Domo, Qualtrics, Overstock.com, Zions Bancorp, Intermountain Healthcare, InMoment and MRM/McCann. The job titles of those who participated were Predictive Markets Sr. Product Mgr., Insights and Innovations Lead, Chief of Staff over Analytics, Data Scientist, Senior Analyst, IT Corporate Recruiter, Data Warehouse Analysis Manager, Business Intelligence Development Manager, HR Workforce Solutions/Analytics Dir., Vice President of Business Analytics, and Senior Vice President of Analytics and Insights. The focus group voiced strong support for a business analytics degree as well as an accompanying graduate certificate, helped define what each would look like, and indicated that they very much would like to hire graduates with the appropriate mix of business and analytics skills from the University of Utah.

To lend support to what we heard in the focus group, below we include a sampling of job descriptions that have been advertised to current MSIS (Master of Science in Information Systems) students (especially those emphasizing analytics and business intelligence) for which graduates pursuing the new certificate from either the MSIS program, one of the school's other specialized master's programs, or the MBA program would be well qualified. The announcements emphasize the demand by employers for a graduate program to prepare students for such positions.



Analytic Data Developer | Nov. 1

Being a part of Intermountain Healthcare means joining with a world-class team of over 36,000 employees and embarking on a career filled with opportunities, strength, innovation, and fulfillment. Our mission is: Helping people live the healthiest lives possible.

Our patients deserve the best in healthcare, and we deliver.

This position develops and manages data that supports analytical activities within the actuarial departments of SelectHealth. This position provides expertise on data sources and data requirements for financial and analytical projects, in collaboration with actuarial analysts and business intelligence developers. This position works with many types of data including claims, member enrollment, premium, healthcare providers, fee schedules, and data from external sources (vendors, clients, government).

## Honeywell

Big Data Database Administrator Full-time

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<sup>4</sup> [http://www.mckinsey.com/insights/business\\_technology/big\\_data\\_the\\_next\\_frontier\\_for\\_innovation](http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation)

The BigData/Hadoop Technical Analyst will reports to the Director of the Database and Web Hosting Services organization. This position will ensure operational support, stability and delivery for BigData/Hadoop cutting edge technologies such as Cassandra, HBase/Hadoop, Greenplum, and Aster across platform in on-prem and cloud environment. BigData/Hadoop Technical Analyst will be working with the Data Science IT and Engineering teams to ensure the data infrastructure is optimal and humming.



Summit IT Specialist | 10-15

We live in an era of remarkable change and opportunity. Data and technology are transforming industries, society, and even the workplace—by creating professions that didn't exist before the emergence of analytics, cloud, social, mobile and security. As the largest technology and consulting employer in the world, IBM is a leader in this global transformation and just the place to start your Technical Specialty career.



Business Intelligence Developer | Full-time

UIT-University Support Services has an immediate opening for a BI Developer. This position is focused on developing and supporting the Enterprise Data Warehouse and the reporting solutions across our Teaching and Learning, Finance, Human Resources, and Facilities/Ancillary Services environments. This position will be responsible for the development of functional specifications to fulfill the data requirements for delivering comprehensive business intelligence solutions, data mart design, reporting and analytics. Strong data modeling, SQL skills and knowledge of 3rd party reporting tools is required.



Uof UBusiness Data Analyst (SQL/PeopleSoft report writer)- Full-time

Ready for U!!! Career growth opportunity in the growing Human Resource Management Analytics field for a self-motivated, degreed individual with 2-4+ years' experience related to data mining, report generating, and data presentation. Responsible for generating ad-hoc reports via SQL queries and PeopleSoft query manager, conducting basic data analysis, proactively creating business reports library and maintaining KPIs.



## Multiple Full-Time Positions

Did you miss them at last weeks fair? You have one more chance! Apply in UCareerpath by Friday Oct 2!  
GM is hiring multiple entry level positions

- (1) Data Analytic Developer
- (2) Software Developer
- (3) Software Test Analyst
- (4) Software Test Analyst



Want to work for the Patriots in The Kraft Group in Boston?  
Business Intelligence Manager

The Manager of Business Intelligence will define BI technologies and work closely with the Director of Business Intelligence during BI implementation. The Manger of business intelligence will help assess the current state of the data, provide insight of available technologies, and work closely with vendors during vetting and implementation. Upon implementation of a data warehouse and visual analytics, the Manager of Business Intelligence will oversee projects and data flows from beginning to completion, including ETL/ELT pipelines to dashboards and reports.

## Student Demand

In April 2015 we conducted a survey of undergraduate students within the David Eccles School of Business to gauge interest in a graduate degree in analytics. We did not specifically ask about a graduate certificate (from our perspective the degree is the more substantial and risky offering). However, we expect interest to be similar. We also expect high interest in an undergraduate certificate which will be among the next steps in rolling out our programs in analytics.

The exhibits below are excerpts from the results of the survey. The results show that more than half of the nearly 400 respondents would either definitely pursue or strongly consider pursuing an advanced degree in business analytics. Of 58 students who indicated that they would not likely pursue such a degree, only about 25% indicated that they were not interested in analytics; the majority had other reasons including no desire for an advanced degree or plans to do graduate work outside of Utah. We were very encouraged by the results of the survey, which reinforced the strong demand from industry and suggested by the growth of analytics programs in other states.

### Year in School:

#	Answer	Bar	Response	%
1	Freshman		31	8%
2	Sophomore		54	14%
3	Junior		134	34%
4	Senior		173	44%
	Total		392	

### Interest in an Analytics Master Degree:

1. If the Business School offered a one-year master degree in Business Analytics how interested would you be in gaining that degree?

#	Answer	Bar	Response	%
1	I would definitely pursue that degree.		59	15%
2	I would strongly consider that degree.		144	37%
3	I would consider that degree.		131	33%
4	I would not be interested in that degree.		58	15%
	Total		392	

### Reasons for Lack of Interest:

2. Please provide the most applicable reason why you would not be interested.

#	Answer	Bar	Response	%
1	I am not planning on pursuing a master degree.		5	9%
2	I am planning on pursuing a master degree somewhere else.		15	26%
3	I have chosen a different degree and am too far along to change.		6	10%
4	I am not interested in Business Analytics.		15	26%
5	I am not sufficiently familiar with the field of business analytics.		11	19%
6	Other (please specify)		6	10%
	Total		58	

### Desired Emphases:

3. Which emphasis within the program would you be most interested in?

#	Answer	Bar	Response	%
1	Accounting		42	13%
2	Data Science		71	21%
3	Economics		16	5%
4	Finance		66	20%
5	Marketing		66	20%
6	Operations Research		43	13%
7	No emphasis		20	6%
8	Other (please specify)		7	2%
	Total		331	

### Similar Programs

We did our best to learn of other programs in the state of Utah offering degrees or certificates related to Business Analytics. The following table shows the results of our benchmarking study. While there are programs or certificates that have some overlap with parts of the proposed curriculum, there is no master

degree or certificate in the state that is dedicated to business analytics. Moreover, even if there were degrees at other institutions, geographical considerations make it imperative that there be a degree program in the Salt Lake area.

The closest certificate program is offered by our own School of Computing. However, our certificate (and degree) will be differentiated in that it will provide a more focused analytics experience in business areas such as digital marketing and e-commerce with a substantial emphasis on the business problem as well as applied analytic techniques.

Institution	Unit	Name of Program	Description	Links
University of Utah	School of Computing	Data Management and Analysis (MS and PhD)	The rate at which scientists and businesses are producing data is increasing at an unstoppable rate. Being able to efficient process and make sense of such data has become a key scientific challenge in computer science. Not only must one be able to store such information compactly, but one additionally must develop algorithms to process it efficiently and intelligent systems that can reason about this data to find interesting patterns or make decisions. These topics form the core of the Data Management and Analysis track.	<a href="http://www.cs.utah.edu/graduate/">http://www.cs.utah.edu/graduate/</a>  <a href="http://www.cs.utah.edu/graduate/hb2014-15/gradhbk2014-15-ms-phd_data/">http://www.cs.utah.edu/graduate/hb2014-15/gradhbk2014-15-ms-phd_data/</a>
University of Utah	School of Computing	Big Data Certificate	Big Data is impacting many areas of science, engineering, and industry; from analyzing troves of weather data to modeling traffic patterns to processing millions of online customers, it is the enormous data which is creating new opportunities and challenges. To tackle these challenges, one must have the training to store, manage, process and analyze data at these scales. But the challenges are beyond scale alone, the complexity of	<a href="http://www.cs.utah.edu/bigdata/">http://www.cs.utah.edu/bigdata/</a>  <a href="http://www.cs.utah.edu/bigdata/FAQ/">http://www.cs.utah.edu/bigdata/FAQ/</a>

			the data requires new powerful analytical techniques. Finally, it is crucial to have skills in communicating and interpreting the results of this analysis. A person trained in all of these skills is a big data scientist.	
Utah State	Huntsman School of Business		<p>The Masters of Management Information Systems (M-MIS) program in the Jon M. Huntsman School of Business at Utah State University offers students an opportunity to make a difference in the organizations with which they work. Our innovative, project-based curriculum carries a STEM* designation in database management and analytics, consistently attracting many talented students from around the world.</p> <p>"Big Data, its proponents insist, will be the next big trend in management." ~ NY Times.</p> <p>The dynamic job market currently requires a solid analytical and technological foundation; therefore, our data-focused curriculum concentrates on the decision-making process and the valuable role technology plays in its enhancement. Upon graduation, M-MIS students compete in the marketplace with solid database, web development, business analysis, and IT strategy training to complement the Huntsman School of Business acumen.</p>	<p><a href="http://huntsman.usu.edu/mmis/">http://huntsman.usu.edu/mmis/</a></p> <p><a href="http://huntsman.usu.edu/mmis/htm/curriculum">http://huntsman.usu.edu/mmis/htm/curriculum</a></p>
Utah Valley University		Information Systems -	The BS in Information Systems program prepares students to	<a href="http://www.uvu.edu/catalog/current/departments/information-">http://www.uvu.edu/catalog/current/departments/information-</a>

		Business Intelligence Systems Emphasis, B.S.	be Information Systems professionals. Graduates develop and deploy enterprise-level systems to meet organizational needs. The Business Intelligence Systems (BIS) emphasis prepares graduates to become business intelligence analysts who produce financial and marketing intelligence by querying data repositories, generating reports, and devising methods for identifying data patterns and trends. Organizations store an enormous amount of data. People who are able to perform data mining and can analyze the data to detect trends and form predictions are highly sought by national and regional organizations.	systems-and-technology/information-systems-business-intelligence-systems-emphasis-bs/
Salt Lake Community College	Computer Sciences and Information Systems Division	Database Information and Technology Certificate of Proficiency	The program provides students a well-rounded introduction to acquiring knowledge and skills in designing, processing and managing business database systems.	<a href="http://www.slcc.edu/catalog/current/csis_data_cp.pdf">http://www.slcc.edu/catalog/current/csis_data_cp.pdf</a>

\*Southern Utah, Snow College, Dixie State, and Weber State had no programs that were similar to what we were looking for.

**Collaboration with and Impact on Other USHE Institutions**

Because most of the programs currently offered overlap only slightly with the proposed certificate, we have had limited conversation with others. We have discussed the plans for our degree and certificate with the School of Computing within the University of Utah and they will participate in the program, in particular in the data visualization class. We don't foresee a negative impact on other institutions with the introduction of the certificate. We hope that our sister schools that offer information systems, mathematics, statistics, computer science, marketing and other similar undergraduate degrees will make their students aware of the analytics programs at the University of Utah and encourage their students to pursue graduate education with us.

**Benefits**

The principal benefits of the certificate program will be to current and potential students at the University of Utah and to the business community in the greater Salt Lake area (and beyond). The successful implementation of the program will raise the visibility of the David Eccles School of Business and help with

the current trend of improved rankings for the School. Quoting again from the alumnus's letter cited in the "Need" section above, "But [no other institution] in my estimation should be able to do this better than the University of Utah." The reputational and economic benefits from the program should be significant.

### **66% by 2020**

Because this proposal is for a graduate certificate, we see its primary impact at the graduate rather than post-secondary level. However, the resources developed for the program will enhance the undergraduate teaching mission of the David Eccles School of Business, drawing more students to the undergraduate degree. Moreover, we continue to see growth in the operations of large multi-national corporations within Utah. These organizations increasingly house sophisticated operations within the state which require a highly educated workforce. By meeting the needs of these employers, USHE institutions can encourage further growth in such operations which offer exceptional career opportunities to undergraduate students and encourage the pursuit of post-secondary degrees.

### **Section III: Institutional Impact**

*Will the proposed administrative change or program affect enrollments in instructional programs of affiliated departments or programs? How will the proposed change affect existing administrative structures? If a new unit, where will it fit in the organizational structure of the institution? What changes in faculty and staff will be required? What new physical facilities or modification to existing facilities will be required? Describe the extent of the equipment commitment necessary to initiate the administrative change. If you are submitting a reinstated program, or program for off-campus delivery, respond to the previous questions as appropriate. (Remove these descriptive italics after completing this section of the template.)*

The mission of the David Eccles School of Business is to build foundations for ethical business leadership by creating, discovering and communicating knowledge about leading edge research, innovation, and best management practices. We believe that by preparing our graduates to be engaged citizens of the rapidly changing global world of business, and through the synergy of research, education and service, the David Eccles School of Business will continue to be among the most respected business schools in the world.

The proposed *Graduate Certificate in Business Analytics* will help provide the knowledge and skills students need in order to pursue a career in business analytics and data science, skills that are becoming more and more necessary to compete in a global marketplace. Leadership in business today requires the ability to make fact-based decisions. Hence the certificate program aligns directly with the School's mission to build foundations for business leadership.

The *Graduate Certificate in Business Analytics* will also contribute to the mission of the University of Utah through "*the discovery, creation and application of knowledge; through the dissemination of knowledge by teaching, publication...and technology transfer; and through community engagement*" in the area of analytics and data science (italicized language from the University Mission Statement). The core curriculum and matriculation benchmarks are designed to facilitate discovery and knowledge creation not only at a broad level, but also specifically within the context of business.

### **Institutional Readiness**

The David Eccles School of Business already offers several standalone master degrees and certificate programs and has created an infrastructure to manage such programs. That infrastructure includes some centralized functions (e.g., a centralized Business Career Services and a graduate admissions group) and

some program-specific administration (program directors and managers). The School has an Associate Dean who oversees all such programs and program directors meet together regularly to identify, discuss and address issues that are common to all programs.

The addition of the *Master of Science in Business Analytics* degree will require the appointment of a program director, a part-time career counselor, and at least one supporting staff member to have the same capabilities as the existing programs. In the first couple of years it is possible that an existing director (e.g., the director of the Master of Science of Information Systems (MSIS) program) and associated staff – minus the career personnel – will be able to manage the MSBA program. The anticipated growth, however, will require that a separate director and staff be selected. Given this need associated with the degree program, the certificate program can be administered within the apparatus put in place for the MSBA degree itself.

In terms of faculty, the School is well-positioned to offer the courses required for the program. There are scholars and teachers in several departments (including those specializing in marketing, information systems, strategy and statistics) who already offer courses with heavy analytics components and hence are prepared to offer the classes proposed for the new program. Some of those faculty do teach undergraduate classes, so there will necessarily be an impact on the staffing of lower-division courses. In the longer term, however, we anticipate that the expertise and experience gained through the new master program will lead to the establishment of new classes and even a degree program at the undergraduate level that emphasizes analytics. In order to grow, additional faculty will need to be hired to staff classes within the program or to staff classes that are left unstaffed because of a shift of faculty to courses in the new program. Subsequent sections provide more detail on the faculty.

### Departmental Faculty

Because the program is cross-disciplinary within the Eccles School, it is difficult to list “departmental” faculty. Because the instructions said not to provide a program-specific headcount, we have included numbers for two of the departments that will be most closely associated with the MSBA program: Marketing and Operations and Information Systems. Not all members of the faculty of those two departments will participate in the program; similarly, faculty from other departments (e.g., Strategy and Entrepreneurship, Computer Science) will teach in the program but are not included in the count of faculty in the table. The numbers were determined based on the knowledge of the relevant department chairs.

Department Faculty Category	Dpt Faculty Headcount – Prior to Program Implementation	Faculty Additions to Support Program	Dpt Faculty Headcount at Full Program Implementation
<b>With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)</b>			
Full-time Tenured	16	2	18
Full-time Non-Tenured	4		4
Part-time Tenured			
Part-time Non-Tenured			
<b>With Master’s Degrees</b>			
Full-time Tenured			
Full-time Non-Tenured	3		3
Part-time Tenured			

Part-time Non-Tenured	18		18
<b>With Bachelor's Degrees</b>			
Full-time Tenured			
Full-time Non-Tenured			
Part-time Tenured			
Part-time Non-Tenured			
<b>Other</b>			
Full-time Tenured			
Full-time Non-Tenured			
Part-time Tenured			
Part-time Non-Tenured			
<b>Total Headcount Faculty in the Department</b>			
Full-time Tenured			
Full-time Non-Tenured			
Part-time Tenured			
Part-time Non-Tenured			
<b>Total Department Faculty FTE</b> (As reported in the most recent A-1/S-11 Institutional Cost Study for "prior to program implementation" and using the A-1/S-11 Cost Study Definition for the projected "at full program implementation.")	26	2	28

**Staff**

For the MSBA degree, we anticipate the need for one program director, one program manager (who will also act as an advisor and help supervise capstone projects), and a half-time career counselor. There will also be some need for teaching assistants, but we should be able to use existing PhD students to fill those roles. The certificate program does not add significantly to staffing requirements.

**Library and Information Resources**

The current resources available through the Marriott Library are anticipated to be sufficient for the implementation of the new program.

**Section IV: Finances**

*What costs or savings are anticipated from this change? If new funds are required, describe in detail expected sources of funds. Describe any budgetary impact on other programs or units within the institution. Describe how students in the proposed program will be advised. How will new students be accounted for if advisor's schedule is at full capacity? (Remove these descriptive italics after completing this section of the template.)*

The *Graduate Certificate in Business Analytics* is being proposed in conjunction with the *Master of Science in Business Analytics Degree*. The certificate has very limited financial impact beyond that associated with developing the degree program. To the contrary, in exchange for minor administrative costs, the certificate will aid in the population of courses offered as part of the degree program. It may, on the other hand, cannibalize certain classes within the David Eccles School of Business. However, such transfers should be revenue-neutral for the school as well as cost-neutral given that the school is offering the classes as part of

a degree program. Therefore, we draw largely on financial calculations associated with the Master's degree and reproduce them below.

**Department Budget-Master of Science in Business Analytics Degree**

Because of the cross-functional nature of the program (in that it cuts across department lines) and after consulting with the University's budget office, we determined that the table provided in the template and shown below did not apply very well to our proposal; hence we left it blank. Instead, we created the subsequent table that shows the incremental budget information for the proposed MSBA degree for the next five years.

Three-Year Budget Projection							
Departmental Data	Current Departmental Budget – Prior to New Program Implementation	Departmental Budget					
		Year 1		Year 2		Year 3	
		Addition to Budget	Total Budget	Addition to Budget	Total Budget	Addition to Budget	Total Budget
<b>Personnel Expense</b>							
Salaries and Wages							
Benefits							
<b>Total Personnel Expense</b>	\$	\$	\$	\$	\$	\$	\$
<b>Non-Personnel Expense</b>							
Travel							
Capital							
Library							
Current Expense							
Total Non-Personnel Expense							
<b>Total Expense (Personnel + Current)</b>	\$	\$	\$	\$	\$	\$	\$
<b>Departmental Funding</b>							
Appropriated Fund							
Other:							
Special Legislative Appropriation							
Grants and Contracts							
Special Fees / Differential Tuition							
<b>Total Revenue</b>	\$	\$	\$	\$	\$	\$	\$

Difference							
Revenue-Expense	\$	\$	\$	\$	\$	\$	\$
Departmental Instructional Cost / Student Credit Hour* (as reported in institutional Cost Study for "current" and using the same Cost Study Definition for "projected")	\$	\$	\$	\$	\$	\$	\$

\* *Projected Instructional Cost/Student Credit Hour* data contained in this chart are to be used in the Third-Year Follow-Up Report and Cyclical Reviews required by R411.

<b>MSBA Students</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Incremental Headcount	10	20	30	40	50
Tuition per student	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
<b>MSBA Revenue = Tuition</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Gross Tuition	\$280,000	\$560,000	\$840,000	\$1,120,000	\$1,400,000
Tuition to Eccles (80%)	\$224,000	\$448,000	\$672,000	\$896,000	\$1,120,000
<b>TOTAL Expenses</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Staff Salaries, Wages, & Benefits	\$39,000	\$39,000	\$227,500	\$227,500	\$227,500
Faculty Salaries, Wages, & Benefits	\$50,000	\$350,000	\$380,000	\$680,000	\$680,000
Travel	\$5,000	\$5,000	\$25,000	\$25,000	\$25,000
<b>TOTAL Expenses</b>	<b>\$94,000</b>	<b>\$394,000</b>	<b>\$612,500</b>	<b>\$912,500</b>	<b>\$912,500</b>

<b>MSBA Revenues - Expenses</b>	<b>\$130,000</b>	<b>\$54,000</b>	<b>\$59,500</b>	<b>(\$16,500)</b>	<b>\$207,500</b>
<b>Certificate Students</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Incremental Headcount	5	10	15	20	25
Tuition per student	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
<b>Cert. Revenue = Tuition</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Gross Tuition	\$75,000	\$150,000	\$225,000	\$300,000	\$375,000
Tuition to Eccles (80%)	\$60,000	\$120,000	\$180,000	\$240,000	\$300,000
<b>Total MSBA Degree + Cert Revenues - Expenses</b>	<b>\$190,000</b>	<b>\$174,000</b>	<b>\$219,500</b>	<b>\$203,500</b>	<b>\$487,500</b>

### Summary

The above figure shows the current conservative estimate of incremental student headcount and revenue for both the proposed MSBA degree as well as the MSBA graduate certificate, as resources and expenses for both programs will be shared. As you can see, the student headcount from both the degree program and certificate lead to a total tuition which will more than fully fund the new program. Therefore, we expect there will be no impact to the existing budgets of the Eccles School or the University to fund the program.

### Funding Sources

#### Revenue

Our primary funding source is from tuition to the program. The portion of that tuition which stays within the David Eccles School of Business is roughly 80%. It is also likely that donations from alumni and other supporters would flow to the program, but for now, we will stick with the conservative tuition-only estimate.

#### *Headcount*

We have based the MBSA degree revenue on the assumption that we will grow roughly 10 students per year. This estimate is reasonable based on our student surveys, discussions with both students and corporate partners, and our past MSIS program growth of over 150 students enrolled approximately 5 years after the program was approved. While this 150 student number includes more than students who began

the program in that year. Assuming even 50% were new students (a high estimate), we are still being conservative with our MSBA growth target of 50 students in year 5.

For the graduate certificate, we conservatively estimated half the incremental headcount of the MSBA degree program.

### *Tuition*

For the MSBA degree program, we have based tuition on the current rate for our MSIS program multiplied by the total MSBA program of 33 credit hours. The tuition rate is reasonable given the similar level (and, therefore, compensation) of job prospects expected out of the program. This is also a lower rate than some of our peer institutions. It is likely that this tuition will grow over the 5 years, but we have taken a simplistic stance in keeping this number (as well as expenses) constant over this time period.

For the graduate certificate, we have estimated tuition based on an 18 credit hour program to be completed over two semesters.

### Expenses

We have broken down expenses into three categories, based on previously approved program budgets. Again, resources and expenses for both the MSBA degree program and the graduate certificate program in business analytics will be shared.

The relevant expenses are the following: staff, faculty, and travel.

### *Staff*

As mentioned previously, the MSIS program is a similarly quantitatively-based graduate business program. As such, where possible, resources will be shared across these two programs. Four areas of staff support to consider are Program Management, Admissions, Academic Advising, and Career Services.

- Program Management: In the first two years, the budding program can be managed by existing Program Leadership (e.g. MSIS Program Director). After the program has been established, however, **a new Program Director will be necessary in year three** to manage and grow the MSBA program. This position will teach, and as such, part of the salary is included in the Staff Wages and part in Faculty Wages.
- Admissions: Given a recent reorganization and the fact that we've hired new admissions staff in other areas, our current MSIS admissions staff has bandwidth to support the admissions work for this new degree and certificate. **No new staff needed.**
- Academic Advising: We have recently added a new FTE to the MSIS staff, allowing the academic advising to be completed with existing headcount for a couple of years. As the degree and certificate programs grow, however, additional headcount will be necessary. **New program manager to be added in year three.**
- Career Services: Currently, we have one person supporting both graduate and undergraduate information systems students. There is no additional bandwidth there. **We propose adding 0.5 FTE of Career Services staff** to support this new program. Given a roughly 200 graduate student/career counselor ratio, this FTE will be able to help build relationships in the early years and will develop the career services programming in addition to counseling students. They will

also teach a portion of the capstone course for these students. We estimate the cost of this FTE to be \$39,000, which includes 30% in benefits.

### *Faculty*

As per the faculty grid in section II, we currently have the expertise within the university to teach the courses offered in this new degree. That being said, we recognize there will be a need to hire adjunct faculty or to teach an overload for some of these courses. Therefore, we have allocated \$50,000 per year for adjunct faculty. In addition, in years two and four, we expect the enrollment size to fund one additional tenure-track hire. We estimate the all-in cost to be \$300,000 per faculty member, including 30% benefits, research funding, etc.

### *Travel*

A small travel budget has been included for admissions, recruiting, etc. Given that admissions and advising will be shared resources for a time, we estimate this need to be small, e.g. admissions personnel attending a graduate program fair would already be paid for on behalf of the MSIS program. In year 3 when a new Program Director and Program Manager are hired, we have increased the travel budget to account for additional trips (potentially internationally).

### **Reallocation**

No internal reallocation is requested at this point.

### **Impact on Existing Budgets**

Because the program will be self-sufficient, the program does not impact the existing budgets of other units.

## **Section V: Program Curriculum**

The *Graduate Certificate in Business Analytics* consists of the following courses:

### **All Program Courses (with New Courses in Bold)**

<b>Course Prefix and Number</b>	<b>Title</b>	<b>Credit Hours</b>
<i>Required Courses</i>		
IS XXXX	<b>Introduction to Business Analytics</b>	1.5
OIS XXXX	<b>Foundations of Data Science</b>	3.0
<b>Sub-Total</b>		<b>4.5</b>
<i>Elective Courses Group A</i>		
IS 6420	Database Theory and Design	3.0
IS 6482	Data Mining	3.0
MKTG 6600	Marketing Analytics	3.0
IS 6481	Big Data Analytics	3.0
IS XXXX	<b>Big Data Visualization</b>	1.5
IS 6485	Internet Analytics	3.0
IS/MKTG XXXX	<b>Supervised and Unsupervised Machine Learning</b>	3.0

Course Prefix and Number	Title	Credit Hours
OIS 6610	Practical Management Science	3.0
<i>Elective Courses Group B: At most <u>one</u> of the following may count toward elective credits:</i>		
IS 6483	Advanced Data Mining	3.0
IS 6484	Advanced Data Management	3.0
IS 6480	Data Warehousing Design and Implementation	3.0
MKTG 6730	Strategic Marketing Communications	3.0
MKTG 6770	Consumer Insights and Analytics	3.0
FINAN 6390	Financial Modeling	3.0
FINAN 6400	Financial Engineering	3.0
OIS 6500	Visual Basic Applications for Business	1.5
OIS 6425	Lean Six Sigma	3.0
STRAT 6850	Business Analytics	3.0
<b>Sub-Total</b>		<b>13.5</b>
Track/Options (if applicable)		
<b>Sub-Total</b>		
<b>Total Number of Credits</b>		<b>18</b>

We have currently developed a planned schedule which spreads the required and principle elective courses for the certificate out across Fall, Spring, and Summer semesters as follows:

### Program Schedule

Fall Semester	Title	Credit Hours
IS XXXX	Introduction to Business Analytics	1.5
OIS XXXX	Foundations of Data Science	3.0
IS 6420	Database Theory and Design	3.0
IS 6482	Data Mining (Part 1)	1.5
<b>Sub-Total</b>		<b>6.0 to 9.0</b>
Spring Semester	Title	Credit Hours
IS 6482	Data Mining (Part 2)	1.5
IS 6481	Big Data Analytics	3.0
MKTG 6600	Marketing Analytics	3.0
IS XXXX	Big Data Visualization	1.5
<b>Sub-Total</b>		<b>6.0 to 9.0</b>
Summer Semester	Title	Credit Hours
IS 6485	Internet Analytics	3.0
IS/MKTG XXXX	Supervised and Unsupervised Machine Learning	3.0
<b>Sub-Total</b>		<b>6.0</b>

Fall Semester	Title	Credit Hours
<b>Total</b>		<b>18</b>

The two new required courses are minor modifications to existing courses. The two new elective courses will be mostly new to the Eccles School, bringing new capabilities on both the teaching and research fronts.



January 7, 2016

Bradden Blair, PhD, MBA, MHA  
Director of IS Programs  
David Eccles School of Business  
University of Utah  
Salt Lake City, UT 84112

Dean Professor Blair,

The University of Utah Marriott Library appreciates the request to comment on our ability to support a new Master of Science in Business Analytics and a new Graduate Certificate in Business Analytics. The Library is committed to supporting the University and its faculty as they develop programs needed by our students.

Because the curriculum supporting the degree will be based to some extent on existing courses and largely involve existing faculty, and because similar programs of study exist in the MSIS program within the School of Business and the MS, PhD and big data programs in the School of Computing, our current collections should already have sufficient size and depth to satisfy the needs of most students and faculty.

The Marriott Library has book purchasing plans which provide for the acquisition of English language scholarly books published in topics relevant to business analytics programs. The Library also encourages faculty to work with librarians to strengthen book collections in subject areas where it may be necessary.

The Marriott Library maintains extensive holdings of scholarly journals in computer science, statistics, business and related disciplines. Specific journals supporting business analytics already provided by the Library include the *Decision Analysis* journal and the *Analytics Magazine* from INFORMS; the *IEEE Transactions on Knowledge and Data Engineering*; *Decision Analytics*; *Decision Support Systems*; *Intelligent Systems in Accounting, Finance and Management*; *EPJ Data Science*; *Information Visualization*; *Data Mining and Knowledge Discovery*; *Journal of Interactive Marketing*; *Journal of Big Data*; *Statistical Analysis and Data Mining*; *Journal of Management Information Systems*; *Strategic Management Journal*; the *MIS Quarterly*; the *Journal of Strategic Information Systems*; the *Journal of Data Science, Executive Strategies*; *Journal of Multi-Criteria Decision Analysis*; numerous publications from the Association for Computing Machinery like the *ACM Transactions on Knowledge Discovery in Data*; and many others. We would like to work with faculty to evaluate the most workable preferences for providing any additional needed periodical literature to support the program.

The Marriott Library also provides many databases that will support the new programs: *Web of Science*; *Scopus*; *Inspec*; *IEEEExplore*; *Computing Reviews*; *Computer Source*; *WorldCat*; *Dissertations & Theses Global*; *Business Source Premier*; *BizMiner*; *BMI Research*; *IBISWorld Industry Research*; *MarketResearch.com*; *PrivCo*; *Value Line*; *Mergent Intellect*; and several others.

Student difficulties in locating materials often stem not from collection weaknesses, but from the complexities of using a large research library. We offer class presentations and one-to-one consultations with library specialists and other information specialists who can help students find the most relevant works and suggest the most appropriate research strategies.

We look forward to working with the faculty and students in this new program.

Yours truly,



Rick Anderson  
Associate Dean  
Collections and Scholarly Communication  
J. Willard Marriott Library

January 12, 2016

To whom it may concern:

I have reviewed the proposal for the Master of Science in Business Analytics degree and the accompanying certificate. I was involved in the development of the program and find it to provide excellent coverage of business analytics topics. It is a much needed program both for the Marketing Department and the Eccles School as a whole.

Recent shifts in the way marketing is practiced along with the much greater availability of customer and transactional data have created an environment in which analytical skills are becoming necessary for careers in the field, particularly in areas such as digital marketing and social media. Not only are such skills required, a premium exists in the market for graduates equipped with analytic capabilities such that I expect graduates of the program to be in high demand. The Department is already experiencing much increased interest in our analytics offerings among students. Our Marketing Analytics class, for example, which will be part of the new program, is at its capacity for the spring semester with 60 students versus a historical average of around 30.

The program will allow the Marketing Department and Eccles School to remain competitive with peer institutions. In the western region, Arizona State, UCLA, USC, and Berkeley offer similar programs. All indications are that these programs have been highly successful—they are drawing quality students in good numbers and placing graduates effectively. The program will also allow us to build up the teaching capabilities of the Department and School in these areas which will benefit students in our other master's programs as well as our undergraduate students.

Importantly, I anticipate that the Marketing Department will be able to meet the demands of the program without having to make compromises in other areas. Initial coverage will draw on existing tenure track and highly qualified adjunct instructors. Thus, from a departmental standpoint, I am strongly in favor of the program. It has also received unanimous support from members of the department.

Thank you in advance for your support.

Sincerely,



Chair, Department of Marketing



**Scientific Computing and Imaging Institute**

72 S. Central Campus Dr., Suite 3750, Salt Lake City, Utah 84112

January 11, 2016

To Whom It May Concern:

It is my understanding the David Eccles School of Business is proposing a master's degree and graduate certificate in business analytics. I am writing this letter in response to your request for a letter of support from the Scientific Computing and Imaging Institute and Office of the Assistant Vice President for Research – Corporate Relations for your proposal.

As noted in the proposal, the need for business analytics professionals has increased dramatically in recent years. Demand for data savvy graduates from both the information systems and computer science programs at the University of Utah is on the rise.

You may be aware the MSCS, MSC, and big data certificate, offered through the School of Computing as well as collaborations with the Math Department. While there are some similarities between courses in the math, information systems and computing science departments, School of Computing courses have generally included different content. School of Computing programs serve a different population of students with differing needs and desired career goals. For example, although the business school does offer coursework in computer programming, their graduates do not receive the same level of training in programming or pursue the same positions as computer science graduates.

Companies such as Adobe, EMC, Zions Bank, Goldman Sachs, and others recognize the differences between the programs and the unique approaches to the analytics domain. This has been readily apparent in discussions with technology leaders from these companies.

It is my belief that these proposals, as well as new developments from the School of Computing can only collectively strengthen the analytics prowess at the University of Utah.

Thank you for the opportunity to review and respond to your proposal. I wish you the best as you take the next steps in the approval process.

Sincerely,

Greg M. Jones  
Assistant Vice President for Research,  
USTAR/Corporate Relations  
Associate Director,  
Scientific Computing and Imaging (SCI) Institute  
Adj. Asst. Professor Radiology  
University of Utah



January 11, 2016

To Whom It May Concern:

The David Eccles School of Business is proposing both a master's degree and a graduate certificate in business analytics. I am writing this letter in response to a request for a letter of support from me as the dean of the Eccles School.

The need for business analytics professionals has increased dramatically in recent years as we've seen as heard in both the business and higher education press as well as from our very own students and employers.

In fact, one of the bodies that evaluates our standing and reputation among business schools, the Association to Advance Collegiate Schools of Business (AACSB International), in 2013 updated its accreditation standards to recognize the growing importance of incorporating analytics and data science into business education. According to the standard, "All general management and specialist degree programs at the bachelor's, master's and doctoral level [should address] the following areas: Information technology and statistics/quantitative methods impacts on business practices to include data creation, data sharing, data analytics, data mining, data reporting, and storage between and across organizations including related ethical issues." These new programs will help us to meet these requirements and to assume a position of leadership among PAC12 business schools.

The mission of the David Eccles School of Business is to build foundations for ethical business leadership by creating, discovering and communicating knowledge about leading edge research, innovation, and best management practices. We believe that by preparing our graduates to be engaged citizens of the rapidly changing global world of business, and through the synergy of research, education and service, the David Eccles School of Business will continue to be among the most respected business schools in the world.

I believe that these new business analytics programs will not only further the mission of the David Eccles School of Business but will also further advance the mission and goals of the University of Utah by promoting student success, developing and transferring new knowledge from faculty research, and ensuring the long-term viability of the university by bringing in new revenues to the school and university.

Thank you for the opportunity to share my perspective on the new business analytics degree proposals. I am excited for the positive impact these programs will provide our college, our university, our students, and the community.

Sincerely,

A handwritten signature in black ink, appearing to read 'Taylor Randall'.

Taylor Randall  
Dean  
David Eccles School of Business