

BOARD OF HIGHER EDUCATION

REQUEST FOR COMMITTEE AND BOARD ACTION

COMMITTEE: Academic Affairs

NO: AAC 17-11

COMMITTEE DATE: January 17, 2017

BOARD DATE: January 24, 2017

**APPLICATION OF THE UNIVERSITY OF MASSACHUSETTS BOSTON TO AWARD
THE MASTER OF SCIENCE IN BUSINESS ANALYTICS**

MOVED: The Board of Higher Education hereby approves the application of the University of **Massachusetts Boston** to award the **Master of Science in Business Analytics**.

Upon graduating the first class for this program, the University shall submit to the Board a status report addressing its success in reaching program goals as stated in the application and in the areas of enrollment, curriculum, faculty resources, and program effectiveness.

Authority: Massachusetts General Laws Chapter 15A, Section 9(b)

Contact: Winifred M. Hagan, Ed.D., Associate Commissioner for Academic Affairs and Student Success

BOARD OF HIGHER EDUCATION

January 2017

Master of Science in Business Analytics

INTENT AND MISSION

The proposed Master of Science in Business Analytics (MSBA) program is designed to fulfill the University of Massachusetts Boston (UMB) mission, values and goals. The proposed MSBA program affirms UMB's mission and the mission of the College of Management. It is expected to provide students with a competitive and high-value education and support the economic development of the greater Boston region. UMB intends that the proposed program will educate and train the next generation of analytical experts to serve in industries central to the greater Boston region and to world economic development such as the high technology, healthcare, financial services, environmental sustainability, and pharmaceutical industries.

UMB reports that the proposed MSBA program is designed to develop students' expertise in business analytics and data science, provide high quality education in utilizing analytical techniques, methods and data strategies, and prepare students for data-driven practices. The proposed MSBA is intended help students learn quantitative methods and applications; to learn theories and techniques that are important to the field of data science; and focus on effective formulation techniques, mathematical and algorithmic concepts, and technology solutions. The proposed MSBA program is also intended to educate students to select, integrate, and process data needed for effective business decision-making and understand and apply different modeling techniques to solve business problems. The proposed MSBA program is expected to prepare students to become practitioners in data analytics with job titles such as data scientist, business analyst, business intelligence analyst, business intelligence developers, and analytics manager.

The proposed program obtained all necessary governance approvals on campus and were approved by the University of Massachusetts' Board of Trustees on December 9, 2016. The required letter of intent was circulated on May 19, 2016. No comments were received.

NEED AND DEMAND

National and State Labor Market Outlook

Hanover Research® was hired to conduct a comprehensive market research study on the job demands in business analytics both nationally and regionally. Hanover Research® presented its findings based on a scan of specialized business degree programs and assessed their viability for the UMB's College of Management. It also analyzed five-year degree completion data for master's degrees in the U.S. and the Boston metropolitan area. Data came from the NCES Integrated Postsecondary Education Data System (IPEDS), that gathers degree completion data annually from all U.S. postsecondary institutions. The analysis identified business analytics as a major

growth area due to business reliance on data-driven strategies. Market analysis from other sources demonstrates a workforce shortage in business analytics. McKinsey Global Institute that by 2018 the U.S. will require 440,000 to 490,000 analytical skilled jobs¹. The U.S. Bureau of Labor Statistics classifies these workers as statisticians, software developers, and others². The job outlook from 2012-2022 is 22- 27%, much faster than average growth^{3&4}.

According to Massachusetts Executive Office of Labor and Workforce Development, related jobs, including Software Developers, Operations Research Analysts, and Statisticians in the field will show growth ranging from 20.42% to 33.22% from 2012 to 2022⁵. It is anticipated that the demand for big data analytics will increase across various industry segments. For example, during 2014, there was a 123.60% increase in demand for Information Technology experts with big data expertise and an 89.8% increase in demand for Computer Systems Analysts with an advanced knowledge of data science⁶. The industries hiring big data expertise as of December 2014 include professional, scientific, and technical services, information industry, manufacturing, retail, sustainability, finance and insurance, wholesale, education services, accommodation and food services, and health care and social assistance⁷. Many of these industries play a significant role in the MA economy. UMB expects that the proposed program will prepare students to compete in these industries.

Student Demand

Currently, the Management Science and Information Systems (MSIS) Department offers a business analytics specialization in two programs. These specializations consist of four courses. They provide a foundation for students to understand the analytics field. These courses are in high demand, but are not sufficient to provide in-depth education for those who want to advance their careers in data science fields. The proposed program is expected to provide students with more rigorous learning experiences in order to advance in careers as data analysts and scientists.

OVERVIEW OF PROPOSED PROGRAM

Program Overview

The proposed MSBA program was developed by the MSIS department as part of its building an academic curriculum in analytics through the Business Intelligence pathway in the Bachelor of Science in Information Technology (BSIT) program. The BSIT has been successful and with an increase in demands for analytics, UMB began to offer a Business Analytics Specialization in the MBA program and a graduate level Business Analytics certificate. The specialization and certificate program offer a group of four

¹ http://www.washingtonpost.com/business/capitalbusiness/as-demand-for-big-data-analysts-grows-schools-rush-to-graduate-students-with-necessary-skills/2013/09/13/afbafb3e-1a66-11e3-82ef-a059e54c49d0_story.html

² Bureau of Labor Statistics, U.S. Department of Labor, *Working with Big Data*, on the Internet at <http://www.bls.gov/careeroutlook/2013/fall/art01.pdf>

³ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2014-15 Edition*, Statisticians, <http://www.bls.gov/ooh/math/statisticians.htm>

⁴ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2014-15 Edition*, Software Developers, <http://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm>

⁵ http://lmi2.detma.org/lmi/Occupation_Projection_jobsSTEM.asp

⁶ <http://www.forbes.com/sites/louiscolombus/2014/12/29/where-big-data-jobs-will-be-in-2015/>

⁷ <http://www.forbes.com/sites/louiscolombus/2014/12/29/where-big-data-jobs-will-be-in-2015/>

courses in data management and analytics. They provide the academic foundation for students to work in the analytics field. It is expected that the MSIS Department will implement and supervise the proposed program. The departmental curriculum committee will work with graduate program director to periodically review and improve the program's academic contents.

Duplication

UMB conducted a market analysis to understand the programs offered in New England and the East Coast area, and found that many schools just started their programs this year and do not offer the specializations in analytics which are available in the proposed program (see table below). UMass Lowell offers a MSBA program with four pathways; Big Data Analytics, Managerial Decision Making, Marketing Analytics, and Finance Analytics. The UMB proposal is distinguished by offering more technical courses and a Supply Chain Analytics specialization that is expected to prepare students to be data experts in supply chain and service industries. UMB anticipates that while both UMass Lowell and UMB belong to the UMass system, they serve students from different parts of the state with UMB serving residents and working professionals in close proximity to the city of Boston.

Institution	Program Name	Location	Delivery Format	Total Credits	Sample Curriculum
Bentley University	<u>Master in Business Analytics</u>	Waltham, MA	Classroom	30	Managerial Statistics; Data Management and Systems Modeling; Optimization and Simulation for Business Decisions; Time Series Analysis; Data Mining; Object-Oriented Application Development
Hofstra University	<u>MBA with concentration in Business Analytics,</u>	Hempstead, NY	Classroom	41 to 48	Database Management Systems; Data Mining for Business Analytics; Spreadsheet Modeling and Decision Making; Time Series Analysis of Financial Data; Multivariate Data Analysis Methods
Suffolk University	<u>MBA with Concentration in Business Intelligence</u>	Boston, MA	Classroom	50	Business Systems Analysis; Data Management and Big Data; Business Intelligence and Data Analytics; ERP System and Process Reengineering; Security and Privacy
University of Connecticut	<u>MS in Business Analytics and Project Management</u>	Mansfield, CT	Classroom	33	Business Process Modeling and Data Management; Business Decision Modeling; Data Mining and Business Intelligence; Data Analytics with R; Big Data Analytics with Hadoop;

					Analytical Consulting for Financial Services
Worcester Polytechnic Institute	<u>MS in Data Science</u>	Worcester, MA	Classroom	33	Statistical Methods for Data Science; Regression Analysis; Database Management Systems; Big Data Management; Knowledge Discovery and Data Mining; Machine Learning; Business Intelligence; Big Data Analytics
Northeastern University	<u>MS in Business Analytics (program launches Fall 2015)</u>	Boston, MA	Online	30	Introduction to Business Analytics, New Media and Digital Marketing Analytics, Advanced Enterprise Data Practice, Introduction to Computational Statistics, Information Design and Visual Analytics
Babson College	<u>MBA with Concentration in Business Analytics</u>	Babson Park, MA	Classroom, Blended	--	Competing on Analytics using Technology, Introduction to Data Science and Business Analytics, Marketing Analytics, Analytical Managers and Organizations, Clouds, Platforms, and Networks
Brandeis University	<u>MBA with Concentration in Data Analytics</u>	Waltham, MA	Classroom	--	Foundations of Econometrics, Analyzing Big Data, Forecasting in Finance & Economics: Time-series econometrics, Business Dynamics, Applications of System Dynamics
George Mason University School of Engineering	<u>Masters Data Analytics Engineering</u>	Fairfax, VA	Classroom	30	Concentration – Applied Analytics, Bioengineering, Data Mining, Digital Forensics, Predictive Analytics, Statistics for Analytics
Rutger Business School	<u>MBA in Analytics & Information Management</u>	Newark, NJ	Classroom	30	Design/Analysis of Data Structures & Algorithms, Machine Learning, Data Mining for Finance, Business Forecasting, Analytic for Business Intelligence
Simon Business School - University of Rochester	<u>MS in Business Administration, Business Analytics Concentration</u>	Rochester, NY	Classroom	40	Statistics using R, Intro to Business Analytics, Advanced Determining & Machine Learning, Framing & Analyzing Business Problems, Business Modeling, Marketing Management, Economics Core Analytics

Stevens Institute of Technology	<u>MS in Business Intelligence & Analytics</u>	Hoboken, NJ	Classroom	36	Strategic Data Planning & Management, Data Warehousing, Data Mining, Network Analysis, Risk, Modeling, Optimization, Multivariate
UMass Lowell	<u>MS in Business Analytics</u>	Lowell, MA	Classroom and Online	30	Tracks-- Big Data Analytics, Managerial Decision Making, Marketing Analytics Track, Finance Analytics Track
UMass Dartmouth	<u>MS in Data Science</u>	Dartmouth MA	Classroom	30	Mathematical Statistics, Database Design, Computational Methods, Data Visualization, Math Modeling, Simulations, Linear Algebra, Numerical Optimization, Data Mining and Knowledge Discovery

ACADEMIC AND RELATED MATTERS

Admission

The proposed MSBA program plans to welcome students from a wide range of academic backgrounds, including those with undergraduate degrees in business, information systems, information technology, computer science, engineering, math, statistics, operation management, supply chain management, and others.

The admissions standards and procedures will be consistent with the College of Management's learning objectives for the Graduate Program. Application materials will include official bachelor degree transcripts from all institutions attended, GMAT or GRE scores, a statement of interest, three letters of recommendation attesting to the applicant's academic and/or professional knowledge and skills, and TOEFL(Test of English as a Foreign Language) scores for international applicants whose first language is not English. Transfer students will also be required to submit official transcripts of all graduate courses completed.

Program Enrollment

	# of Students Year 1	# of Students Year 2	# of Students Year 3	# of Students Year 4	# of Students Year 5
New Full-Time	15	20	30	30	30
Continuing Full-Time	0	2	5	5	5
New Part-Time	6 (0.5 FTE)				
Continuing Part-Time	0	6 (0.5 FTE)	6 (0.5 FTE)	6 (0.5 FTE)	6 (0.5 FTE)
Totals	21	34	47	47	47

Curriculum (Attachment A)

The proposed program curriculum is intended to focus on effective formulation techniques, mathematical and algorithmic concepts, and technology solutions. Students will learn to use current software tools to apply various modeling techniques and be required to complete 30 credits for the MSBA degree. UMB proposes to initiate the program with two specializations, big data analytics and supply chain analytics. Each will require students to take five elective courses to satisfy the specialization requirements. Students will be expected to take a statistics course before starting the program. It is planned that students who have not completed a statistics course will take Statistical Analysis for Managers at UMB.

Internships or Field Studies

There are no internships or field studies associated with this program.

RESOURCES AND BUDGET

Fiscal (Attachment B)

It is anticipated that the proposed program will draw on existing faculty (including new hires), staff, and technology to provide the primary support for the program. The budget includes \$2500 per year for marketing expenses and \$5000 for general operating expenses. Revenues generated by tuition and fees are expected to exceed the cost of the projected expenses.

Faculty and Administration (Attachment C)

Existing faculty and professional staff in the MSIS department have expertise in teaching in the business analytics area. Eighteen full time faculty members and one adjunct faculty member will teach in the program. All full-time faculty members have doctoral degrees in the field. The adjunct faculty member has a Master's degree in technology and has significant work experience in the field. Existing faculty have a range of experience in implementing new programs and teaching and advising graduate students. The program will rely on existing staff in the college of management.

Facilities, Library and Information Technologies

The proposed MSBA program is designed to make use of both traditional and online delivery methods. Faculty members will continue to use existing office space.

No new library resources are anticipated for the program since current journals and online databases are expected to be sufficient. The library has subscriptions to most of the primary and valued journals in technology, data science, and business analytics.

Current lab sessions required in MSIS courses take place in Presentation Room 5 and general labs on campus. The proposed MSBA program will continue to leverage current technology resources available, including the existing high computing facility for all the

UMASS campuses.

Affiliations and Partnerships

UMB is planning to create an industry advisory board for the MSIS department. MSIS also expects to conduct an employer survey of graduates from the program as part of this strategy. The MSIS department plans to integrate industry related experiences and problem-solving into some of the coursework. It is expected that this will be another strategy that will help to develop significant partnerships and affiliations.

PROGRAM EFFECTIVENESS

Goal	Measurable Objective	Strategy for Achievement	Timetable
Enrollment of first student cohort in Spring 2017	Have 21+ high-quality students enrolled in Spring 2017 to start the program following approval of program	Adopt proactive, effective marketing strategies <ul style="list-style-type: none"> • to promote the program among our undergraduate students who want to advance their knowledge in analytics on campus • to promote among current graduate students and alumni who are interested in choosing MSBA as a second major • to promote among organizations in Massachusetts • to promote on the internet via college's Facebook pages, blogs, LinkedIn network, etc. 	Year 1
Retention and graduation	Maintain high student retention and graduation rate (90+ %)	The MSIS department will work with the graduate program office to supervise the academic program and monitor students' progress	Year 1 and onward

AACSB Accreditation	The MSBA program will pass AACSB review in its next visit.	Follow AACSB's guidelines to 1) develop learning objectives 2) develop and implement assessment plan 3) collect learning data 4) Review the program 5) Improve the program based on feedback	From now to Year 5 (next AACSB visit)
Build program synergy among the undergraduate, graduate program, and Ph.D. programs ⁸	Encourage qualified BSIT and MIS undergraduate students who are interested in analytics to join the MSBA (20%+) and encourage top MSBA students to join the Ph.D. program.	Market the three programs together.	Year 1 and onward
Develop job placement program with local organizations	Job placement for majority within one year	Communicate with local firms	Year 1
Integrate research and practice with external funding	Establish Analytics Center	Continue to build strong analytics programs and seek funding to support analytical programs and research that can help MSBA	Year 3

EXTERNAL REVIEW AND INSTITUTIONAL RESPONSE

The proposed MSBA program was reviewed by Dr. Nanda Kumar, Associate Professor of Computer Information Systems, City University of New York; and Dr. Dongsong Zhang, Professor, Department of Information Systems, University of Maryland, Baltimore County. A site visit took place on August 24, 2016 to further discuss the proposal with the administrators, the faculty involved in developing the proposal, as well as a group of undergraduate and graduate students in the department of MSIS. The team found that UMB was correct to anticipate the oncoming increasing demand for data-literate managerial talent. They cited the recent report by McKinsey & Co, that there will be a need not only for data scientists but also for managers who can understand the possibilities 'big data' can present and leverage it to foster innovation and economic growth. The reviewers expressed particular gratification that the proposed program will serve the needs of the local population around the city of Boston and provide an affordable high quality education to under-represented and under-served students.

⁸ The MSIS department has offered Business Intelligence track in [Bachelor of Science in Information Technology \(BSIT\)](#). The MSIS department will start the Ph.D. program of "Information System for Data Science". Both of these two programs focus on analytics

The team recommended that students in the program have flexibility to take up to 2 courses relevant to business analytics outside the MSIS Department upon approval of the program director, in order to provide students with choices from a broad range of courses that are interesting to them and their work. They also suggested that MSIS specify clearly in course descriptions the differences between similar courses that exist in the current BSIT program and those that will be offered in the curriculum of the proposed MSBA program. The reviewers recommended that UMB create an industry advisory board, in which the members may meet once a year and provide feedback to the MSIS department with regard to adjusting or refining the curriculum and to conduct an employer survey of graduated students. As well, it was recommended that a new program of this nature would be better served if more upfront investment were made in marketing the program widely to the appropriate audience. Finally, the team noted student request for the inclusion of real-time business problems and cases in some of the course content.

UMB made adjustments consistent with the external reviewers' suggestions and recommendations either in the body of the proposal or in the plans for implementation once the program has obtained approval.

STAFF ANALYSIS AND RECOMMENDATION

Staff thoroughly reviewed all documentation submitted by the University of **Massachusetts Boston** and the external reviewers. Staff recommendation is for approval of the proposed **Master of Science in Business Analytics** program.

ATTACHMENT A: CURRICULUM

<i>Major Required (Core) Courses (Total courses required = 5)</i>		
<i>Course Number</i>	<i>Course Title</i>	<i>Credit Hours</i>
MSIS 670	Enterprise Business Intelligence	3
MSIS 642	Applied Regressions for Business Analytics	3
MSIS 672	Enterprise Data Mining and Predictive Analytics	3
MSIS 638	Decision-making models	3
MSIS 630	Project and Change Management	3
	Subtotal # Core Credits Required	15
<i>The Big Data Analytics specialization (Total courses required = 5)</i>		
MSIS 618	Database Management Systems	3
MSIS 671	Enterprise Data Warehousing	3
MSIS 680	Advanced Data Mining	3
MSIS 656	Information Storage Management	3
MSIS 685	Introduction to Big Data Analytics	3
MSIS 615	Object Oriented Information Systems	3
MSIS 682	Linear Programming	3
MSIS 643	Applied Decision Analytics	3
MSIS 673	Business Analytics Project	3
	SubTotal # Concentration Credits Required	15
<i>The Supply Chain specialization (Total courses required = 5)</i>		
MBAMS 635	Operations Management	3
MBAMS 652	Lean & Six Sigma	3
MSIS 631	Operational Risk Management	3
MSIS 617	Management of the Supply Chain	3
MSIS 680	Advanced Data Mining	3
MSIS 682	Linear Programming	3
MSIS 643	Applied Decision Analytics	3
MSIS 673	Business Analytics Project	3
	Subtotal # Elective Credits Required	15
<i>Curriculum Summary</i>		
Total number of courses required for the degree		10 courses

Total credit hours required for degree	30
<i>Prerequisite or Other Additional Requirements:</i> Statistic MSIS 111 or MBAMS 630 Statistical Analysis for Managers or Equivalent in last five years. Otherwise, students are required to take MBAMS 630 Statistical Analysis or test out.	

ATTACHMENT B: BUDGET

REVENUE ESTIMATES										
	Year 1 2016		Year 2 2017		Year 3 2018		Year 4 2019		Year 5 2020	
<i>Full-Time Tuition Rate: In-State</i>	1,554		1,554		1,554		1,554		1,554	
<i>Full-Time Tuition Rate: Out-State</i>	5,855		5,855		5,855		5,855		5,855	
<i>Mandatory Fees per Student (In-state)</i>	13,482		14,021		14,582		15,165		15,771	
<i>Mandatory Fees per Student (out-state)</i>	18,369		19,103		19,868		20,662		21,489	
<i>FTE # of New Students: In-State</i>	10		12		17		17		17	
<i>FTE # of New Students: Out-State</i>	8		11		16		16		16	
<i># of In-State FTE Students transferring in from the institution's existing programs</i>		0		0		0		0		0
<i># of Out-State FTE Students transferring in from the institution's existing programs</i>										
Tuition and Fees										
	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs
First Year Students										
Tuition										
In-State	\$15,540	\$0	\$18,648	\$0	\$26,418	\$0	\$26,418	\$0	\$26,418	\$0
Out-of-State	\$46,838	\$0	\$64,403	\$0	\$93,677	\$0	\$93,677	\$0	\$93,677	\$0
Mandatory Fees	\$281,765	\$0	\$378,387	\$0	\$565,769	\$0	\$588,399	\$0	\$611,935	\$0

Second Year Students										
Tuition										
In-State			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Out-of-State			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mandatory Fees			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Third Year Students										
Tuition										
In-State					\$0	\$0	\$0	\$0	\$0	\$0
Out-of-State					\$0	\$0	\$0	\$0	\$0	\$0
Mandatory Fees					\$0	\$0	\$0	\$0	\$0	\$0
Fourth Year Students										
Tuition										
In-State						\$0	\$0	\$0	\$0	\$0
Out-of-State						\$46,838	\$0	\$64,403	\$0	\$0
Mandatory Fees						\$0	\$0	\$0	\$0	\$0
Fifth Year Students										
Tuition										
In-State								\$0	\$0	\$0
Out-of-State								\$0	\$0	\$0
Mandatory Fees								\$0	\$0	\$0
Gross Tuition and Fees	\$344,143	\$0	\$461,438	\$0	\$685,863	\$0	\$755,333	\$0	\$796,433	\$0
Grants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Contracts	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Campus budget allocation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other evenues	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$344,143	\$0	\$461,438	\$0	\$685,863	\$0	\$755,333	\$0	\$796,433	\$0

EXPENDITURE ESTIMATES

	Year 1 2016		Year 2 2017		Year 3 2018		Year 4 2019		Year 5 2020	
	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources	New Expenditures required for Program	Expenditures from current resources
Personnel Services										
Faculty	\$185,000		\$190,550		\$196,267		\$202,154		\$208,219	
Administrators		\$3,500		\$3,605		\$3,713		\$3,825		\$3,939
Support Staff		\$8,193		\$8,439		\$8,692		\$8,953		\$9,221
Others										

Fringe Benefits 34 %	\$62,900	\$3,976	\$64,787	\$4,095	\$66,731	\$4,218	\$68,733	\$4,344	\$70,795	\$4,475
Total Personnel	\$247,900	\$15,668	\$255,337	\$16,138	\$262,997	\$16,623	\$270,887	\$17,121	\$279,014	\$17,635
Operating Expenses										
Supplies	\$5,000		\$5,150		\$5,305		\$5,464		\$5,628	
Library Resources										
Marketing/Promotional Expenses	\$2,500		\$2,500		\$2,500		\$2,500		\$2,500	
Laboratory Expenses										
General Administrative Overhead	\$22,986	\$1,410	\$23,669	\$1,452	\$24,372	\$1,496	\$25,097	\$1,541	\$25,843	\$1,587
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Operating Expenses	\$30,486	\$1,410	\$31,319	\$1,452	\$32,177	\$1,496	\$33,060	\$1,541	\$33,970	\$1,587
Net Student Assistance										
Assistantships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fellowships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stipends/Scholarships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Student Assistance	\$0	\$0								

Capital										
Facilities / Campus recharges	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Capital	\$0									

Total Expenditures	\$278,386	\$17,079	\$286,656	\$17,591	\$295,174	\$18,119	\$303,947	\$18,662	\$312,984	\$19,222
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BUDGET SUMMARY OF NEW PROGRAM ONLY

	Year 1 2014__	Year 2 2015__	Year 3 2016__	Year 4 2017__	Year 5 2018__
Total of newly generated revenue	\$344,143	\$461,438	\$685,863	\$755,333	\$796,433
Total of additional resources required for program	\$278,386	\$286,656	\$295,174	\$303,947	\$312,984
Excess/ (Deficiency)	\$65,757	\$174,782	\$390,690	\$451,385	\$483,449

Justification of Financial Projections:

ATTACHMENT C: FACULTY

Name of faculty (Name, Degree and Field, Title)	Ten- ured Y/N	Courses Taught (C) indicatescore course; (OL) indicatesany course currently taught online.	# of sec- tion s	Division or College of Employment	Full- or Part- time in Program	Full- or part- time in other department or program	Sites where individual will teach program courses
Ashrafi, Noushing Ph.D. in Information Systems Professor of Management Science and Information Systems	Y	MSIS 670 Enterprise Business Intelligence	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Ayyagari, Ramakrishna Ph.D. in Information Systems Professor of Management Science and Information Systems	Y	MSIS 642 Regression	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Bharati, Pratyush Ph.D. in Information Systems Associate Professor of Management Science and Information Systems	Y	MSIS 630 Project and Change Management	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Blake, Roger Ph.D. in Information Systems Associate Professor of Management Science and Information Systems	Y	MSIS 680 Advanced Data Mining	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus

Du, Kui Ph.D. in Information Systems Assistant Professor of Management Science and Information Systems	N	MSIS 615 Object Oriented Information Systems	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Elahi, Ehsan Ph.D. in Industrial and Systems Engineering Associate Professor of Management Science and Information Systems	Y	MSIS 631 Operational Risk Management MSIS 617 Management of the Supply Chain	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Golmohammadi, Davood Ph.D. in Industrial and Management Systems Engineering Associate Professor of Management Science and Information Systems	Y	MBAMS 635 Operations Management MBAMS 630 Statistical Analysis for Managers (for those who lack relevant background)	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Hao, Haijing (Jane) Ph.D. in Information Systems Assistant Professor of Management Science and Information Systems	N	MSIS 642 Regression MSIS 671 Enterprise Data Warehousing	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Keisler, Jeffrey M. Ph.D. in Decision Science Professor of Management Science and Information Systems	Y	MSIS 643 Applied Decision Analytics	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus

Kim, Jongwoo (Jonathan) Ph.D. in Information Systems Assistant Professor of Management Science and Information Systems	N	MSIS 618 Database Management Systems	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Kuilboer, Jean-Pierre Ph.D. in Information Systems Associate Professor of Management Science and Information Systems	Y	MSIS 685 Big Data	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Lee, One-Ki (Daniel) Ph.D. in Information Systems Associate Professor of Management Science and Information Systems	Y	MSIS 630 Project and Change Management	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Pajouh, Foad Mahdavi Ph.D. in Industrial Engineering and Management Associate Professor of Management Science and Information Systems	N	MSIS 682 Optimization MBAMS 652 Lean & Six Sigma	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Namayanja, Josephine Ph.D. in Information Systems Assistant Professor of Management Science and Information Systems	N	MSIS 685 Big Data	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Syed, Romilla Ph.D. in Information Systems	N	MSIS 615 Object Oriented Information Systems	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus

Assistant Professor of Management Science and Information Systems							
Xu, Peng Ph.D. in Information Systems Associate Professor of Management Science and Information Systems	Y	MSIS 672 Enterprise Data Mining and Predictive Analytics	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Zhang, Wei Ph.D. in Information Systems Associate Professor of Management Science and Information Systems	Y	MSIS 618 Database Management Systems	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Yarmand, Hamed Ph.D. in Operations Research Lecturer of Management Science and Information Systems	N	MSIS 638 Decision-making models	1	College of Management	Part-time	Full-time in the MSIS Department	Main Campus
Delvy, Paul Master Science in Computer Science Master Science in Management Lecturer	N	MSIS 656 Information Storage Management	1	College of Management	Part-time	Part-time in the Management and Marketing Department	Main Campus