

PROPOSAL FOR NEW MASTERS PROGRAM

College of Business
Institution Submitting Proposal

Master of Science in Business Analytics
Degree Designation as on Diploma

Master of Science in Business Analytics
Title of Proposed Degree Program

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|---|---|
| EEO Status | _____ |
| CIP Code | _____ |
| Academic Unit (e.g. Department, Division, School) | <u>CIS Department, College of Business</u> |
| Name of Academic Unit | <u>College of Business</u> |
| Name of Program Director | <u>Jian Guan, Ph.D.</u> |
| Intended Date of Implementation | <u>Fall 2018 Semester</u> |
| Anticipated Date for Granting First Degrees | <u>Summer 2019 Semester</u> |
| Date of Governing Board Approval | _____ |
| Name, Title and Information of Contact Person | <u>Richard Germain, Ph.D.</u> <u>Associate Dean of Graduate Programs</u> <u>College of Business</u> Richard.germain@louisville.edu |

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| Date of CPE Approval | _____ |
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Introduction

This document proposes a new Master of Science in Business Analytics degree program housed within the College of Business at the University of Louisville. The envisioned initial execution of the program involves a 30 credit hour, cohort-based, 13 month degree. All financial statements are built around this model. The long-term vision is to offer the program in hybrid and/or on-line modalities within five years of the program's initial intake.

Evaluation Criteria

All actions in the approval of new programs for public institutions are subject to a stipulation regarding the program's ability to attain specified goals that have been established by the institution and approved by the Council on Postsecondary Education (the Council). At the conclusion of an appropriate period of time, the program's performance shall be reviewed by Council staff following criteria established in the Council's Academic Programs Policy.

A. Centrality to the Institution's Mission and Consistency with State's Goals

A program will adhere to the role and scope of the institution as set forth in its mission statement and as complemented by the institution's academic plan.

1. List the objectives of the proposed program. These objectives should deal with the specific institutional and societal needs that this program will address.

This program is designed to provide in-depth coverage of topics in the advanced business analytics area necessary for the new digital economy and to meet demand for business analytics talent. Thus the proposed program provides a comprehensive coverage of analytic knowledge and skills within the context of business applications. Specifically, there are four key areas of business analytics reflected in the proposed program: business acumen, applied mathematics, computing technologies, and communicating with impact. These skills will allow students to ask the right business questions, build working models, use the models to perform the in-depth analyses, and successfully interpret and convey the results for prospective employers.

2. Explain how the proposed program relates to the institutional mission and strategic plan.

The proposed program is consistent with the mission of the University of Louisville as outlined in the Mission Statement (<http://louisville.edu/graduatecatalog/mission-statement>). More specifically the proposed program is designed to provide a hitherto unavailable, high-quality educational opportunity to 1) serve both existing students and attract new students; 2) serve hiring need of local businesses; 3) foster close collaborations with local businesses through the Curriculum Advisory Committee, internships, and class projects based on real business problems.

3. Explain how the proposed program addresses the [state's postsecondary education strategic agenda](#).

The Commonwealth of Kentucky's 2016-2021 Strategic Agenda for Postsecondary and Adult Education (<http://cpe.ky.gov/ourwork/documents/201621strategicagenda.pdf>) lists three urgent priorities:

Opportunity: engage more people to take advantage of postsecondary opportunities.

The proposed program provides a hitherto unavailable opportunity for both existing students and potential students by offering training and potentially promising careers in business analytics, a high-demand area in an economy that is becoming increasingly digital. The program will serve the following target populations:

- *Current undergraduate students from University of Louisville and other colleges in Kentucky. Undergraduate students from various disciplines, but particularly those majoring in a business field or a STEM field, will find the program to provide much needed knowledge and skills to enter a highly rewarding area of employment.*
- *Recent graduates with similar backgrounds as described above will also find the context-building components of the proposed program attractive to advance professionally.*
- *Career switchers will find the program attractive as they can either gain much needed knowledge and skills in their existing job or advance professionally.*
- *International students will likely be another source of candidates, who tend to be highly qualified students and provide additional diversity and an enhanced global perspective to the educational experience.*

- (a) Success: increase degree and certificate completion, fill workplace shortages, and guide more graduates to career paths.

The graduates of the proposed program will fulfill clearly identified shortages in analytics professions in the region while opening the door to a career path for people to be meaningfully engaged in an increasingly digital economy.

- (b) Impact: create economic growth and development and make the state more prosperous.

The graduates of the proposed program will participate in a high growth area of the economy. Adequate supply of highly trained professionals, such as those graduating from the proposed program, will not only meet the growing demand from businesses in Kentucky but also make Kentucky more attractive for new businesses that represent the new digital economy.

4. Explain how the proposed program furthers the [statewide implementation plan](#).

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(<http://cpe.ky.gov/ourwork/documents/201621strategicagenda.pdf>) documents the statewide implementation plan. Six policy objectives are detailed:

(a) Adequate funding;

The proposed program does not require any additional funding from either the College of Business or the University of Louisville. Please the financial model in the later part of this document for detail.

(b) Accountability;

The accreditation of the proposed program will fall under the general The Association to Advance Collegiate Schools of Business (AACSB) College of Business accreditation. The next accreditation cycle will begin in 2020.

(c) Outcomes-based funding;

Since the proposed program is self-funded, this item does not apply.

(d) Measures of progress

The proposed program will follow the rigorous process for AACSB accreditation in terms of progress monitoring. In addition, the key measures of progress for the program will be the number of students enrolled, the qualifications and quality of the students enrolled, and the placement rate / starting salaries of program graduates.

(e) Progress reports

Progress reports will be based on the key metrics identified in part (d) above. Progress reports are anticipated to be generated annually.

(f) Campus strategic plans

The proposed program will meet several important components of the University of Louisville strategy (<http://louisville.edu/graduatecatalog/mission-statement>). More specifically the proposed program is designed to provide a hitherto unavailable, high-quality educational opportunity to 1) serve both existing students and attract new students; 2) serve hiring need of local businesses; 3) foster close collaborations with local businesses through the Curriculum Advisory Committee, internships, and class projects based on real business problems.

B. Program Quality and Student Success

The curriculum should be structured to meet the stated objectives and student learning outcomes of the program.

1. List all student learning outcomes of the program.
 - *Understand and use core information systems technologies in a business analytics context, such as programming, database modeling and SQL, and advanced data manipulation techniques.*
 - *Create models using statistical, data mining and machine learning techniques, and evaluate and interpret the output of such models to support decision making.*
 - *Work in a team environment to solve large data analytic problems.*
 - *Clearly communicate and present complex analytics results to business clients, using data visualization techniques and practical and simple business terms that can be understood by a general non-technical audience.*
 - *Identify and evaluate appropriate data analytics techniques to be used depending on the specific information needs of the project.*
 - *Obtain knowledge and skill in applying leading analytic tools to complex, real-life analytic problems.*

2. Explain how the curriculum achieves the program-level student learning outcomes by describing the relationship between the overall curriculum or the major curricular components and the program objectives.

| Learning Outcomes | Courses | Credit Hours |
|---|---|---------------------|
| <i>Understand and use core information systems technologies in a business analytics context, such as programming, database modeling and SQL, and advanced data manipulation techniques.</i> | <i>MSBA605: Programming for Analytics MSBA615: Introduction to Statistical Packages MSBA630: Data Management</i> | 6 |
| <i>Create models using statistical, data mining and machine learning techniques, and evaluate and interpret such models to support decision making.</i> | <i>MSBA635: Introduction to Linear Algebra MSBA620: Data Analytics I MSBA635: Data Analytics II MSBA640: Decision Models MSBA645: Data Mining MSBA650: Data Analytics III</i> | 16.5 |
| <i>Work both independently and in a team to solve large data analytic problems.</i> | <i>MSA 690 Capstone or MSA 685 Internship</i> | 3 |
| <i>Clearly communicate and present complex analytics results to business clients, using data visualization techniques and practical and simple</i> | <i>MSBA625: Storytelling with Data MSBA685: Internship MSBA690: Capstone</i> | 3 |

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| <i>business terms that can be understood by a general non-technical audience.</i> | | |
| <i>Identify and evaluate appropriate data analytics techniques to be used depending on the specific information needs of the project.</i> | <i>MSBA 690 Capstone MSBA 685 Internship</i> | <i>3</i> |
| <i>Obtain knowledge and skill in applying leading analytic tools to complex, real-life analytic problems.</i> | <i>MSBA655: Special Topics in Business Analytics MSBA685: Internship MSBA690: Capstone</i> | <i>4.5</i> |

3. Highlight any distinctive qualities of this proposed program.

- *An integrated curriculum—the program combines several important areas of knowledge and skill into one integrated curriculum. These areas include business acumen, information systems technologies, data modeling and analytics, and impactful communication.*
- *Strong business orientation—the program has a strong application orientation with all components of the curriculum designed and delivered with close collaboration with local businesses. This strong business orientation is particularly reflected in the capstone or internship course.*
- *Strong emphasis on practical data modeling and prediction techniques—the program has over 16 credit hours devoted to modeling and prediction techniques.*
- *Business communication—the program introduces early on the skills to interpret and communicate the analytical results to stakeholders for impactful decision making.*

4. Will this program replace or enhance any existing program(s) or concentration(s) within an existing program?

No

- a. If yes, please specify. Include the projected faculty/student in major ratio.

N/A

5. Is there a specialized accrediting agency related to this program?

- a. If yes, identify the agency.

No

- b. Do you plan to seek accreditation?

Accreditation would fall under the general AACSB College of Business accreditation.

- c. If yes, explain your plans for accreditation. If no, explain your rationale for not seeking accreditation.

The next AACSB accreditation cycle would be for the 2021-2022 academic year. The program would be evaluated as part of AACSB accreditation.

6. Attach the SACS Faculty Roster Form. Faculty resources shall be demonstrated to be adequate and appropriate for the proposed program. The number of faculty should meet external standards where appropriate. The qualifications of faculty will support the objectives and curriculum of the proposed program.

- *Associate Professor Robert Carter, Department of Marketing, College of Business, University of Louisville.*
- *Associate Professor Jose Fernandez, Department of Economics, College of Business, University of Louisville.*
- *Associate Professor Sandeep Goyal, Department of Computer Information Systems, College of Business, University of Louisville.*
- *Associate Professor Jian Guan, Department of Computer Information Systems, College of Business, University of Louisville.*
- *Associate Professor Kristen Lucas, Department of Management, College of Business, University of Louisville.*
- *Assistant Professor Andrew Manikas, Department of Management, College of Business, University of Louisville.*
- *Assistant Professor Andrew Wright, Department of Computer Information Systems, College of Business, University of Louisville.*
- *Associate Professor Jozef Zurada, Department of Computer Information Systems*

**Faculty Roster Form
Qualifications of Full-Time and Part-Time Faculty**

Name of Institution: College of Business, University of Louisville

Name of Primary Department, Academic Program, or Discipline: Master of Science in Business Analytics

Academic Term(s) Included: The program is a 3 semester (fall, spring, summer) program. Academic terms are provided for each course under column 2.

Date Form Completed: September 1, 2017

F, P: Full-time or Part-time;

| 1 | 2 | 3 | 4 |
|----------|----------|----------|----------|
|----------|----------|----------|----------|

| NAME (F, P) | COURSES TAUGHT Including Term, Course Number & Title, Credit Hours | ACADEMIC DEGREES& COURSEWORK Relevant to Courses Taught, Including Institution & Major List specific graduate coursework, if needed | OTHER QUALIFICATIONS & COMMENTS Related to Courses Taught |
|--------------------|--|--|---|
| Robert Carter (F) | MSBA 655: Special Topics (3 CH); Spring semester | Ph.D. in Business Administration (Marketing), University of Cincinnati, 2007; MS in Quantitative Analysis, University of Cincinnati, 2006. | Terminal degree and published research in relevant field; 10+ years of industry experience including VP Client Services, AC Neilson; More than 18 CH graduate level course work in statistics, research methods, and data analysis. |
| Jose Fernandez (F) | MSBA 615 Introduction to Statistical Packages (1.5 CH); Fall semester; MSBA 650 Data Analytics III (3 CH), Summer semester | Ph.D. in Economics, University of Virginia, 2008; MA in Economics, University of Virginia, 2002 | Terminal degree and published research in relevant field; More than 18 CH graduate level course work in statistics, econometrics, research methods, and data analysis. |
| Sandeep Goyal (F) | MSBA 620 Data Analytics I (3 CH), Fall semester; MSBA 635 Data Analytics II (3 CH), Summer semester | Ph.D. in Business Administration (Information Systems), University of Arkansas, 2010; MBA (Information Systems Major), California State University Sacramento, 2005. | Terminal degree and research in relevant field; More than 18 CH graduate level course work in computer and information systems programming and statistics. |
| Jian Guan (F) | MSBA 630 Data Management (3 CH), Spring semester; MSBA 645 Data Mining (3 CH), Summer semester | Ph.D. in Computer Science and Engineering, University of Louisville, 1992; MS in Computer Science, University of Louisville, 1989. | Terminal degree and research in relevant field; More than 18 CH graduate level course work in computer science and statistics. |

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| <p><i>Kristen Lucas (F)</i></p> | <p><i>MSBA 625 Storytelling with Data (3 CH), Fall semester</i></p> | <p><i>Ph.D. in Organizational Communication, Purdue University, 2006; MS in Organizational Communication, Purdue University, 2002.</i></p> | <p><i>Terminal degree and research in relevant field; More than 18 CH graduate level course work in communications. Currently, visiting associate professor, MS in Business Analytics and Information Management Program, Purdue University (summer instruction).</i></p> |
| <p><i>Andrew Manikas (F)</i></p> | <p><i>MSBA 640 Decision Models (3 CH), Spring semester</i></p> | <p><i>Ph.D. in Business Administration (Operations Management) Georgia Institute of Technology, 2008; MBA (Materials and Logistics Management Major), Michigan State University), 1992.</i></p> | <p><i>Terminal degree and research in relevant field; More than 18 CH graduate level course work in computer programming, applied mathematics, and statistics; 10+ years consulting experience in operations management.</i></p> |
| <p><i>Andrew Wright (F)</i></p> | <p><i>MSBA 605 Programming for Analytics (1.5 CH), Fall semester</i></p> | <p><i>Ph.D. in Computer Science and Engineering, University of Louisville, 1994; Master of Engineering Mathematics and Computer Science, University of Louisville, 1991.</i></p> | <p><i>Terminal degree and research in relevant field; More than 18 CH graduate level course work in computer engineering and statistics.</i></p> |
| <p><i>Jeff Hieb (F)</i></p> | <p><i>MSBA 610 Introduction to Linear Algebra (1.5 CH), Fall semester</i></p> | <p><i>Ph.D. in Computer Science and Engineering, University of Louisville, 2008; M.S., Computer Science, University of Louisville, 2004.</i></p> | <p><i>Terminal degree and research in relevant field; More than 18 CH graduate level course work in computer science and mathematics.</i></p> |
| <p><i>Richard Germain (F)</i></p> | <p><i>MSBA 685 Internship (3 CH), Spring/summer semester; MSBA 690</i></p> | <p><i>Ph.D. in Business Administration (Marketing), Michigan State University, 1989;</i></p> | <p><i>Terminal degree and research in relevant field; More than 18 CH</i></p> |

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| | <i>Capstone (3 CH), Summer semester</i> | <i>MBA, McGill University, 1986.</i> | <i>graduate level course work in statistics.</i> |
| <i>Jozef Zurada (F)</i> | <i>MSBA 645 Data Mining (3 CH), Summer semester</i> | <i>Ph.D. in Computer Science and Engineering, University of Louisville, 1992; MS in Computer Science, University of Louisville, 1989.</i> | <i>Terminal degree and research in relevant field; More than 18 CH graduate level course work in computer science and statistics.</i> |

Please see Appendix A for the faculty vitae.

- 7. Access to the qualitative and quantitative library resources must be appropriate for the proposed program and should meet recognized standards for study at a particular level or in a particular field where such standards are available. Adequacy of electronic access, library facilities, and human resources to service the proposed program in terms of students and faculty will be considered. Physical facilities and instructional equipment must be adequate to support a high quality program. The proposal must address the availability of classroom, laboratory, and office space as well as any equipment needs.
 - a. Describe the library resources available to support this program. You may attach any documentation provided to SACS.

The existing library resources are adequate to support this program. Please see Appendix B Support Letter from UofL Library and Appendix C Evaluation of Library Resources for the proposed program.

- b. Describe the physical facilities and instructional equipment available to support this program.

The existing College of Business physical facilities and instructional equipment are adequate to support the program.

- 8. Clearly state the admission, retention, and completion standards designed to encourage high quality.
 - a. Indicate expected faculty to student ratio:

The program shall operate on a cohort basis. The student to teacher ratio will thus explicitly depend upon the cohort size. An incoming cohort of 20 translates into a 20-to-1 student-to-teacher ratio.

- 9. Clearly state the degree completion requirements for the program.

The degree completion requirements for the program are:

- a. 30 MSBA course prefix credit hours.
 - Of the 30 MSBA course prefix credit hours:
 - 25.5 credit hours are core
 - 1.5 credit hours are from a special topics course
 - 3.0 credit hours are from either MSBA 685 (Internship) or MSBA 690 (Capstone).
- b. Good academic standing: Specifically a minimum GPA of 3.0.

10. Provide the following information for the program and for each concentration (some categories may not apply to all programs):

- a. Total number of hours required for degree: 30.0
- b. Number of hours in degree program core: 25.5
- c. Number of hours in concentration: 0.0
- d. Number of hours in guided electives: 4.5
- e. Number of hours in free electives: 0.0

11. Describe how the proposed program will articulate with related programs in the state. It should describe the extent to which student transfer has been explored and coordinated with other institutions. Attach all draft articulation agreements related to this proposed program.

The only related program in the state is offered by Bellarmine University, a private university located in Louisville, KY. No articulation is therefore required.

12. List courses under the appropriate curricular headings.

| Course Name | Course Number | Credit Hours | Course Description |
|---------------------------------------|----------------------|---------------------|--|
| <i>Programming for Analytics</i> | <i>MSBA605</i> | <i>1.5</i> | <i>This course introduces the essential general programming concepts and techniques to a data analytics audience without prior programming experience. The goal is to equip the students with the necessary programming skill to be successful in the other courses in the MSBA program. Examples are drawn from the problems and programming patterns often encountered in data analysis. It will use a commonly used in analytics programming language such as Python.</i> |
| <i>Introduction to Linear Algebra</i> | <i>MSBA610</i> | <i>1.5</i> | <i>The objective of this course is to provide students a strong foundation on linear equations and matrices. This course will teach students how to formulate, apply and interpret systems</i> |

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| | | | <i>of linear equations and matrices, interpret data analytics problems in elementary linear algebra, and demonstrate understanding of various applications using linear transformations.</i> |
| <i>Introduction to Statistical Packages</i> | <i>MSBA615</i> | <i>1.5</i> | <i>This course will introduce you to a popular statistical package such as SAS, SPSS, or R. You will learn how to install and configure software necessary for a statistical programming environment and describe generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing, which includes basic programming, reading data, accessing and writing additional functions in such packages as well as debugging, profiling code, and organizing and commenting code.</i> |
| <i>Data Analytics I</i> | <i>MSBA620</i> | <i>3.0</i> | <i>Organizations and individuals create and collect massive amounts of data with relative ease. Much of this data are usually meaningless until they are analyzed for trends, patterns, relationships, and other useful information. The techniques taught in this course will cover the basic statistical techniques that would enable students to analyze datasets, formulate and solve real-world problems to facilitate data-driven decisions. Throughout the course, students will learn concepts and fundamentals of statistical inference and regression analysis by studying theory, developing intuition, and working through practical examples. Students will become proficient in interpreting standard regression output and conducting model selection and validation. Students will also learn the statistical programming language used to construct examples and homework exercises. Examples will be constructed using SAS, SPSS, R, and/or Excel. Students will have many opportunities to apply the new concepts to real data and develop their own statistical routines.</i> |

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| <p><i>Storytelling with Data</i></p> | <p>MSBA625</p> | <p>3.0</p> | <p><i>This course develops your ability to communicate with and about data in multiple professional contexts: formal individual presentations, team-based presentations, and informal one-on-one and small group interactions. After completing this course, you should be able to:</i></p> <ul style="list-style-type: none"> • <i>Present yourself professionally in diverse business communication contexts (e.g., presentations, group discussions, informal interactions, etc.)</i> • <i>Explain data and analyses in ways that are clearly understood by receivers</i> • <i>Provide concise explanations that quickly get to the point without losing important context or content</i> • <i>Demonstrate mastery at being data-driven by (a) translating data and analyses into a narrative that provides context for your message AND (b) creating informative, clutter-free data visualizations to support your message</i> • <i>Make persuasive recommendations that convince receivers to adopt a particular belief or take a course of action</i> |
| <p><i>Data Management</i></p> | <p>MSBA630</p> | <p>3.0</p> | <p><i>This course provides an introduction to issues, principles, and technologies of modeling and using organizational data. It covers concepts and skills for developing, accessing, and administering relational databases, and formulating and executing complex queries. It also discusses the role of data management technologies and practices in an organizational setting and how such technologies and practices may impact business strategy, business processes, and organizational structure. This course has a strong hands-on component. The course will make extensive use of a leading relational database management software and structured query language (SQL).</i></p> |
| <p><i>Data Analytics II</i></p> | <p>MSBA635</p> | <p>3.0</p> | <p><i>Students learn advanced analytical skills in the course that would allow them to recognize information patterns in data employ them in decision making. Students learn to develop models using important analytic methods such as predictive modeling, time-series analysis, logistic regression, growth modeling, and polynomial modeling. These skills will sharpen students' ability to structure problems and to perform logical analyses, translate descriptions of decision problems into formal models and investigate those models in an organized fashion, identify settings in which models can be used effectively, and apply advanced modeling concepts in</i></p> |

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| | | | <i>practical situations. Students also strengthen their computer skills achieved in data analytics I, focusing on how to use popular statistical packages (e.g., SAS, SPSS, R) to support decision making. The emphasis is on models that are widely used in diverse industries and functional areas, including finance, operations, and marketing.</i> |
| <i>Decision Models</i> | <i>MSBA640</i> | <i>3.0</i> | <i>This course trains students to turn real-world problems into mathematical and spreadsheet models and to use such models to make better managerial decisions. This is a hands-on course that focuses on modeling business problems, turning them into spreadsheet models and using tools like Solver or Crystal Ball to obtain solutions to these managerial problems. The course focuses on two classes of models: optimization and simulation. The application areas are diverse and they originate from problems in finance, marketing and operations. We cover problems such as how to optimize a supply chain and how to price products when faced with demand uncertainty. Topics covered include linear and linear integer programming, nonlinear programming and evolutionary solver, simulation and optimization, multi-period linear programming and Monte Carlo simulation.</i> |
| <i>Data Mining</i> | <i>MSBA645</i> | <i>3.0</i> | <i>Drawing on statistics, artificial intelligence and machine learning, the data mining process aims at discovering novel, interesting and actionable patterns in large datasets. This course will introduce the student to the fundamentals of data mining: association and sequence rules discovery, memory-based reasoning, classification and regression decision trees, comparison of data mining models, regression models, and neural network models. The course follows a learn-by-doing approach in which the student will complete assignments using real world datasets.</i> |
| <i>Data Analytics III</i> | <i>MSBA650</i> | <i>3.0</i> | <i>Organizations are increasingly interested in systematically modeling a wide-variety of data. This course introduces students to the new platforms and technologies in Big Data environments and large-scale data mining applications. While there is no single definition of Big Data and multiple emerging software packages exist to work with Big Data, we will cover the most popular approaches. Students will learn the Big Data infrastructure, such as Linux, Parallel and Distributed Computing, HDFS, Hadoop ecosystem and Hadoop-based tools for clustering, similarity search, web analytics and classification. For text analytics exercises students will learn how to extract concepts from text and to perform sentiment analysis.</i> |

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| <i>Special Topics</i> | <i>MSBA655</i> | <i>1.5</i> | <i>This course will be an application of business analytics in a specialized area such as marketing, finance, or healthcare. As an example here is a course description for Marketing Analytics. This course will focus on developing marketing strategies and resource allocation decisions driven by quantitative analysis. Topics covered include market segmentation, market response models, customer profitability, social media, paid search advertising, product recommendation systems, mobile geo-location analysis, media attribution models, and resource allocation. The course will provide necessary background on issues related to integrated marketing communications, pricing, digital marketing, and quantitative analysis.</i> |
| <i>Capstone</i> | <i>MSBA690</i> | <i>3.0</i> | <i>The Capstone course, which is a team based project presented at the culmination of the program, gives students an opportunity to apply their business analytics knowledge and skills to real business problems. For each group the result is a unified and practical case presentation on a topic either of the group's choosing or assigned to the group by the program. Project Framework: Each group will consist of 4–5 participants from diverse backgrounds, encouraging a broader understanding of business analytics. The final deliverables for the project consist of a paper, presentation, and an online portfolio of the group findings. The Capstone project is presented at the culmination of the program. This integrative exercise gives students an opportunity to review and interpret data with business analytics techniques and tools acquired through their courses.</i> |
| <i>Internship</i> | <i>MSBA685</i> | <i>3.0</i> | <i>For some students a competitive option is available to engage in an internship program in lieu of the Capstone course. This internship will be offered on a competitive basis and approved by the program director. During the internship the selected will work at a local business on a part-time basis on an analytics related project.</i> |
| <i>Total</i> | | <i>30</i> | |

13. Describe planned alternative methods of program delivery involving greater use of technology, distance education, and/or accelerated degree designs, to increase efficiency, better address student educational and workforce needs, and maximize student success, for both traditional and non-traditional students.

There is no immediate plan for alternative methods of program delivery.

C. Program Demand/Unnecessary Duplication

Proposed programs must respond to the needs of the academy and to larger economic and social environments. Thus, the institution must demonstrate demand for the proposed program. All proposed programs must address student demand. Programs must also address either employer demand or academic disciplinary needs.

1. Student Demand: Clearly describe all evidence of student demand, typically in the form of surveys of potential students and/or enrollments in related programs at the institution.
 - a. Provide evidence of student demand at the regional, state, and national levels.

We provide the following as evidence of student demand at the regional and national levels:

- *Feasibility Analysis: MS in Business Analytics (Hanover Research, 2017, Appendix D)—This independent report contains several key findings: 1) Trends indicate sufficient demand; 2) students trained in business analytics should face promising employment prospects over the next decade, both in Kentucky and the surrounding region; 3) regional competitive saturation is low.*
- *Local businesses—Six representative local businesses were polled and the current and future demand for analytics professionals is strong. These companies are Accent Marketing, EDJ Analytics, GE Appliances Haier, Humana, LG&E, UPS, Yum Brands. All indicate need for business analytics professionals and anticipate growing need in the near future. This result is consistent with trends analysis provided by leading national organizations. See below.*
- *Predictions by national organizations—Several large national business consulting/management consulting firms continue to predict high job demand in the area of business analytics. For example a top 4 business consulting firm PricewaterhouseCoopers (PWC, 2017) has a forecast of 2.8 million jobs in the analytics area, with healthcare and manufacturing being prominent sectors needing analytics talent. Both of these two sectors are critical to Louisville, Kentucky, and the region. IBM has also predicted a 28% increase in analytics jobs by 2020 (Columbus, 2017). Many other reports have indicated similar strong growth in the area of business analytics.*

- b. Identify the applicant pool and how they will be reached.

The following types of applicants are identified:

- *Current undergraduate students from University of Louisville and other colleges in Kentucky. Undergraduate students from various disciplines, but particularly those majoring in a business field or a STEM field, will find the program to provide much needed knowledge and skills to enter a highly rewarding area of employment.*

- *Recent graduates with similar backgrounds as described above will also find the context-building components of the proposed program attractive to advance professionally.*
- *Career Switchers will find the program attractive as they can either gain much needed knowledge and skills in their existing job or advance professionally.*
- *International students will likely be another source of candidates, who tend to be highly qualified students and provide additional diversity and an enhanced global perspective to the educational experience.*

The potential applicants will be recruited and selected using the existing successful strategy for MBA recruitment and selection and rely on the experienced recruitment staff in the College of Business, University of Louisville. Appendix E shows the current College of Business MBA marketing plan and Appendix F shows the improvement of the College of Business web-based marketing strategy implementation for the current year.

- c. Describe the student recruitment and selection process.

The College of Business has a proven recruitment and selection process and it can be easily adapted for recruiting and selecting students for the proposed program. Appendix E and Appendix F provide an example of our marketing strategy and our MBA marketing tracking for inquiries, downloads, and chats. The College of Business has a dedicated and experienced staff for MBA selection.

- d. Identify the primary feeders for the program.

- *Undergraduates of the College of Business and other business schools in the region*
- *STEM undergraduates from the University of Louisville and colleges in the region*
- *Career switchers*
- *Business analytics professionals seeking to gain more knowledge and advanced skills*
- *International students*

- e. Provide any evidence of a projected net increase in total student enrollments to the campus as a result of the proposed program.

Given the divergence in program goals between this program and others on campus, it is anticipated that the cannibalization rate will be very low. In addition, the program external's advisory board has identified a unique set of employer needs not being serviced by any public institutions in the Commonwealth of Kentucky.

- f. Project estimated student demand for the first five years of the program.

The program will be cohort-based meaning that the Majors (Headcount) in the Fall semester should be very close to the number of degrees conferred. Given appropriate selection of students, our experience with our cohort-based MBA program is that about 95% of student graduate on-time. We expect a similar percentage for the MSBA degree program.

| Academic Year | Degrees Conferred | Majors (Headcount) – Fall Semester |
|----------------------|--------------------------|---|
| 2018-2019 | 15 | 15 |
| 2019-2020 | 20 | 20 |
| 2020-2021 | 20 | 20 |
| 2021-2022 | 20 | 20 |
| 2022-2023 | 20 | 20 |

2. Employer Demand: Clearly describe evidence of employer demand. Such evidence may include employer surveys, current labor market analyses, and future human resources projections. Where appropriate, evidence should demonstrate employers’ preferences for graduates of the proposed program over persons having alternative existing credentials and employers’ willingness to pay higher salaries to graduates of the proposed program.
- a. Describe the types of jobs available for graduates, average wages for these jobs, and the number of anticipated openings for each type of jobs at the regional, state, and national levels.

The following is a list of 6 of the 7 major types of jobs the graduates of the proposed program can fill according to a leading information systems journal Information Weekly (InformationWeekly, 2016):

- *Data Scientist-- apply sophisticated quantitative and computer science skills to both structure and analyze massive unstructured data sets or continuously streaming data, with the intent to derive insights and prescribe action.*
- *Advanced Analytics Professional-- typically perform predictive analytics, prescriptive analytics, simulations, and other forms of advanced analysis.*
- *Data Analyst-- run the gamut of responsibilities, from ensuring data quality and governance, to creating systems that enable business users to gain insights, to performing actual data analysis.*
- *Data Engineer*
- *Data engineers--work behind the scenes to make the jobs of data scientists and data analysts easier.*
- *Business analysts--perform tasks that are very similar to those performed by data analysts. However, business analysts typically have specialized knowledge of*

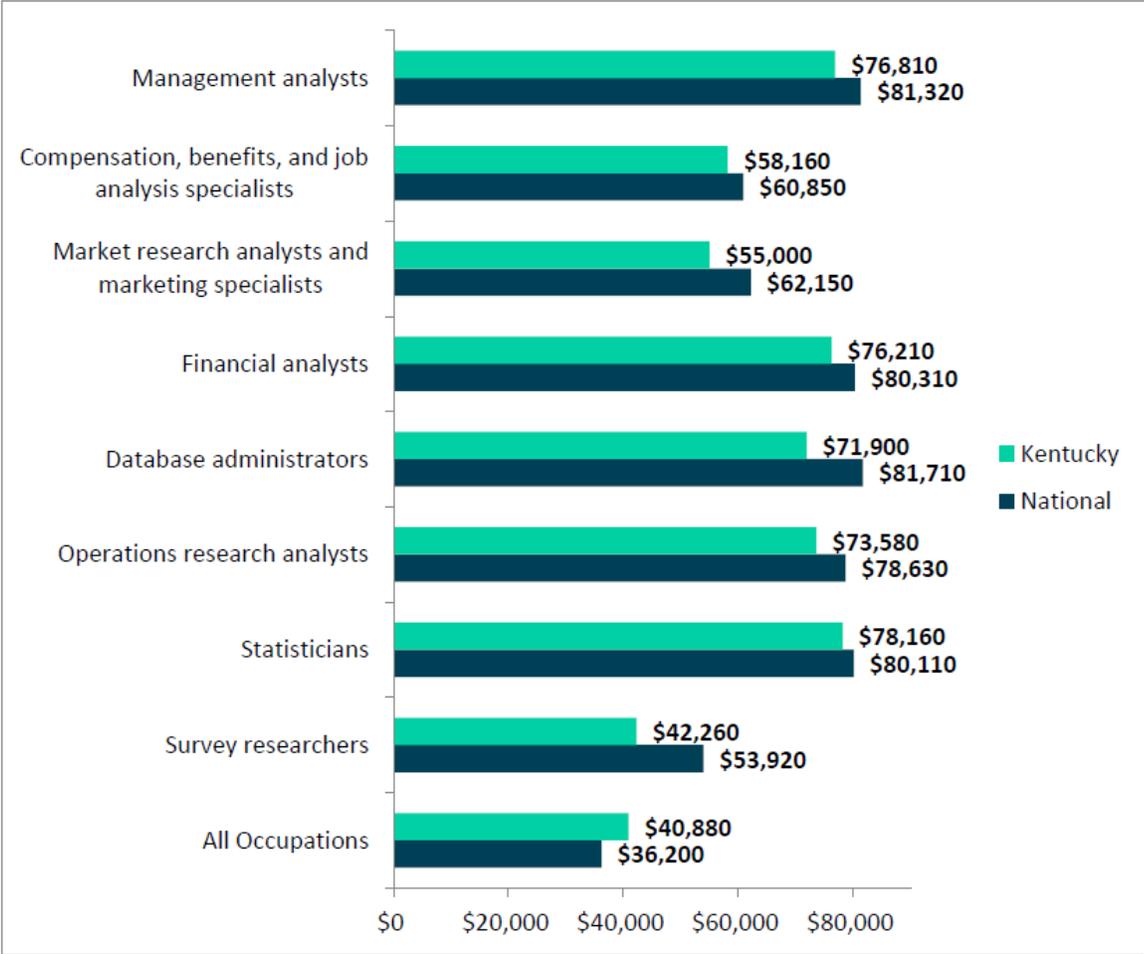
their business domain, and they apply that knowledge and analysis specifically to the operation of the business.

- Business intelligence professionals--adept at using OLAP tools, reports, and dashboards to look at historical trends in data sets. Business intelligence can include data visualization, and popular business intelligence platforms include Tableau, Qlik, and Microsoft Power BI.

According to the Bureau of Labor Statistics jobs for management analysts in general was expected by the U.S. Bureau of Labor Statistics to grow 14% from 2014 to 2024 (www.bls.gov), with the median in 2016 being \$81,320 (BLS, 2016).

The following table from a feasibility study for business analytics program completed in 2017 (see Appendix D) lists the 2015 Kentucky and national average wages for business analytics.

Figure 2.4: Annual Wages for Business Analytics Occupations, 2015



Note: National data is reported as the annual median wages for each occupation, while state data is reported as the annual average wages.
 Source: BLS²⁶

Another table from the same report (see Appendix D) shows the projections of job growth nationally, for the region, and in Kentucky. As can be seen in the table the demand for jobs in the business analytics area is projected to grow by 23.3% by 2024.

Figure 2.2: National, Regional, and State Occupational Projections, 2014-2024

| SOC CODE | TITLE | NUMBER | | CHANGE 2014-24 | | AVERAGE OPENINGS PER YEAR* |
|------------------------------------|--|-------------------|-------------------|------------------|--------------|----------------------------|
| | | 2014 | 2024 | Number | Percent | |
| National (In Thousands) | | | | | | |
| 13-1111 | Management Analysts | 758 | 861.4 | 103.4 | 13.6% | 208.5 |
| 13-1141 | Compensation, Benefits, and Job Analysis Specialists | 84.7 | 88.1 | 3.4 | 4.0% | 24 |
| 13-1161 | Market Research Analysts and Marketing Specialists | 495.5 | 587.8 | 92.3 | 18.6% | 151.4 |
| 13-2051 | Financial Analysts | 277.6 | 310 | 32.3 | 11.7% | 89.4 |
| 15-1141 | Database Administrators | 120 | 133.4 | 13.4 | 11.1% | 39.2 |
| 15-2031 | Operations Research Analysts | 91.3 | 118.9 | 27.6 | 30.2% | 43.9 |
| 15-2041 | Statisticians | 30 | 40.1 | 10.1 | 33.8% | 15.4 |
| 19-3022 | Survey Researchers | 16.7 | 18.7 | 1.9 | 11.6% | 3.9 |
| Total, Selected Occupations | | 1,873.8 | 2,158.4 | 284.6 | 15.2% | 575.7 |
| Total, All Occupations | | 150,539.9 | 160,328.8 | 9,788.9 | 6.5% | 46,506.9 |
| Regional | | | | | | |
| 13-1111 | Management Analysts | 146,170 | 170,370 | 24,200 | 16.6% | 4,460 |
| 13-1141 | Compensation, Benefits, and Job Analysis Specialists | 14,110 | 15,230 | 1,120 | 7.9% | 430 |
| 13-1161 | Market Research Analysts and Marketing Specialists | 80,590 | 97,750 | 17,160 | 21.3% | 2,690 |
| 13-2051 | Financial Analysts | 41,760 | 46,450 | 4,690 | 11.2% | 1,340 |
| 15-1141 | Database Administrators | 23,790 | 27,010 | 3,220 | 13.5% | 830 |
| 15-2031 | Operations Research Analysts | 17,150 | 23,160 | 6,010 | 35.0% | 920 |
| 15-2041 | Statisticians | 5,210 | 6,840 | 1,630 | 31.3% | 260 |
| 19-3022 | Survey Researchers | 2,570 | 2,930 | 360 | 14.0% | 80 |
| Total, Selected Occupations | | 331,350 | 389,740 | 58,390 | 17.6% | 11,010 |
| Total, All Occupations | | 27,861,920 | 30,124,500 | 2,262,580 | 8.1% | 905,310 |
| Kentucky | | | | | | |
| 13-1111 | Management Analysts | 4,280 | 5,110 | 830 | 19.4% | 140 |
| 13-1141 | Compensation, Benefits, and Job Analysis Specialists | 1,580 | 1,810 | 230 | 14.6% | 60 |
| 13-1161 | Market Research Analysts and Marketing Specialists | 3,590 | 4,450 | 860 | 24.0% | 130 |
| 13-2051 | Financial Analysts | 1,370 | 1,540 | 170 | 12.4% | 50 |
| 15-1141 | Database Administrators | 1,850 | 2,210 | 360 | 19.5% | 80 |
| 15-2031 | Operations Research Analysts | 1,600 | 2,390 | 790 | 49.4% | 110 |
| 15-2041 | Statisticians | 990 | 1,310 | 320 | 32.3% | 50 |
| 19-3022 | Survey Researchers | 150 | 180 | 30 | 20.0% | 10 |
| Total, Selected Occupations | | 15,410 | 19,000 | 3,590 | 23.3% | 630 |
| Total, All Occupations | | 2,150,860 | 2,476,960 | 326,100 | 15.2% | 84,060 |

*Due to replacements and growth.
Sources: BLS²³ and Projections Central²⁴

3. Academic Disciplinary Needs: Clearly describe all evidence justifying a new program based on changes in the academic discipline or other academic reasons.

The proposed program is a response to the growing demand for business analytics professionals in the region (and the nation) and demand for educational programs of this kind in the region. Such demand is a direct reflection of an increasingly digital economy. Academic evidence suggests that investments in business analytics create value and lead to more profitable businesses (Sharma et al., 2014; McAfee and Brynjolfsson, 2012). Though no single academic discipline within the College of Business covers all the areas (business acumen, information systems technologies, applied statistics, and decision models) in the proposed business analytics program, the College of Business does have all the requisite disciplines, e.g., Computer Information Systems, Statistics, Marketing Analytics. Thus the College of Business is in a unique position to offer this new academic degree.

4. Similar programs: A new program may serve the same potential student population, the proposed program must be sufficiently different from existing programs in the state or access to existing programs must be sufficiently limited to warrant initiation of a new program.
 - a. Identify similar programs in other Southern Regional Education Board (SREB) states and in the nation.

| MS Analytics Degrees within the Southern Regional Education Board | | |
|--|--|--------------|
| Degree Title | Educational Institution | State |
| <i>M.S. in Statistics and Analytics</i> | <i>University of Arkansas</i> | <i>AR</i> |
| <i>M.S. in Data Analytics</i> | <i>University of Central Florida</i> | <i>FL</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Miami</i> | <i>FL</i> |
| <i>M.S. in Analytics</i> | <i>Georgia Institute of Technology</i> | <i>GA</i> |
| <i>M.S. in Analytics</i> | <i>Georgia State University</i> | <i>GA</i> |
| <i>M.S. in Business Analytics</i> | <i>Mercer University</i> | <i>GA</i> |
| <i>M.S. in Analytics</i> | <i>Bellarmine University</i> | <i>KY</i> |
| <i>M.S. in Analytics</i> | <i>Louisiana State University at Baton Rouge</i> | <i>LA</i> |
| <i>M.S. in Data Analytics</i> | <i>University of Maryland</i> | <i>MD</i> |
| <i>M.S. in Government Analytics</i> | <i>Johns Hopkins University</i> | <i>MD</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Maryland, College Park</i> | <i>MD</i> |
| <i>M.S. in Analytics</i> | <i>North Carolina State University</i> | <i>NC</i> |
| <i>M.S. in Business Analytics</i> | <i>Wake Forest University</i> | <i>SC</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Tennessee at Knoxville</i> | <i>TN</i> |
| <i>M.S. in Analytics</i> | <i>Texas A&M University</i> | <i>TX</i> |
| <i>M.S. in Applied Statistics and Data Analytics</i> | <i>Southern Methodist University</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Texas at Arlington</i> | <i>TX</i> |

| | | |
|---|--------------------------------------|-----------|
| <i>M.S. in Business Analytics</i> | <i>University of Texas at Austin</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Texas at Dallas</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>Southern Methodist University</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Dallas</i> | <i>TX</i> |
| <i>M.S. in Data Analytics Engineering</i> | <i>George Mason University</i> | <i>VA</i> |
| <i>M.S. in Business Analytics</i> | <i>College of William & Mary</i> | <i>VA</i> |
| <i>M.S. in Business Analytics</i> | <i>West Virginia University</i> | <i>WV</i> |

| MS Analytics Degrees within the United States | | |
|--|--|--------------|
| Degree Title | Educational Institution | State |
| <i>M.S. in Statistics and Analytics</i> | <i>University of Arkansas</i> | <i>AR</i> |
| <i>M.S. in Business Analytics</i> | <i>Arizona State University</i> | <i>AZ</i> |
| <i>M.S. in Analytics</i> | <i>University of San Francisco</i> | <i>CA</i> |
| <i>M.S. in Analytics</i> | <i>University of the Pacific</i> | <i>CA</i> |
| <i>M.S. in Business Analytics</i> | <i>California Polytechnic State University – San Luis Obispo</i> | <i>CA</i> |
| <i>M.S. in Business Analytics</i> | <i>University of California, San Diego</i> | <i>CA</i> |
| <i>M.S. in Applied Analytics</i> | <i>Pepperdine University</i> | <i>CA</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Southern California</i> | <i>CA</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Colorado Denver</i> | <i>CO</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Denver</i> | <i>CO</i> |
| <i>M.S. in Business Analytics and Project Management</i> | <i>University of Connecticut</i> | <i>CT</i> |
| <i>M.S. in Business Analytics</i> | <i>Fairfield University</i> | <i>CT</i> |
| <i>M.S. in Business Analytics</i> | <i>Quinnipiac University</i> | <i>CT</i> |
| <i>M.S. in Analytics</i> | <i>Georgetown University</i> | <i>DC</i> |
| <i>M.S. in Analytics</i> | <i>American University</i> | <i>DC</i> |
| <i>M.S. in Business Analytics</i> | <i>George Washington University</i> | <i>DC</i> |
| <i>M.S. in Data Analytics</i> | <i>University of Central Florida</i> | <i>FL</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Miami</i> | <i>FL</i> |
| <i>M.S. in Analytics</i> | <i>Georgia Institute of Technology</i> | <i>GA</i> |
| <i>M.S. in Analytics</i> | <i>Georgia State University</i> | <i>GA</i> |
| <i>M.S. in Business Analytics</i> | <i>Mercer University</i> | <i>GA</i> |
| <i>M.S. in Analytics</i> | <i>Northwestern University</i> | <i>IL</i> |
| <i>M.S. in Predictive Analytics</i> | <i>Northwestern University</i> | <i>IL</i> |
| <i>M.S. in Analytics</i> | <i>University of Chicago</i> | <i>IL</i> |
| <i>M.S. in Business Analytics</i> | <i>Benedictine University</i> | <i>IL</i> |
| <i>M.S. in Business Analytics</i> | <i>Indiana University</i> | <i>IN</i> |
| <i>M.S. in Business Analytics and Information Management</i> | <i>Purdue University</i> | <i>IN</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Notre Dame</i> | <i>IN</i> |

| | | |
|--|--|-----------|
| <i>M.S. in Business Analytics</i> | <i>Iowa State University</i> | <i>IO</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Iowa</i> | <i>IO</i> |
| <i>M.S. in Analytics</i> | <i>Bellarmino University</i> | <i>KY</i> |
| <i>M.S. in Analytics</i> | <i>Louisiana State University at Baton Rouge</i> | <i>LA</i> |
| <i>M.S. in Strategic Analytics</i> | <i>Brandeis University</i> | <i>MA</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Massachusetts at Lowell</i> | <i>MA</i> |
| <i>M.S. in Business Analytics</i> | <i>Babson College</i> | <i>MA</i> |
| <i>M.S. in Business Analytics</i> | <i>Bentley University</i> | <i>MA</i> |
| <i>M.S. in Business Analytics</i> | <i>Massachusetts Institute of Technology</i> | <i>MA</i> |
| <i>M.S. in Business Analytics</i> | <i>Northeastern University</i> | <i>MA</i> |
| <i>M.S. in Data Analytics</i> | <i>University of Maryland</i> | <i>MD</i> |
| <i>M.S. in Government Analytics</i> | <i>Johns Hopkins University</i> | <i>MD</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Maryland, College Park</i> | <i>MD</i> |
| <i>M.S. in Business Analytics</i> | <i>Michigan State University</i> | <i>MI</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Michigan at Dearborn</i> | <i>MI</i> |
| <i>M.S. in Analytics</i> | <i>Capella University</i> | <i>MN</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Minnesota</i> | <i>MN</i> |
| <i>M.S. in Business Analytics</i> | <i>University of St. Thomas, Minnesota</i> | <i>MN</i> |
| <i>M.S. in Applied Statistics and Data Analytics</i> | <i>Maryville University</i> | <i>MO</i> |
| <i>M.S. in Applied Analytics</i> | <i>Saint Louis University</i> | <i>MO</i> |
| <i>M.S. in Customer Analytics</i> | <i>Washington University in St. Louis</i> | <i>MO</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Montana</i> | <i>MT</i> |
| <i>M.S. in Analytics</i> | <i>North Carolina State University</i> | <i>NC</i> |
| <i>M.S. in Business Intelligence and Analytics</i> | <i>Creighton University</i> | <i>NE</i> |
| <i>M.S. in Analytics</i> | <i>University of New Hampshire</i> | <i>NH</i> |
| <i>M.S. in Data Analytics</i> | <i>New England College</i> | <i>NH</i> |
| <i>M.S. in Data Analytics</i> | <i>Southern New Hampshire University</i> | <i>NH</i> |
| <i>M.S. in Business Intelligence and Analytics</i> | <i>Stevens Institute of Technology</i> | <i>NJ</i> |
| <i>M.S. in Data Analytics</i> | <i>City University of New York</i> | <i>NY</i> |
| <i>M.S. in Data Analytics</i> | <i>Clarkson University</i> | <i>NY</i> |
| <i>M.S. in Applied Analytics</i> | <i>Columbia University</i> | <i>NY</i> |
| <i>M.S. in Data Mining and Predictive Analytics</i> | <i>St. John's University</i> | <i>NY</i> |
| <i>M.S. in Business Analytics</i> | <i>Fordham University</i> | <i>NY</i> |
| <i>M.S. in Business Analytics</i> | <i>New York University</i> | <i>NY</i> |
| <i>M.S. in Customer Intelligence and Analytics</i> | <i>Pace University</i> | <i>NY</i> |
| <i>M.S. in Business Analytics</i> | <i>Rensselaer Polytechnic Institute</i> | <i>NY</i> |
| <i>M.S. in Business Intelligence and Analytics</i> | <i>Saint Joseph's University</i> | <i>NY</i> |

| | | |
|---|--|-----------|
| <i>M.S. in Business Analytics</i> | <i>Syracuse University</i> | <i>NY</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Rochester</i> | <i>NY</i> |
| <i>M.S. in Analytics</i> | <i>Bowling Green State University</i> | <i>OH</i> |
| <i>M.S. in Analytics</i> | <i>Wittenberg University</i> | <i>OH</i> |
| <i>M.S. in Business Analytics</i> | <i>Kent State University</i> | <i>OH</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Cincinnati</i> | <i>OH</i> |
| <i>M.S. in Business Analytics</i> | <i>Case Western Reserve University</i> | <i>OH</i> |
| <i>M.S. in Business Analytics</i> | <i>Xavier University</i> | <i>OH</i> |
| <i>M.S. in Business Analytics</i> | <i>Oklahoma State University</i> | <i>OK</i> |
| <i>M.S. in Data Analytics</i> | <i>Oregon State University</i> | <i>OR</i> |
| <i>Master of Professional Studies in Data Analytics</i> | <i>Penn State Great Valley</i> | <i>PA</i> |
| <i>M.S. in Data Analytics</i> | <i>Slippery Rock University</i> | <i>PA</i> |
| <i>M.S. in Analytics</i> | <i>Harrisburg University of Science and Technology</i> | <i>PA</i> |
| <i>M.S. in Business Analytics</i> | <i>Drexel University</i> | <i>PA</i> |
| <i>M.S. in Analytics</i> | <i>Villanova University</i> | <i>PA</i> |
| <i>M.S. in Business Analytics</i> | <i>Wake Forest University</i> | <i>SC</i> |
| <i>M.S. in Analytics</i> | <i>Dakota State University</i> | <i>SD</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Tennessee at Knoxville</i> | <i>TN</i> |
| <i>M.S. in Analytics</i> | <i>Texas A&M University</i> | <i>TX</i> |
| <i>M.S. in Applied Statistics and Data Analytics</i> | <i>Southern Methodist University</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Texas at Arlington</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Texas at Austin</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Texas at Dallas</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>Southern Methodist University</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Dallas</i> | <i>TX</i> |
| <i>M.S. in Business Analytics</i> | <i>University of Utah</i> | <i>UT</i> |
| <i>M.S. in Data Analytics Engineering</i> | <i>George Mason University</i> | <i>VA</i> |
| <i>M.S. in Business Analytics</i> | <i>College of William & Mary</i> | <i>VA</i> |
| <i>M.S. in Analytics and Modeling</i> | <i>Valparaiso University</i> | <i>WA</i> |
| <i>M.S. in Business Analytics</i> | <i>West Virginia University</i> | <i>WV</i> |

b. If similar programs exist in Kentucky,

- i. Does the proposed program differ from existing programs? If yes, please explain.

There is currently no existing program in a KY state institution like the proposed program.

- ii. Does the proposed program serve a different student population (i.e., students in a different geographic area) from existing programs? If yes, please explain.

The proposed program serves a different population than the students in the existing graduate programs in the College of Business. Although there is a business analytics elective in the MBA programs at the College of Business at the University of Louisville, there is virtually no overlap between the broad coursework offered in the MBA program and the highly focused and comprehensive coursework in the proposed program.

- iii. Is access to existing programs limited? If yes, please explain.

Access to the existing programs in the College of Business will not be affected or limited by the proposed program as the new program attracts students from a different population.

- iv. Is there excess demand for existing similar programs? If yes, please explain.

There is no similar program in a state institution in Kentucky.

- v. Will there be collaboration between the proposed program and existing programs?

- i. If yes, please explain the collaborative arrangements with existing programs.

The program is housed entirely within the College of Business and there are no collaborative plans with other Colleges at the University of Louisville.

- ii. If no, please explain why there is no proposed collaboration with existing programs.

There is no proposed collaboration with existing because there is no similar existing program at the University of Louisville.

D. Cost and Funding of the Proposed Program

The resource requirements and planned sources of funding of the proposed program must be detailed in order to assess the adequacy of the resources to support a quality program. This assessment is to ensure that the program will be efficient in its resource utilization and to assess the impact of this proposed program on the institution's overall need for funds.

1. Will this program require additional resources?

- a. If yes, provide a brief summary of additional resources that will be needed to implement this program over the next five years.

The additional resources required by the degree program will all be funded by program tuition. Especially relevant is that the degree is not requesting faculty lines: Rather all instructional expenses will be handled on a faculty overload basis. Part B of the table that follows provides a list of resources required to operate the program over a five year period.

2. Will this program impact existing programs and/or organizational units within your institution?
 - a. If yes, please describe the impact.

It is not anticipated that the program will impact other programs in the College of Business.

3. Provide adequate documentation to demonstrate sufficient return on investment to the state to offset new costs and justify approval for the proposed program.

Part A of the table that follows documents program revenue over a five year period.

Cost/Funding Explanation

Complete the following table for the first five years of the proposed program and provide an explanation of how the institution will sustain funding needs. *The total funding and expenses in the table should be the same, or explain sources(s) of additional funding for the proposed program.

On 11/17/2017 Provost Dale Billingsley sent an email to Dean Todd Mooradian, Robert Golstein, Richard Germain, Susan Howarth, and Gale Rhodes. In that email, the Provost approved an 80/20 revenue split for not only the MSBA degree program, but for all further graduate programs emanating from the College of Business. The relevant passage from that email follows:

Todd, thanks for your response to the terms for the tuition-sharing plan for new programs in COB, which I restate here with one change: I accept your proposal at the 80/20 rate you request for one year, as further negotiated on the basis of actual and projected revenue, and subject to revision no later than 2020 except if superseded by a university-wide revenue-sharing policy.

| A. Funding Sources, by year of program: | | | | | | |
|--|----------------------|----------------------|----------------------|----------------------|--|--|
| 1 st Year | 2 nd Year | 3 rd Year | 4 th Year | 5 th Year | | |
| Total Resources Available from Federal Sources | | | | | | |
| - | - | - | - | - | | |
| - | - | - | - | - | | |
| Narrative Explanation/Justification : | | | | | | |
| The program does not anticipate resources from federal sources | | | | | | |
| Funding Sources, by year of program (continued) | | | | | | |
| 1 st Year | 2 nd Year | 3 rd Year | 4 th Year | 5 th Year | | |
| Total Resources Available from Other Non-State Sources | | | | | | |
| - | - | - | - | - | | |
| - | - | - | - | - | | |
| Narrative Explanation/Justification : | | | | | | |
| The program does anticipate revenue sources from other non-state sources | | | | | | |
| Funding Sources, by year of program (continued) | | | | | | |
| 1 st Year | 2 nd Year | 3 rd Year | 4 th Year | 5 th Year | | |
| State Resources | | | | | | |
| - | - | - | - | - | | |
| - | - | - | - | - | | |
| Narrative Explanation/Justification : | | | | | | |
| The MSBA is not seeking any state resources | | | | | | |
| Funding Sources, by year of program (continued) | | | | | | |
| 1 st Year | 2 nd Year | 3 rd Year | 4 th Year | 5 th Year | | |
| \$ - | \$ - | \$ - | \$ - | \$ - | | |
| - | - | - | - | - | | |

Narrative Explanation/Justification: No allocation from extant programs is anticipated

No internal allocation is expected from other College of Business budget accounts

| Funding Sources, by year of program (continued) | <i>1st Year</i> | <i>2nd Year</i> | <i>3rd Year</i> | <i>4th Year</i> | <i>5th Year</i> |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Student Tuition | | | | | |
| ~ New | \$450,000 | \$600,000 | \$600,000 | \$600,000 | \$600,000 |

Narrative Explanation/Justification: Describe the impact of this program on enrollment, tuition, and fees.

It is anticipated that a very low level of cannibalization will exist across existing degree programs. The program should lead to a significant increase in enrollment in enrollment, tuition, and fees.

The total program charge to students is set at \$30,000. It is anticipated that 15 students will enter the initial cohort and that 20 students will enter each cohort thereafter.

| A. TOTAL - Funding Sources (REVENUES) - | <i>1st Year</i> | <i>2nd Year</i> | <i>3rd Year</i> | <i>4th Year</i> | <i>5th Year</i> |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | \$450,000 | \$600,000 | \$600,000 | \$600,000 | \$600,000 |

| B. Breakdown of Budget Expenses/Requirements | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Staff: | | | | | |
| <u>Executive, Administrative, Managerial</u> New: Program Director stipend | \$ 25,700 | \$ 25,700 | \$ 25,700 | \$ 25,700 | \$ 25,700 |
| <u>Other Professional</u> New: New staff hire -- program manager | \$ 77,100 | \$ 77,100 | \$ 77,100 | \$ 77,100 | \$ 77,100 |
| <u>Faculty</u> | \$ 94,120 | \$ 94,120 | \$ 94,120 | \$ 94,120 | \$ 94,120 |

| | | | | | |
|--|-----------|-----------|-----------|-----------|-----------|
| New (all instructional expenditures are on an overload basis) | | | | | |
| <u>Graduate Assistants</u> | | | | | |
| New: Average scholarship of \$2,000 per student | \$ 30,000 | \$ 40,000 | \$ 40,000 | \$ 40,000 | \$ 40,000 |
| Existing | | | | | |
| Student Employees | | | | | |
| New | 0 | 0 | 0 | 0 | 0 |
| Existing | | | | | |
| The program director shall receive an annual stipend of \$20,000. The total cost (including benefits) equals \$25,700. An additional staff support person is required to assist in recruiting, placement, scheduling, event planning, and other technical aspects of program administration: base salary = \$60,000 plus benefits = \$77,100. No new faculty are to be hired as a result of the program. Existing faculty within the COB will be paid on an overload basis, supplemented by adjuncts on an as needed basis. Scholarships are set at an average of \$2,000 per student per year | | | | | |
| Equipment and Instructional Materials | | | | | |
| New | 0 | 0 | 0 | 0 | 0 |
| Existing | | | | | |
| Narrative Explanation/Justification: No new equipment or instructional materials are required | | | | | |
| Library | | | | | |
| New | 0 | 0 | 0 | 0 | 0 |
| Existing | | | | | |
| Narrative Explanation/Justification: No new library facilities / materials are required | | | | | |
| Contractual Services | | | | | |
| New: Annual marketing budget | \$ 50,000 | \$ 50,000 | \$ 50,000 | \$ 50,000 | \$ 50,000 |
| Narrative Explanation/Justification: Annual Marketing budget of \$50,000 | | | | | |
| Academic and/or Student Support Services | | | | | |
| New | 0 | 0 | 0 | 0 | 0 |
| Existing | | | | | |
| Narrative Explanation/Justification: Services are provided by the hire of additional staff person | | | | | |
| Other Support Services | | | | | |
| New | \$ 20,250 | \$ 26,500 | \$ 26,500 | \$ 26,500 | \$ 26,500 |

| | | | | | |
|--|------------|------------|------------|------------|------------|
| Existing | | | | | |
| Narrative Explanation/Justification: Funds are devoted to an orientation event, a graduation celebration, and additional food services | | | | | |
| Faculty Development | | | | | |
| New | 0 | 0 | 0 | 0 | 0 |
| Existing | | | | | |
| Narrative Explanation/Justification: No faculty development costs are expected | | | | | |
| Assessment | | | | | |
| New | 0 | 0 | 0 | 0 | 0 |
| Narrative Explanation/Justification: Head of the program will be receive an annual stipend. One of their responsibilities will be to execute on annual program assessment responsibilities | | | | | |
| Other | | | | | |
| New: | | | | | |
| Narrative Explanation/Justification: | | | | | |
| TOTAL | | | | | |
| New | \$ 297,170 | \$ 313,420 | \$ 313,420 | \$ 313,420 | \$ 313,420 |

| | | <i>1st Year</i> | <i>2nd Year</i> | <i>3rd Year</i> | <i>4th Year</i> | <i>5th Year</i> |
|-----------|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| A. | TOTAL - Funding Sources (REVENUES) | \$ 450,000 | \$ 600,000 | \$ 600,000 | \$ 600,000 | \$ 600,000 |
| B. | TOTAL - Expenses/Requirements (EXPENDITURES) | (297,170) | (313,420) | (313,420) | (313,420) | (313,420) |
| | BALANCE - (SURPLUS/DEFICIT) | \$152,830 | \$286,580 | \$286,580 | \$286,580 | \$286,580 |

The following two tables provide additional financial details on the program based on intakes of 15 and 20 students.

| |
|---|
| MS in Business Analytics Financial Analysis: 15 Students |
|---|

| | | |
|---|---|-----------|
| Input Variables | Enter total program charge to students | \$ 30,000 |
| | Enter Program Director salary stipend | \$ 20,000 |
| | Enter course overload instructor salary per 3 CH course | \$ 8,000 |
| | Enter staff overhead | \$ 60,000 |
| | Enter average scholarship amount | \$ 2,000 |
| | Enter program credit hours | 30 |
| | Enter proportion of revenue after mandatory UofL fees captured by the COB | 0.80 |
| | Enter marketing budget | \$ 50,000 |
| | Enter number of students in the cohort | 15 |
| | Enter food service variable cost | \$ 750 |
| | Enter orientation event variable cost per student | \$ 250 |
| | Enter orientation event fixed cost per student | \$ 750 |
| | Enter graduation celebration variable cost per student | \$ 250 |
| | Enter graduation celebration fixed cost per student | \$ 750 |
| | Benefit rate on faculty salary overloads | 0.1765 |
| | Benefit rate on administrative salaries | 0.285 |
| Mandatory student fees (% of program fee) | 0.0090915 | |

| | | |
|---|--|------------|
| Cost / Revenue Statement | Total program revenue | \$ 450,000 |
| | Discounts on COB revenue: Mandatory UofL fees, UofL overhead | |
| | Mandatory UofL student fees | \$ 4,091 |
| | UofL overhead | \$ 89,182 |
| | Scholarships | \$ 30,000 |
| | Total deductions from COB revenue | \$ 123,273 |
| | COB revenue after mandatory UofL fees, UofL overhead, scholarships | \$ 326,727 |
| | Variable cost | |
| | Orientation event | \$ 3,750 |
| | Graduation celebration | \$ 3,750 |
| | Food services | \$ 11,250 |
| | Gross margin | \$ 307,977 |
| | Fixed cost | |
| | Instructor salaries | \$ 94,120 |
| | Marketing budget | \$ 50,000 |
| | Program director stipend (includes benefits) | \$ 25,700 |
| | Graduation celebration fixed cost per student | \$ 750 |
| Orientation event fixed cost per student | \$ 750 | |
| Staff overhead position (includes benefits) | \$ 77,100 | |

| | | |
|--|--|------------|
| | Total fixed cost | \$ 248,420 |
| | Program surplus (at the College of Business) | \$ 59,557 |

| | | |
|----------------------------|--|--------------|
| Break-even Analysis | Break-even in number of students = $TFC / (\text{Unit Revenue} - \text{Unit Variable cost})$ | 12.099 |
| | Total Fixed cost (TFC) | \$ 248,420 |
| | Unit variable cost (UVC) | \$ 1,250 |
| | Unit selling price (USP) = Unit revenue to COB | \$ 21,781.80 |

MS in Business Analytics Financial Analysis: 20 Students

| | | |
|---|---|-----------|
| Input Variables | Enter total program charge to students | \$ 30,000 |
| | Enter Program Director salary stipend | \$ 20,000 |
| | Enter course overload instructor salary per 3 CH course | \$ 8,000 |
| | Enter staff overhead | \$ 60,000 |
| | Enter average scholarship amount | \$ 2,000 |
| | Enter program credit hours | 30 |
| | Enter proportion of revenue after mandatory UofL fees captured by the COB | 0.80 |
| | Enter marketing budget | \$ 50,000 |
| | Enter number of students in the cohort | 20 |
| | Enter food service variable cost | \$ 750 |
| | Enter orientation event variable cost per student | \$ 250 |
| | Enter orientation event fixed cost per student | \$ 750 |
| | Enter graduation celebration variable cost per student | \$ 250 |
| | Enter graduation celebration fixed cost per student | \$ 750 |
| | Benefit rate on faculty salary overloads | 0.1765 |
| | Benefit rate on administrative salaries | 0.285 |
| Mandatory student fees (% of program fee) | 0.0090915 | |

| | | |
|---------------------------------|--|------------|
| Cost / Revenue Statement | Total program revenue | \$ 600,000 |
| | Discounts on COB revenue: Mandatory UofL fees, UofL overhead | |
| | Mandatory UofL student fees | \$ 5,455 |
| | UofL overhead | \$ 118,909 |
| | Scholarships | \$ 40,000 |
| | Total deductions from COB revenue | \$ 164,364 |
| | COB revenue after mandatory UofL fees, UofL overhead, scholarships | \$ 435,636 |
| | Variable cost | |
| | Orientation event | \$ 5,000 |
| | Graduation celebration | \$ 5,000 |
| Food services | \$ 15,000 | |

| | | |
|---|----|---------|
| Gross margin | \$ | 410,636 |
| Fixed cost | | |
| Instructor salaries | \$ | 94,120 |
| Marketing budget | \$ | 50,000 |
| Program director stipdend (includes benefits) | \$ | 25,700 |
| Graduation celebration fixed cost per student | \$ | 750 |
| Orientatition event fixed cost per student | \$ | 750 |
| Staff overhead position (includes benefits) | \$ | 77,100 |
| Total fixed cost | \$ | 248,420 |
| Program surplus (at the College of Business) | \$ | 162,216 |

| | | |
|----------------------------|--|--------------|
| Break-even Analysis | Break-even in number of students = $TFC / (\text{Unit Revenue} - \text{Unit Variable cost})$ | 12.099 |
| | Total Fixed cost (TFC) | \$ 248,420 |
| | Unit variable cost (UVC) | \$ 1,250 |
| | Unit selling price (USP) = Unit revenue to COB | \$ 21,781.80 |

E. Program Review and Assessment

Describe program evaluation procedures for the proposed program. These procedures may include evaluation of courses and faculty by students, administrators, and departmental personnel as appropriate. Program review procedures shall include standards and guidelines for the assessment of student outcomes implied by the program objectives and consistent with the institutional mission.

1. For each assessment method, please provide direct indicators of achievement of program-level student learning outcomes and frequency of data collection:

a. Which components will be evaluated?

An assurance of learning (AOL) report will be required for each course (based on functional knowledge) and each program goal in the degree program.

b. When will the components be evaluated?

Functional knowledge will be evaluated every time a course is taught and programmatic knowledge will be measured once for every cohort.

c. When will the data be collected?

The AOL for functional knowledge based on courses will be due two weeks after the last scheduled class meeting date. Programmatic AOL data will be collected at the appropriate and to be determined time within each cohort.

- d. How will the data be collected?

Individual faculty are responsible for completing the AOL report for their courses or programmatic goals. The instructor will forward the individual AOL report to the program director who shall maintain the program AOL records and be responsible for creating the annual program AOL report in conjunction with the College-wide AOL report.

- e. What will be the benchmarks and/or targets to be achieved?

Using a four point scale with 1=unacceptable, 2=poor, 3=good, and 4=excellent, the target on AOL is to have 80% or more of students evaluated as good or excellent.

- f. What individuals or groups will be responsible for data collection?

Individual instructors shall complete course AOL reports. The program director shall collect course AOL reports and maintain program AOL reports.

- g. How will the data and findings be shared with faculty?

The program AOL report will be created by the program director and will be shared with the program curriculum committee. After review by the curriculum committee, the program AOL report will be shared with the College-wide AOL committee. The results will also be shared with the Associate Dean for Graduate Programs.

- h. How will the data be used for making programmatic improvements?

The data will be analyzed and acted upon appropriately. In addition, the AOL report will be shared with an external advisory board to obtain their input and feedback.

2. What are the measures of teaching effectiveness?

A primary source of understanding teaching effectiveness will be the university system of individual instructor course evaluations. The program will also establish a mechanism for students to select a student class representative and student class representative assistant. These individuals will provide feedback on many issues including teaching effectiveness.

3. What efforts to improve teaching effectiveness will be pursued based on these measures?

*Program administrators have several options at their disposal to improve program teaching effectiveness. These include, but are not limited to: (1) the creation of a standardized syllabus **format** that is more readily understood by administrators and more easily communicated to instructors, including adjuncts; (2) taking advantage of available Delphi instructor training should the need arise for such remedial measures; (3) other, less formal,*

communications and instructor coaching as offered by College of Business administrators; and (4) effective selection of program instructors and instruction replacement if the need arises.

4. What are the plans to evaluate students' post-graduate success?

Post-graduate success will be evaluated through two major mechanisms:

- 1. An exit survey of program graduates will be conducted with a timeframe of completion three to six month upon graduation. The exit survey will focus on program graduate employment status.*
- 2. An annually updated program graduate file will be maintained collecting data on program graduate employment status.*

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List of Appendix Files

Appendix A: Faculty CV

Appendix B: Letter of Support for a Master of Science in Business Analytics

Appendix C: Evaluation of Library Resources

Appendix D: Feasibility Analysis - MS in Business Analytics - University of Louisville Delphi Center for Teaching Learning

Appendix E: 2017 College of Business Graduate Program Marketing Plan

Appendix F: 2017 College of Business Web-based Marketing

Appendix G: Course Syllabi