THE OHIO STATE UNIVERSITY
FISHER COLLEGE OF BUSINESS

Walter Zinn
Associate Dean of Graduate
Students and Programs

200A Fisher Hall
2100 Neil Avenue
Columbus, OH 43210
614-292-0797 Phone

April 27, 2017

Dear Prof. Schlueter:

Thank you for your feedback and for the time and effort you and the combined Grad School/CAA curriculum subcommittee devoted to our proposal. Attached please find an updated copy of our proposal, which we have revised to address the two remaining comments/requests noted in your email communication (dated March 20, 2017). For ease of reference, those two comments/requests are reproduced here in *italics* followed by our response in regular font.

1. *On page 7 of the pdf: we note that you propose for classes to meet on Saturdays in order to "meet the needs of working professionals, while also being accessible to non-working professionals." This makes sense and is entirely possible for courses offered through Fisher. The subcommittee wondered, however, if the electives you propose including from ECON and STAT (on page 9 of the pdf) are also offered on Saturday. If not: what might this mean for the program?*

Thank you for your feedback. Please note that the inclusion of a course on the list of preapproved electives does not imply a commitment to offer that course on Saturdays each year. Consistent with our approach in the EMBA and WPMBA programs, and working with course offering units both within and outside Fisher, we will endeavor to go beyond offering the minimum number of elective courses required (2 courses) in the program and offer as many electives on Saturdays as feasible, subject to demand (overall program size and student preferences) and staffing constraints. Further, it is important to note that students always have the opportunity to enroll in sections of elective courses offered during regular times, including evening sections currently offered to students in our MBA program for Working Professionals. This clarification is now reflected in the revised proposal (footnote #3 on p. 8).

2. *The subcommittee was grateful for the letter of support from TDA in Appendix 1. Several committee members wondered, however, if contact had been made with the Department of Computer Science and Engineering and the Department of Statistics, both of whom offer coursework and programming that touches on data analytics, including, for example, "modeling and survey design" (listed in the full stack analysis on page 3 of the pdf). If contact has not been made, the subcommittee would like to see letters of support from those programs as well.*

As requested, we reached out to our colleagues in both departments. Letters of support from both STAT and CSE are now included in Appendix I.

Thank you for your feedback. The result is a stronger proposal, one that we hope will win your support and the committee's final approval.

Walter Zinn
Associate Dean of Graduate Students and Programs
Fisher College of Business

Specialized Master in Business – Business Analytics (SMB-A)

A Proposal to add a Third Program Track to the SMB Degree Program

May 24, 2017

Introduction

The Fisher College of Business proposes a new (third) track be added the Specialized Master in Business degree program, this being a track in Business Analytics. We would like to launch this track, designated as Specialized Master in Business – Business Analytics (SMB-A), in Autumn 2018.

The Specialized Master in Business (SMB) degree program was approved by the Ohio Board of Regents in January 2010, with initial program tracks in Finance and Marketing. The SMB-Marketing track launched almost immediately thereafter, with an initial cohort of students drawn from a single employer, Nationwide Insurance. The program has been discontinued temporarily after the contract with Nationwide Insurance ended in 2012. The format of the program and its delivery will be discussed in the near future with the possibility of converting the program into an online offering. The SMB-Finance program track has completed four successful years and is now in the fifth year of operation. Demand for the program has grown and continues to stay high.

The SMB program proposal approved in January 2010 indicated that additional program tracks would likely be developed as new market opportunities were identified to capitalize on faculty expertise. We believe that such opportunities now warrant the addition of this SMB track in Business Analytics.

Rationale for an SMB Program Track in Business Analytics

Business schools position themselves to address the needs of a number of different types of graduate students, students who in turn seek to prepare themselves for successful careers in business by acquiring the skills and capabilities sought by employers. The most common professional master's degree granted by business schools is the MBA degree. MBA programs provide students with a broad business education, covering many functional areas, while also allowing for concentration in one or more areas. While valuable to many, there are important categories of prospective graduate business students for whom the MBA is not ideally suited. Many businesses seek individuals with graduate training in a single area of expertise. Individuals with focused graduate business training, for example, are ideally suited for managerial and professional positions in a specific areas, such as accounting, finance or

marketing. As another example, individuals currently working in a specialized area may seek to advance their careers by moving to the next level of knowledge and capability in that area or by acquiring graduate training in another area to complement their expertise. These individuals seek more rapid career advancement with their current employer in their current area of focus or to execute a career shift into a new area. (Relative to MBA degrees, specialized master degrees in business disciplines generally require less course work and, as mentioned earlier, have a strong disciplinary/area focus. The typical specialized business degree can be completed in 9 to 16 months, while the typical MBA program is completed in two years. Enrollment in specialized masters programs is also generally smaller than enrollment in MBA programs.) It is in response to those market needs, that the SMB program was introduced at Fisher, consistent with both the college's growth strategy and the mix of degrees typical of business schools at peer institution. As noted above, the SMB program, which was approved by the Ohio Board of Regents in January 2010, envisions multiple specialty program tracks with a common business core, with initial program tracks in Finance and Marketing. The SMB proposal, as approved, noted that additional program tracks would likely be developed as new market opportunities were identified to capitalize on faculty expertise. We believe that such opportunities now warrant the addition of this SMB track in Business Analytics.

Advances in information technology and the digitization of business have created increasing demand for professionals who can effectively harness, interpret and analyze data. A McKinsey Global Institute report, for example, predicted a potential shortage of 140,000 to 190,000 workers with deep analytical skills (Data Scientists) in the United States alone by 2018, as well as a shortage of 1.5 million *data-savvy managers* with the know-how to use analytics and lead analytics initiatives. Data Scientists are those individuals who have the knowledge and skills to conduct sophisticated and systematic analyses of data. These will be individuals with PhD's or extensive experience in Big Data and Analytics. A Master program in Analytics may or may not generate a Data Scientist. The program would provide an outstanding foundation for additional training that they would need. The Data Savvy individuals use Analytics in the course of their normal daily work activity, in roles such as Actuaries, Audit Analysts, Logistics Analysts, Economists, Epidemiologists, etc. A Master program would provide individuals in these roles the skills they need to succeed.

Unlike traditional M.S. programs in Data Analytics, including a possible future program being contemplated at the university level, our program is a specialized tagged master's degree program focusing on Business Analytics, with 10.5 credit hours of required business foundation course work. Effectively, the program seeks to blend an understanding of business with an understanding of analytics methods and techniques, producing data-savvy managers and consultants with expertise in how to use analytics and lead analytics initiatives in business. Figure 1 illustrates the positioning our proposed SMB-A program relative to traditional MBA

programs and master degree programs in Data Analytics (MDA). As the figure shows, analytics skills and knowledge can be conceptualized as a stack or a continuum ranging from domain (business) knowledge on one end to technical knowledge related to the design and implementation of scalable analytics solutions. Different degree programs are intended to focus on different aspects of this full stack. MBA programs generally provide students with broad business education, masters programs in Data Analytics tend to focus exclusively on the technical aspects of analytics. As a tagged degree program, our proposed SMB-A program bridges the gap between business domain knowledge and computing/technical knowledge, preparing students to function credibly as business analytics professionals/consultants who can, as part of a team, lead analytics initiatives in business organizations from initial conception to full-scale implementation and deployment.

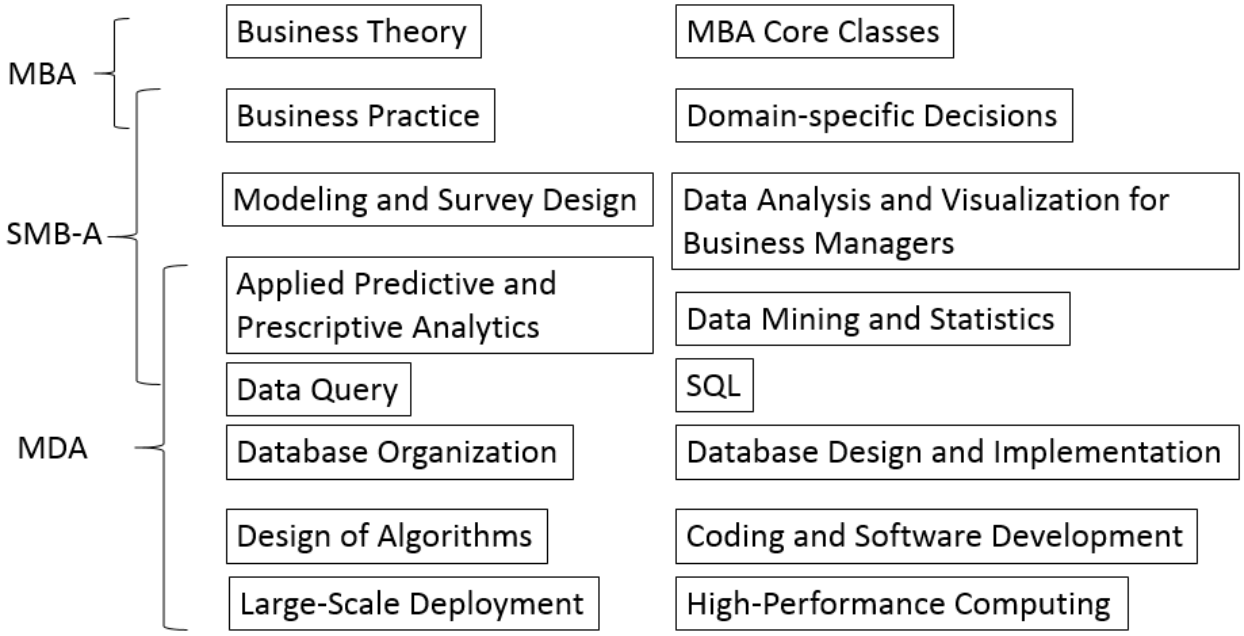

Figure 1: Full Stack Analytics

The Bureau of Labor Statistics (BLS Website, 2016) has projected job openings for all major job types for the years from 2014 – 2024. If we assume roles that include Financial Analysts, Market Research Analysts, Info Security Analysts, Operations Research Analysts, Statisticians, and Management Analysts, the job openings in the next eight years are approximately 534,000. If we assume that 40% - 50% of those job openings will have Analytics as part of the role, then the number of individuals that will need to graduate either with an undergraduate or graduate degree in Analytics will total 210,000 – 260,000.

Currently, there are 4 universities that have undergraduate programs in Analytics, and 120 that have a Master level program in Business or Data Analytics. All those programs

combined will generate approximately 6,000 students per year. That still leaves opportunities for programs to help fill the need for 160,000 to 210,000 additional degreed individuals.

The Columbus Collaboratory, a consortium of seven local companies (AEP, Battelle, Cardinal Health, Huntington Bank, L Brands, Nationwide Insurance and Ohio Health) recently worked with their constituent companies to determine open head count for Analytics roles. Currently there are 105 open roles for Analytics focused individuals at those companies. This does not include JPMC, IBM, Worthington Industries and a number of smaller companies located in Central Ohio. A Master level program in Analytics will be enthusiastically received by these companies.

Clearly, there is significant market demand for analytics-trained professionals in the Central Ohio region and we do not have a graduate program in Business Analytics offered in this region. Our market analysis shows some activity in schools in other cities in Ohio (e.g., Bowling Green, Cincinnati), but nothing in the Central Ohio region. The intended market for the SMB-A at Fisher are individuals in Central Ohio with existing exposure to business who wish to develop skills in business analytics management. A primary market target is working professionals in Columbus, Ohio with technical data capabilities such at IT and data base management. Other market targets are individuals working as engineers, accounting, operations, HR, and finance professionals looking to move into analytics-related positions within their firms, individuals with undergraduate business degrees who want to develop data-related skills, and current undergraduate business students who want to earn a dual BS/MS degree.

Fisher College of Business has several highly qualified faculty who currently teach both in the Undergraduate Business Analytics Minor and the Business Analytics Major in the MBA program. For example, Professor Greg Allenby of Marketing and Logistics has received multiple honors and awards for his analytical work. Professor Elliot Bendoly who specializes in Data Visualization has recently received the Distinguished Scholar Award from the Academy of Management's Operations Management Division. Professor Waleed Muhanna has taught Data Mining for graduate students for several years and is a member of several Information Systems societies and Editorial Review Boards. The college has also invested and continues to invest in recruiting faculty in the area of analytics, under the auspices of Translational Data Analytics @ Ohio State University (TDA@OSU), a cross-cutting foundational component of the university's Discovery Theme Initiatives (DTI). The new program will further leverage the talents of these newly hired faculty.

The Proposed SMB—Business Analytics Curriculum

Business analytics is the process of transforming data into insights for making better business decisions. The term characterizes fluency in working with and leveraging data, understanding its relevance to business and effectively presenting results. It comprises the exploration of the past, prediction of the future and inference about how best to make effective changes to how business is currently practiced:

1. Descriptive Analytics – using reporting and visualization tools to identify interesting patterns, behaviors and trends.
2. Predictive Analytics – using data mining techniques and historical data to predict the future and uncover patterns that may not be readily apparent with descriptive analytics.
3. Prescriptive Analytics – using causal inference and operations research tools (optimization, simulation modeling) to determine which decisions will lead to a desired/best outcome.

The SMB-Business Analytics track prepares students to be a bridge between theory and business practice by giving students a solid understanding in the science of data analytics and its implications for business development. Foundational elements of this bridge should allow students to leverage analytics methods and techniques to improve the efficiency and effectiveness of business processes within individual functional areas and across the enterprise and to effectively communicate with functional managers, statistical programmers and information system scientists.

Learning Goals:

The learning goals for the proposed SMB-A track derive from the program's rationale and are informed by the learning goals for other specialized SMB programs. The goals are:

1. Graduates will demonstrate fluency in working with data and an understanding of data acquisition and management in organizations to meet specified business objectives.

2. Graduates will be able to conceptualize real world business problems, identify data requirements, engage in rigorous critical thinking, and develop innovative solutions through the application of (a) descriptive; (b) predictive; and (c) prescriptive data analytic methods and techniques.

3. Graduates will demonstrate competence in communicating tractable results and integrated insights that inform organizational decision-making.

4. Graduates will identify and evaluate ethical issues surrounding data and its use in business decision making.

Curriculum Structure:

The program curriculum is comprised of 31.5 semester credit hours of coursework. These credit hours will be distributed as follows:

- 10.5 credit hours for business foundation course work as called for by the SMB proposal approved by the Board of Regents in January 2010[1]. The four courses cover Managerial Economics, Accounting and Financial Analysis, Statistics and Data Analysis, and Leadership and Organizational Behavior. These courses will be taught by Fisher faculty.

- 12 credit hours of course work in Data Management, and Descriptive, Predictive, and Prescriptive Analytics. These courses will be taught by Fisher faculty.

- 3 credit hours for a capstone project using real data from a corporate partner. This project will also be a distinguishing feature of this program because our competitive analysis shows very few schools offering live project experience of this nature to their students.

- 6 credit hours of electives which can be from the current courses in Fisher or from approved courses offered by departments outside Fisher (e.g., Statistics and Economics).

The proposed SMB-A program track is very similar to the SMB tracks in Finance and Marketing. The only difference being envisioned is that the core curriculum is modified to suit the analytics market by covering the core concepts in the context of analytics rather than the context of general business. Further, because the program is primarily aimed at individuals who have had prior exposure to business either at the undergraduate level or at work, the core will examine more specific issues within the business analytics domain than the basics. For example, instead of offering a fundamental course on Managerial Economics, the program includes coverage of some research tools in the context of Managerial Economics. As in the case of the previously approved tracks, the SMB-A program track will require a minimum of 30 semester credit hours, meeting the requirements of The Ohio State University and of AACSB (the major worldwide accreditation organization for business schools) for a Master's degree.

[1] The approved SMB program envisions multiple tracks of specialization, albeit with a set of core classes common to all tracks, consisting of 16 quarter hours (10.66 semester hours) in the areas of accounting/financial analysis, statistics, managerial economics, and leadership.

Curriculum Map:

The relationships between the program's learning goals and core specialization courses are shown in the following curriculum map. (Curriculum mapping is done to ensure that learning goals are reflected in the curriculum so that each goal is taught and assessed in the program core.) For each course, individual Learning Goals are:

1. Not taught or assessed
2. Taught and assessed at an Introductory level
3. Taught and assessed at an Intermediate level
4. Taught and assessed at an Advanced level

Core Course	Learning Goal 1	Learning Goal 2	Learning Goal 3	Learning Goal 4
Statistics	1	2	1	2
Data Management	4	3	1	3
Descriptive Analytics	3	4 (LG2.a)	4	3
Predictive Analytics	3	4 (LG2.b)	4	3
Prescriptive Analytics	3	4 (LG2.c)	4	3
Capstone Project	4	4	4	4

Program of Study and Delivery Format

As noted in the section on program rationale, our proposed program is aimed at early and mid-career working professionals. Our experience with existing programs and anecdotal evidence suggest that aspiring working professionals find it increasingly difficult to secure time off work. For most working professionals, long and unpredictable working hours make taking classes in the evening particularly challenging after very busy days at work—more so for working professionals with young kids and other family obligations. Unlike traditional evening programs where students tend to study on a part-time basis, however, ours is a full-time program delivered over a 2.5 semesters. Classes will meet on Saturdays only in order to accommodate the needs of working professionals, while also being accessible to non-working professionals.

The program will use a hybrid course delivery format, blending a mix of ½ online instruction with ½ on-campus class meetings involving in-depth discussion, live demonstration and explorations of subjects and hands-on individual and group exercises. Using this blended format, students will essentially take two courses at a time, with the delivery of each 3-credit hour course spread over 5 Saturdays during a 7-weeks term with distance-learning content and

support in-between. Saturday class meetings will be delivered in roughly 4-hour blocks (8am-12pm, and 1pm-5pm)[2]. The delivery format and program of study conform to The Ohio State University academic calendar. Classes will begin toward the end of August, with each half-semester consisting of two classes for a total of ten 3-credit hour courses classes and one 1.5-hour course delivered as follows:

Autumn (Term 1; 7 weeks): Statistics (3), Managerial Economics (3)
Autumn (Term 2; 7 weeks): Data Management (3), Accounting and Finance (3)

Spring (Term 1; 7 weeks): Descriptive Analytics (3), Predictive Analytics (3)
Spring (Term 2; 7 weeks): Prescriptive Analytics (3), Electives (3)

Summer (Term 1; 8 weeks): Leadership (1.5), Electives (3),
Practicum/Capstone Project (3)

Beyond required core classes, students choose 6 credit hours of electives from the following options[3]: (Other courses may also be considered in order to meet individual needs of students. These courses should be approved by the student's advisor, in consultation with the program's academic director.)

Type I – Analytics focused (a minimum of 3 credit hours)
Type II – General domain knowledge (up to 3 credit hours)

Type I Electives:

A sampling of options currently offered at FCOB:

AMIS 7220 - Financial Statement Analysis I
AMIS 7221 - Financial Statement Analysis II
AMIS 7520 - Fraud Examination

FIN 7221 - Financial Modeling
FIN 7230 - Derivatives I
FIN 7232 - Derivatives II

[2] Since students will be on campus by 8am, we do not think that parking would be a problem on football Saturdays. Further, our hybrid delivery model, where classes are held on campus on 5 Saturdays of each 7-weeks term, permits some scheduling flexibility around major home games.

[3] The inclusion of a course on the list of preapproved electives does not imply a commitment to offer that course on Saturdays each year. Following our approach in the EMBA and WPMBA programs, and working with course offering units both within and outside Fisher, we will endeavor to go beyond offering the minimum number of elective courses required (2 courses) and offer as many electives on Saturdays as feasible, subject to demand (overall program size and student preferences) and staffing constraints. Students always have the opportunity to enroll in sections of elective courses offered during regular times, including evening sections currently offered for students in our MBA program for Working Professionals.

MGT 7222 - Simulation, Risk Analysis and Decision Making
MGT 7223 - Project Management
MGT 7232 - Supply Chain Analytics: Matching Supply with Demand
MGT 7258 - Sports Analytics

M&L 7219 - Customer Satisfaction and Loyalty Analysis
M&L 7201 - Marketing Research and Analytics
M&L 7204 - Quantitative Product and Pricing Analysis
M&L 7382 - Logistics Analytics

A sampling of Electives outside of Fisher (substituting for one of the above electives Type I electives):

Econ 6731 - Survey of Econometric Methods I
Econ 6732 - Survey of Econometric Methods II
Stat 6410 - Design and Analysis of Experiments
Stat 6550 - The Statistical Analysis of Time Series
Stat 6560 - Applied Multivariate Analysis
Stat 6570- Applied Bayesian Analysis
Stat 6605 - Applied Survival Analysis
Stat 6610 - Applied Nonparametric Statistics
Stat 6640 - Principles of Statistical Quality Control
Stat 6650 - Discrete Data Analysis
Stat 6730 - Introduction to Computational Statistics

Type II electives:

Any graduate level course offered at FCOB (listed at Type I or otherwise)

Graduation takes place during summer commencement (early august) of each year. The program's calendar and program of study for the class of 2019 are shown on the next page.

SMB—Analytics

Class of 2019 Calendar & Plan of Study

2018

AUGUST

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

DECEMBER

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

2019

JANUARY

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

FEBRUARY

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

MARCH

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

APRIL

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

MAY

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JUNE

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Saturday Class Schedule: 8:00 a.m. - 5:00 p.m.

Green Dates: On Campus Classes

(Schedule and Plan of Study subject to change)

fisher.osu.edu/graduate/smba **fishergrad@fisher.osu.edu**

10-Month Plan of Study

Autumn Semester (12 Credits)
- **Term 1 (Aug 21 – Oct 8):**
  - **Statistics (3)**
  - **Managerial Economics (3)**
- **Term 2 (Oct 15 – Dec 13):**
  - **Data Management (3)**
  - **Accounting and Finance (3)**

Spring Semester (12 Credits)
- **Term 1 (Jan 7 – Feb 26):**
  - **Descriptive Analytics (3)**
  - **Predictive Analytics (3)**
- **Term 2 (Feb 28 – April 30):**
  - **Prescriptive Analytics (3)**
  - **Electives (3)**

Summer Semester (7.5 Credits)
- **Term 1 (May 8 – Jun 29):**
  - **Leadership (1.5)**
  - **Electives (3)**
  - **Capstone Project (3)**

Commencement: Aug 2, 2019

Launch

Our plan is to launch the program in Autumn 2018. Analytics at the graduate level is not new for Fisher College of Business. The Nationwide Center for Advanced Customer Insights has been in existence at Fisher for over seven years and has brought together academics and practitioners from various disciplines to address cutting edge consumer analytics problems. The Executive Education group at Fisher has hosted several talks by the Center Director, Mr. Ralph Greco, which have been attended by various executives in local companies. More recently, we offered a Sports Analytics course for our Working Professional MBA students. The Center has also been in touch with various companies and has been discussing our efforts at launching a graduate program in analytics. We believe there is significant interest in the proposed SMB-A track for us to get a starting class of at least 25 students.

Administration, Admissions, and Faculty Requirements

Program administration: Fisher College employs a matrix structure for managing its educational programs. Responsibility for the program will be vested in the Specialized Master in Business Committee chaired by Professor Walter Zinn, Associate Dean for Graduate Programs. The SMB-Business Analytics Subcommittee, which is chaired by the co-Academic Program Directors, Professors Greg Allenby and Waleed Muhanna, will assume responsibility for recruitment, program administration, and student career management. The co-directors will work with the staff from the Graduate Programs Office for student recruitment and program administration. The co-directors will also be working closely with the Office of Career Management for career assistance for students of the program.

Admissions: The criteria for admission to the program will be an appropriate undergraduate degree meeting a 3.0 minimum GPA standard, a competitive score on the General Management Admission Test (GMAT) or Graduate Record Examination (GRE) (if the student has less than five years of work experience), quality letters of recommendation, personal essays, relevant work experience and demonstrated leadership capability. Applications will be processed through established university and college channels. Staff from the Graduate Programs Office will be responsible for running the admissions process, working with other departments as appropriate.

Career Services Support for Graduates: When the program is delivered to students selected for advancement in their careers, there is no need for placement support. When a student is planning on a change of career, there will be a need for placement support from the Office of Career Management. It is anticipated that initially current staff will be able to handle

the small number of students requiring placement support. As the program grows in scale, it may be necessary to add to the Career Services staff to support students.

Facilities: Courses will be taught in classrooms at the Fisher College of Business. All classes will meet on Saturdays to facilitate attendance from working professionals.

Faculty: For the first year, faculty compensation (except in the case of any use of junior faculty (see below)) will be in the form of supplemental compensation for overload teaching (instruction delivered over and above assigned teaching responsibilities). Any use of junior faculty in the program will be through on-load teaching so as to not limit research activity. Initial reliance on overload teaching limits the need for additional faculty hires in the short term while the new program track develops. Over the longer term, the program will generate revenue sufficient to help grow the faculty, both tenure track and clinical faculty.

Program Track Review: The status of the SMB-A track will be reviewed every three years by the Graduate Programs Committee of Fisher College of Business, as called for by the Strategic Plan adopted in December 2015. Should the track fail to meet expectations academically or otherwise, the track will be terminated. It expected that the track should generate positive net revenue for the college over a three year window, and remain a positive contributor from there forward. Should the overall degree program fail to meet expectations over a five year time frame, the degree will be terminated.

<u>Appendix I</u>: Letters of Support from TDA@OSU, STAT, and CSE

February 20, 2017

Professor Walter Zinn
Associate Dean for Graduate Students and Programs
Fisher College of Business
CAMPUS

Dear Prof. Zinn:

We at Translational Data Analytics @Ohio State, or TDA, reviewed the proposal shared with us to create the SMB-Business Analytics degree program. At the outset, we were happy to note that our colleagues at Fisher College of Business share our passion and interest in creating and coordinating viable and useful programs. We extend full support for the proposed SMB-Business Analytics degree program.

The proposed track/program—we believe—complements the efforts underway at the university level towards a future M.S. degree programs in Data Analytics as being coordinated by us at TDA. Our proposed programs will create a more general data scientist with likely exposure to variety of applications from engineering, medicine, science, and the humanities. Much like the existing undergraduate program in Data Analytics it will provide a framework for several programs on our campus to incorporate Data Analytics into their curriculum. It is likely that we will be coordinating both traditional and Professional Science Masters (PSM) program. The latter will aim to recruit working professionals.

Therefore, we share your assessment that your proposed program is a specialized tagged master's degree program focusing on Business Analytics, one that seeks to blend an understanding of businesses processes with an understanding of analytics methods and techniques, producing data-savvy managers and consultants with expertise in how to use analytics and lead analytics initiatives in business. We also note that SMB-Business Analytics program is definitely aimed at the mid-career working professional similar to the goals of the PSM degree we are developing. To close, we note that in skills stack the likely graduates in from the PSM degree will be closer to computer scientists and scientists and specialists with more advanced degrees.

Consistent with Translational Data Analytics component of the Discovery Theme Initiative, your proposed program will only expand and strengthen OSU's program offerings in the area of Data Analytics and leverage the talents of existing faculty and new faculty hired under the auspices of that initiative. We concur with the recommendations of the Fisher faculty and recommend that the proposed SMB-Business Analytics proposal be approved by the University.

Sincerely,

Raghu Machiraju, PhD, *Professor*
Interim Director, Translational Data Analytics
Department of Biomedical Informatics
Department of Computer Science and Engineering
The Ohio State University

THE OHIO STATE UNIVERSITY

Translational Data Analytics @ Ohio State

THE OHIO STATE UNIVERSITY

College of Arts and Sciences

Department of Statistics

404 Cockins Hall
1958 Neil Avenue
Columbus, OH 43210

614-292-2866 Phone
614-292-2096 Fax

stat.osu.edu

04/11/2017

Professor Greg Allenby
Helen C. Kurtz Chair in Marketing
Department of Marketing and Logistics
Fisher College of Business

Dear Greg:

I and the Curriculum Committee in the Department of Statistics have examined the proposal that you have shared with us. The proposal is for a Specialized Master in Business – Business Analytics.

We have long supported the growth of programs at The Ohio State University which complement our own offerings. We believe that your proposed program does this, targeting professionals in early-to-mid-career who will lead and manage teams of Data Scientists (as Data Analysts, Statisticians, and those in related fields are now commonly labeled). As such, it targets a different group than our tagged masters degree, the Master of Applied Statistics, which is aimed at an audience that desires more technically oriented training.

Several courses that are commonly taken by our own masters students are appropriate as electives for your proposed degree. We are pleased to see them listed as electives for your program, and we would welcome additional students in these courses.

We are strongly supportive of your proposal.

Sincerely,

Steven MacEachern
Chair and Professor
Department of Statistics

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

College of Engineering
Department of Computer Science and Engineering

Dr. Rephael Wenger
CSE Associate Chair
CSE Dept, The Ohio State U.
Columbus Ohio 43210
April 21, 2017

Dear Dr. Muhanna:

The Curriculum Committee of the Department of Computer Science and Engineering has reviewed the proposal for a new track (Business Analytics) to be added to the Specialized Master of Business degree program.

The graduate programs in CSE focus on developing the technical and computational skills for analytics and data science. As such, the objectives of our graduate programs are complementary to those of the proposed track, which seeks to produce data-savvy managers and consultants with the skills needed to lead analytics initiatives in business.

In addition to our graduate offerings, the CSE department has extensive offerings at the undergraduate level for introducing computational thinking in various applied contexts. These offerings include courses for students from across the university, using a variety of application domains: programming for engineering and science (e.g., MATLAB, C++), programming for media and games, spreadsheets, and databases. The proposed track in Business Analytics targets a distinct audience in that it focuses on mid-career professionals with existing exposure to business who wish to develop skills in business analytics management.

For students with the appropriate depth of technical background, there are several CSE courses which could fit as technical electives for the Business Analytics track. In particular, I would highlight our courses in machine learning, visualization, data mining, and databases (5242, 5243, 5244, 5245, 5361, 5441, 5521, 5522, 5523, 5541, 5544, 5545). Several of these courses include evening offerings, which would help scheduling for students who are practicing professionals.

Furthermore, there are two points of possible synergy which may be easy to leverage: (i) CSE 5241 Introduction to Database Design, and (ii) the College of Engineering's Certificate in Practice in Data Analytics. The former (CSE 5241) is part of the College of Engineering's Master in Global Engineering Leadership and is entirely online. We would welcome the opportunity to discuss the feasibility of including it (or some variant) as the course offerings within the Business Analytics track evolve. The latter (the Certificate of Practice) is not a degree program. Nevertheless, there may be opportunities there worth exploring with Dr. David Tomasko (and Bob Mick) from the College of Engineering.

We offer our support for your proposal and, with this letter, confirm our concurrence.

Sincerely,

Rephael Wenger

Dr. Rephael Wenger
CSE Associate Chair
Dept. of Computer Sci. and Eng.
The Ohio State University

Appendix II: Advising Sheet

THE OHIO STATE UNIVERSITY
FISHER COLLEGE OF BUSINESS

Specialized Master in Business – Business Analytics (SMB-A)

Curriculum Advising Sheet

(fisher.osu.edu/graduate/smba)

Overall Requirements and Curriculum Structure

In addition to meeting all the requirements of the Graduate School at The Ohio State University, SMB-A students are required to complete a minimum of 31.5 semester credit hours of graduate work with a minimum cumulative GPA of 3.0. In accordance with Graduate School rules, at least 80% (25.5 credit hours) must be earned at OSU.

Course Work	Semester Credit Hrs
Business Foundation Course Work	10.5
Business Analytics Core Classes	12
Electives	6
Capstone	3
Total credits	31.5

Overall Requirements and Curriculum Structure

All students seeking an SMB-A will take the following courses:

Required Business Foundation Course Work (10.5 credit hours)

ACCTMIS 6XXX	Accounting/Financial Analysis for Decision Making	3
BUSMGT 6221 & 6222	Statistics and Data Analysis for Managers	3
BUSMHR 6XXX	Managerial Economics for Analytics	3
BUSMHR 7263	Leadership Development & Org. Behavior	1.5

Required Business Analytics Core Classes (12 credit hours)

ACCTMIS 76XX	Data Management and Business Intelligence	3
BUSMGT 7257	Data Analysis and Visualization (Descriptive Analytics)	3
BUSMGT 72XX	Predictive Analytics	3
BUSMGT 72XX	Prescriptive Analytics	3

Required Capstone Course/Project (3 credit hours)

BUSMGT 7XXX	Business Analytics Practicum	3

Electives (6 credit hours)

Through careful consultation with their advisors, students choose 6 credit hours of electives from the following options: (Other classes may also be considered to meet individual needs of students. These courses should be approved by the student's advisor, in consultation with the program's academic director.)

Type I – Analytics focused (a minimum of 3 credit hours)
Type II – General domain knowledge (up to 3 credit hours)

Type I Electives:

A sampling of options currently offered at FCOB:

AMIS 7220 - Financial Statement Analysis I
AMIS 7221 - Financial Statement Analysis II
AMIS 7520 - Fraud Examination

FIN 7221 - Financial Modeling
FIN 7230 - Derivatives I
FIN 7232 - Derivatives II

MGT 7222 - Simulation, Risk Analysis and Decision Making
MGT 7223 - Project Management
MGT 7232 - Supply Chain Analytics: Matching Supply with Demand
MGT 7258 - Sports Analytics

M&L 7219 - Customer Satisfaction and Loyalty Analysis
M&L 7201 - Marketing Research and Analytics
M&L 7204 - Quantitative Product and Pricing Analysis
M&L 7382 - Logistics Analytics

A sampling of Electives outside of Fisher (substituting for one of the above electives Type I electives):

Econ 6731 - Survey of Econometric Methods I
Econ 6732 - Survey of Econometric Methods II
Stat 6410 - Design and Analysis of Experiments
Stat 6550 - The Statistical Analysis of Time Series
Stat 6560 - Applied Multivariate Analysis
Stat 6570- Applied Bayesian Analysis
Stat 6605 - Applied Survival Analysis
Stat 6610 - Applied Nonparametric Statistics
Stat 6640 - Principles of Statistical Quality Control
Stat 6650 - Discrete Data Analysis

Stat 6730 - Introduction to Computational Statistics

Type II electives:

Any graduate level course offered at FCOB (listed at Type I or otherwise)

Program Exit Requirements

- Fulfillment of credit hour requirements
- Fulfillment of course requirements
- Successful completion of the Capstone course with a grade of “B” or better.

MEMORANDUM OF UNDERSTANDING

College:	**Fisher College of Business**
Department:	**Dean's Office**
Faculty director:	**Greg Allenby and Waleed Muhanna**
Primary contact, if different from faculty director:	
Fiscal officer:	**Barb Deyoung**
Marketing director:	**Melanie DiFeo**
Enrollment contact for state authorization compliance:	**Walter Zinn**
Additional colleges/contacts:	

Name of program:	**Specialized Master of Business-Analytics (SMB-Analytics)**	
Approval process *(change in delivery or new program)*:	**New Program**	
Will this program have a different fee structure from what would normally be assessed similar students at the university? If so, then please explain:	**Yes. A different fee structure will be used to remain consistent with other Fisher College of Business graduate programs and is based on competitive data.**	
Total credit hours:	**31.5**	
# of courses to be created:	**15 (8 3-CH courses, and 7 1.5-CH courses)**	
# of courses already in an online format that need ODEE review:	**0**	
# of anticipated students:	**25-50**	
State authorization:	**For this program, does your college plan to do any of the following outside of Ohio? Yes/No**	
	Maintain a physical location, facility or instruction site (may include server or other equipment or administrative offices)	**No**
	Recruit students (either occasionally or consistently)	**No**
	Conduct soliciting, marketing or advertising	**No**
	Employ full time and/or adjunct faculty (1099/W-2)	**No**
	Conduct instructional activities such as clinicals, labs, practicums, internships or externships (where students meet face to face)	**Yes**
	Have contracts or agreements to provide services to students, such as proctored exams	**No**
	Have partnerships with educational institutions	**No**

Course Name	*Faculty Lead*	*OAA Approved for Online Delivery*	*Developed*	*Delivered*	*5 Hour Review (semester immediately following first delivery)*	*Reviewed (every 3 years)*
Statistics and Data Analysis for Managers	J. Draper	SU17	AU17	AU18	SP19	SP21
Managerial Economics for Analytics	R. Bailey	SU17	AU17	AU18	SP19	SP21
Accounting/ Financial Analysis for Decision Making	A. Van Buskirk	SU17	AU17	AU18	SP19	SP21
Data Management and Business Intelligence	W. Muhanna	SU17	AU17	AU18	SP19	SP21
Data Analysis and Visualization/ Descriptive Analytics	E. Bendoly	SU17	SP18	SP19	SU19	SU21
Predictive Analytics	W. Muhanna	SU17	SP18	SP19	SU19	SU21
Prescriptive Analytics	G. Allenby	SU17	SP18	SP19	SU19	SU21
Financial Modeling (elective 1; 1.5 CH)	D. Oglevee	SU17	SP18	SP19	SU19	SU21
Fraud Examination (elective; 1.5 CH)	E. Spires	SU17	SU18	SP19	SU19	SU21
Negotiation (elective, 1.5 CH)	R. Lount	SU17	SU18	SP19	SU19	SU21
Leadership Development & Org. Behavior (1.5 CH)	B. Tepper	SU17	SU18	SU19	AU19	AU21
Business Analytics Practicum	R. Bailey	SU17	SU18	SU19	AU19	AU21
Bayesian Analytics (elective; 1.5 CH)	G. Allenby	SU17	AU18	SU19	AU19	AU21
Sports Analytics (elective; 1.5 CH)	J. Draper	SU17	AU18	SU19	AU19	AU21
Simulation & Risk Analysis (elective; 1.5 CH)	H. Park	SU17	AU18	SU19	AU19	AU21

Colleges entering into this agreement will:
Secure approval from the following, where applicable: • Graduate School • Council on Academic Affairs (CAA) • University Senate • Board of Trustees • Department of Higher Education
Contact the university budget office regarding new program and to request a distance education specific fee table. Differential fees must be approved by the Board of Trustees, if applicable.
Meet the program standards set forth by your accrediting body (if applicable) for alternative delivery models
Submit courses for online delivery and any course revisions to curriculum.osu.edu (after CAA approval)
Label students in Student Information System with appropriate subplan. Distance students = subplan ONL
Provide budget forecasting/market analysis using ODEE funding model (attached) • Incur the costs for your program specific advertising • Incur additional costs associated with distance education programming (e.g. student advising, increased TA support)
Collaborate with ODEE on State Authorizations as well as State Licensure approvals, if applicable • Notify ODEE of states/countries where they would like to enroll students • Communicate to prospective students their ability to enroll and seek federal financial aid based on State Authorizations
Collaborate with ODEE on the technical solutions for effective course delivery: • Online-specific syllabus requirements (ODS statement, COAM statement, etc.) • OSU identity/branding guidelines • Carmen course template providing students with effective navigation and online course expectations, etc. • Provide course content materials for placement into mutually agreed upon formats and technologies for distance delivery • Utilize Quality Matters principles in course design • Focus on outcome-based learning and incorporate assessment into courses
Work with faculty on the workload assignment
Encourage distance education faculty/instructors/students to participate in ODEE's Distance Education Learning and Teaching Academy
Collaborate with relevant student support services (ODS, UCAT, Writing Center, Libraries, Veterans Affairs, etc.) • Incur costs to provide required accessibility accommodations for videos and activities not produced by ODEE
Collaborate with ODEE to review and update courses every three years.
Provide at least one required student participation activity each week in a course • Course designers will implement activities each week of a course to verify enrollment. This is beyond a simple login to a course space, but constitutes a discussion posting, quiz attempt, artifact submission, etc.
Identify student technology support for tools only used by your program
Provide replacement instructor(s) in a timely manner should an instructor separate from the university during the course development process or terminate and postpone course development until a replacement instructor can be identified.

ODEE entering into this agreement will:
Administer state authorization program • Necessary to ensure program meets federal student financial aid guidelines • Communicate with the colleges the status of approved state authorizations
Collaborate with the college on the technical solutions for effective course delivery: • Online-specific syllabus requirements (ODS statement, COAM statement, etc.)

• OSU identity guidelines • Course templates providing students with effective navigation and online course expectations, etc. • Placing course content materials into mutually agreed upon formats and technologies for distance delivery • Utilize Quality Matters principles in course design • Focus on outcome-based learning and incorporate assessment into courses
Provide instructional designer production time
Provide distance education professional development opportunities for faculty/instructors/students through ODEE's Distance Education Learning and Teaching Academy
Collaborate with the college to review and update courses every three years
Collaborate with course instructors to provide at least one required student participation activity each week in a course • Course designers will implement activities each week of a course to verify enrollment. This is beyond a simple login to a course space, but constitutes a discussion posting, quiz attempt, artifact submission, etc.
Provide distance education faculty and students access to: • An OCIO managed Tier 1 help desk for ODEE/OCIO provided tools/services
Provide OSU online program advertising • Two minute program specific introductory video • Consult with college marketing on strategies for program specific advertising • Program included in general OSU online marketing strategy • Marketing will only be conducted in states/countries in which the program has been authorized
Collaborate with program directors to revise the course development process should an instructor separate from the university during that time. Options include continue work on course through the end of the 14 week development process with a replacement instructor or terminate and postpone course development until a replacement instructor can be identified.

***Products and services used will be held to each service level of agreement.**

MOU created by:	**Walter Zinn, Associate Dean of Graduate Programs and Students**	
MOU approved by:	**Mike Hofherr, Vice President and Chief Information Officer:** Anil K. Mobhija	**Date:** July 26, '17
	Dean, College:	**Date:**
	Fiscal Officer, College*: Barbara L. Dejong	**Date:** 7/26/2017

**Please review and attach program revenue projection worksheet*

Robert Griffiths, AVP Distance Education

Robert P. Griffiths July 27, 17