Date: February 4, 2019

To: Sarah Mangelsdorf, Provost
    Office of the Provost
    University of Wisconsin - Madison

Willian Karpus, Dean
    Graduate School
    University of Wisconsin - Madison

From: Barry Gerhart, Interim Albert O. Nicholas Dean, Wisconsin School of Business

Re: Notice of Intent: New Master of Science in Business Analytics

The School of Business is submitting a Notice of Intent (NOI) to create a new MS in Business Analytics. Many of our peer universities, including several other Big Ten schools, have launched successful MS programs in Business Analytics in recent years. These programs are meeting a student demand for business school degrees that teach data-driven decision making in business. Graduates of these programs also meet a growing need in industry for business domain experts that are versed in analytical techniques. Thus far, the UW System does not offer a Business Analytics degree, so we are excited to close this gap in the UW offerings.

Letters of support from the iSchool, the Departments of Engineering Professional Development, Computer Science, Economics, and Statistics are attached. We anticipate that the College of Letter & Science APC will consider this at their February 5, 2019 meeting and are optimistic that they will provide comment shortly after that meeting.

This Notice of Intent was approved by the School of Business Academic Planning Council on November 15, 2018 and by the faculty of the School of Business on November 26, 2018.

We are now requesting approval from the Graduate Faculty Executive Committee and UAPC.

Thank you for considering this request.

cc:  Jocelyn Milner, Associate Vice Provost, Academic Planning and Institutional Research
     Nicole Wiessinger, Academic Planner, Academic Planning and Institutional Research
     Josh Morrill, Assistant Dean, Academic Analysis, Planning and Assessment, Graduate School
     Parmesh Ramanathan, Associate Dean for Graduate Education, Graduate School
     Ella Mae Matsumura, Senior Associate Dean of Academic Programs
     Enno Siemsen, Associate Dean for the MBA and Master’s Programs
     Sharon Kahn, Director of Academic Affairs
Notice of Intent for New Academic Degree
Masters of Science: Business Analytics

Name of Proposed Degree: Master of Science in Business Analytics

Home unit: School of Business

Mode of Delivery: Primarily face-to-face, but will also include blended options

Primary Faculty Contact:
- Daniel Bauer, Associate Professor
- Kristin Branch, Faculty Associate
- Jordan Tong, Associate Professor

Program Description
The Wisconsin School of Business is proposing a new Master of Science in Business Analytics (MSBA) program for students who want to combine strong analytical and quantitative ability with managerial excellence and application knowledge to pursue a career in business analytics.

Our intended Learning Outcomes include:

- Apply business analytic tools and methods across various business functions (marketing, finance, supply chain, etc.) and industries (health care, finance, technology, etc.)
- Deliver insights and recommendations for organizations using cutting-edge descriptive, predictive, and prescriptive analytics techniques
- Manage analytics projects, communicate professionally, and influence data-based changes within an organization
- Use software & programming languages to go from data collection to solution implementation (SQL, R, Python, Tableau, Excel)

Program Content
The masters will start with one 3-credit summer term Statistics and Programming for Business Analytics Boot Camp (starting in summer 2020) and then include the full fall and spring semesters for a total of three terms of study. The program will feature a cohort format with all students starting and ending together. The boot camp and fall semester provide a methodological foundation educating students with a balanced skillset across descriptive, predictive, and prescriptive analytical techniques that they can use to deliver insights and solutions to a breadth of business problems. The spring semester focuses on business analytics applications through hands-on experience, real-world consulting projects, and by allowing students to select courses in specific business functions/industries.
More specifically, this Master program will help students learn to:

- Apply business analytics tools and methods across various business functions and industries:
  - Marketing Analytics
  - Risk Analytics and Behavioral Science
  - Supply Chain Analytics
  - People Analytics
  - Health Analytics

- Deliver insights and recommendations for organizations using cutting-edge descriptive, predictive, and prescriptive analytics techniques:
  - Data visualization
  - Experimentation and causal analysis
  - Machine learning
  - Prescriptive modeling and decision-making

- Manage analytics projects, communicate professionally, and influence data-based changes within an organization:
  - Project and change management
  - Business analytics consulting practicum
  - Applied learning courses

- Leverage expertise in software & statistical programming to go from data collection to solution implementation (SQL, R, Python, Tableau, Excel):
  - Summer boot camp
  - Data management
  - Applied learning courses

The Master of Science in Business Analytics program will be 30 credits, offered in-person, and will start in summer 2020, with the Statistics and Programming for Business Analytics Boot Camp into Summer Term (August offering).

Resources

The initial planning and startup phase for the Master of Science in Business Analytics is coordinated by the Leadership Team consisting of two Associate Professors and a Faculty Associate. This will be a 101 program where tuition dollars are generated and appropriated. The Wisconsin School of Business Dean’s office will allocate funds from tuition allocation to support the teaching, student support, and advising of the Master of Science in Business Analytics, and additional head count will be added when the student and credit count supports those additions.

Other Required Approvals

No specialized accreditation or HLC approval is required.

Alignment with broader UW-Madison, Direction, and Academic Programs

On 10/3/2018, the University of Wisconsin—Madison announced its intention to expand its computing efforts with a new synergetic project across Computer Sciences, Statistics, and the iSchool to “bring computing and key related disciplines closer together to encourage collaboration and expand teaching and research activities.” “It is crucial that UW-Madison stay at the forefront of research and education in computing, information and data
science,” said Chancellor Blank. With this Master of Science in Business Analytics, the Wisconsin School of Business can complement, contribute to, and leverage this broader UW-Madison initiative. For instance, we envision students from these other programs will take advantage of the business applications classes in various industries offered under the umbrella of the Master of Science in Business Analytics. And vice-versa our own students will have the possibility of deepening and broadening their modeling and computational skills by accessing classes in these programs.

The Master of Science in Business Analytics provides an option for UW-Madison undergraduate students to stay a 5th year Master’s program and obtain a master’s degree. Students studying business may want to expand their knowledge in business analytics and tap corresponding career opportunities. Students majoring in statistics, economics, computer science, and many other quantitative non-business fields may find this Master of Science in Business Analytics a way to link their undergraduate studies to business in order to expand their career possibilities. Additionally, students from other institutions across the state of Wisconsin, the US, and even the globe will be drawn to UW-Madison’s business application focused Master of Science in Business Analytics.

The Master of Science in Business Analytics is directly aligned with the Wisconsin School of Business Strategic Initiative goal of new and expanded Masters programs. It will also support the summer enrollment goal with our Statistics and Programming boot camp.

The University of Wisconsin—Madison states its goal of building innovative professional master-level degrees and other lifelong learning experiences in its Strategic Plan. We foresee extending the Wisconsin Idea as our curriculum emphasizes applied learning and includes live consulting projects with businesses in Wisconsin and beyond.

**Need for the new program**

Comparable business schools have recently launched master degrees in business analytics with sizeable cohorts. For example, Minnesota’s 2017-2018 student cohort was 97 students, Purdue’s was 82 students, Texas’ was 53, and USC’s was 90.

The Wisconsin School of Business recently conducted a survey taken by 2448 current UW-Madison students to review and indicate interest in the various MS offerings in development consideration. The MS in Business Analytics was the top-ranked interest of the Master programs offered with 73% of students expressing some level of interest. When asked about their interest level in enrolling in a Masters program immediately after undergraduate studies (our main target) 40 students in their senior stated extremely or very interested with 81 students in total expressing some level of interest in pursuing UW’s Master of Science in Business Analytics immediately upon undergraduate graduation. The interest numbers increase with the junior, sophomore or freshman students. In the survey, the most common majors expressing interest in this Master of Science in Business Analytics include Business BBA students (Finance, Accounting, Marketing, Actuarial Science, Information Systems, and Management – in that order). No Major BS and No Major BA students are the other two top major groups.

The Master of Science in Business Analytics overlaps with other programs offered on campus, particularly the Master of Science in Statistics Option in Data Science and related programs pushed forward under the school-wide initiative mentioned above. As also outlined above, we view these similarities as synergetic rather than providing competition. In particular, we are serving a different student population: The Master of Science in Statistics Option in Data Science requires background in linear algebra, advanced calculus, probability, and
programming, whereas we simply require one semester of calculus. Thus, the prototypical student will be less technically equipped, but possibly more veering towards managerial positions and liaison roles in analytics (and, indeed, our survey results indicated that the largest population of interested students are BBA graduates). And while most credits in the Master of Science in Statistics Option in Data Science are spent deepening students’ skills in statistical modeling, the Master of Science in Business Analytics curriculum takes a balanced approach between descriptive, predictive, and prescriptive analytics with an emphasis on business applications. Hence, the MSBA prepares students to tap the broad opportunities in business analytics rather than educating specialized data scientists.

Within the UW system, there is currently no MS-Business Analytics degree offered. There are a few UW schools offering concentrations/emphases in Analytics within their MBA degrees (UW-Milwaukee, UW-Parkside, UW-Whitewater), but the level of depth as well as the prospective student populations are different. Also, there is a system-wide UW Master of Science in Data Science offered by six UW campuses and extensions, but delivery is online only and the focus is on methods rather than business applications. Hence, currently UW students need to leave the state in order to obtain this in-demand degree. As the flagship university and the leading business school in the state, WSB is in a prime position to close this gap in the UW system offering.

Many universities currently offer the Master of Science in Business Analytics program as noted in this article, including some of our direct peers (e.g., University of Minnesota or Purdue). These programs have shown substantial growth over the past years. A Poet & Quants article notes that, “Business analytics programs have also become a popular offering, as schools respond to industry’s need to exploit big data, and the subsequent demand for skilled data analysts. Twenty-seven business analytics programs are available among the top 100 schools, and that number is likely to rise quickly.”

Starting median salaries for those with an Masters in Business Analytics is approximately $80,000/year based on this article from US News.

The positive evidence from our study as well as the emergence of similar master programs at other business schools make a strong case for student and industry demand. In less than 10 years, the number of business analytics master’s programs in the US has grown from 0 to over 80 (Institute of Advanced Analytics Report 2018).

Program Team

The team actively developing and leading the initiative (Leadership Team): Daniel Bauer, Associate Professor, Kristin Branch, Faculty Associate and Jordan Tong, Associate Professor. Other faculty members advising the degree include: Ella Mae Matsumura, Senior Associate Dean and Full Professor, Enno Siemsen, Associate Dean and Full Professor.
November 27, 2018

Ella Mae Matsumura
Senior Associate Dean of Academic Programs
Robert and Monica Beyer Professor in Accounting
Wisconsin School of Business
4345 Grainger Hall
975 University Avenue
Madison, WI 53706

Dear Professor Matsumura,

The Information School (iSchool) is pleased to support the Notice of Intent (NOI) for the new Master of Science in Business Analytics, currently under development by the Wisconsin School of Business (WSB). We believe that the new MS program will give WSB graduate students structured means to gain analytics expertise, and help them develop a credential to make them more competitive in job seeking. There is high demand for applied analytics professionals, and it is important that the UW-Madison campus offers multiple pathways for students to gain expertise in this area.

Sincerely,

Kyung-Sun Kim
Interim Director and Professor
Memo To:     Ella Mae Matsumura, Senior Associate Dean for Academic Programs

Regarding:  Notice of Intent: New Master of Science in Business Analytics

Dear Ella Mae,

I have received your November 18, 2018 letter requesting EPD’s support as part of the process for the Wisconsin School of Business’ pursuit of a new Master of Science in Business Analytics. As you probably know EPD’s master’s degree programs, including our Master of Engineering: Engineering Data Analytics (MEDA), are all delivered online. The target audience for these graduate degrees is practicing professionals that intend to continue their employment while pursuing their advanced degree. I understand the proposed MSBA will be an on-campus residential program targeting students graduating with a BS as an option for a fifth-year masters. As such, these two programs are not competitive as they are focused on different disciplines and audiences. If you feel there are ways we could collaborate into the future to leverage resources or to achieve mutual strengthening of our respective programs, please do not hesitate to reach out to us.

On behalf of the Department of Engineering Professional Development, we support the development of this new Business Analytics MS program. I appreciate you reaching out with the advance notice of intent to develop this new MS program.

Regards,

Douglas T. Reindl

cc.  Susan Ottmann – Director, EPD Online Degree Programs
    Jake Blanchard – Executive Associate Dean, COE
December 3, 2018

Ella Mae Matsumura  
Senior Associate Dean of Academic Programs  
*Robert and Monica Beyer Professor of Accounting*

As Chair of the Computer Sciences (CS) Department, I write to express enthusiastic support for the proposed Master of Science: Business Analytics degree. The intention of this degree, as you explained in our meeting, is to provide managers with both the management training as well as exposure to basic technological skills so that they are better able to manage and make decisions in an environment where technology is increasingly pervasive. It is great to see UW-Madison work towards creating such a degree.

Since there are currently no CS courses involved, there is no additional demand placed on the CS department at this time. That said, the CS department is planning to develop courses, especially as part of a proposed data science major, that may be of relevance as core (technology-related) courses in the proposed Business Analytics degree.

While at this time the CS department does not have the staffing for more closer interactions with the Wisconsin School of Business for this, or other curricula that require technological training, I expect that will change in the future. At that time, closer interactions may not only be warranted but also prudent, especially given the rapid change in technology and its impact on organizational structures and operations. I ask that the Wisconsin School of Business periodically evaluate the Business Analytics degree and assess potential pedagogical interactions with the computing entities on campus.

Sincerely,

Gurindar S. Sohi  
Department Chair
Vilas Research Professor
Ella Mae Matsumura  
Senior Associate Dean of Academic Programs  
Robert and Monica Beyer Professor in Accounting  
Wisconsin School of Business  
4345 Grainger Hall  
975 University Avenue  
Madison, WI 53706

Dear Professor Matsumura,

I received your email on December 7, 2018, regarding the proposal to create a new MS-Business Analytics in the Wisconsin School of Business. The faculty in the Department of Economics conducted a high level review of the proposal. The focus of the review was to generally assess for curricular overlap between the Masters of Science in Economics – Graduate Foundations (MS-GF) and the proposed MS- Business Analytics. There is some curricular overlap between the programs, however we recognize that the MS-Business Analytics curriculum is less technical than the Economics MS-GF curriculum.

The Economics MS-GF offers three courses that cover some of the same content that is part of the proposed MS-Business Analytics. The Economics courses are

(a) Data Analytics for Economists  
(b) Economics of Machine Learning  
(c) Economics of Big Data.

The Economics of Machine Learning was taught fall 2018 semester. The Economics of Machine Learning content is close to the “Machine Learning for Business Analytics” and “Experiments and Causal Methods for Business Insight” courses that are part of the proposed MS-Business Analytics. One example used in the Economics of Machine Learning course is predicting sales/predicting the effect of promotions on a product's demand. Second, causal inference is a prominent topic in econometrics courses (which is a big focus of our MS-GF program) and we touch on the problem of causal inference and how machines learning tools can serve for causal inferences, possibly leveraging data generated by experiments.

The faculty consensus is that the overlap between the program coursework will be mitigated by the difference in technical training. We note that the first learning outcome is “Apply business analytic tools and methods across various business functions (marketing, finance, supply chain, etc.) and industries (health care, finance, technology, etc.)”. In addition, the proposal explicitly states that the training will be at a very low tech level - more appropriate to training managers of data analytic industry divisions. These aspects of the training minimize the overlap with our data analytic programs. On behalf of the faculty in the Department of Economics, I offer our support for the proposed MS-Business Analytics degree program.

Sincerely,

Ananth Seshadri  
Chairman, Department of Economics  
Todd E. and Elizabeth H. Warnock Distinguished Chair
December 11, 2018

Dear Ella Mae,

On behalf of the Statistics Department, I am writing to indicate no objections to the new Master of Science in Business Analytics currently under development by the Wisconsin School of Business.

The Statistics Department launched in 2015 a Data Science Option in our Master of Science - Statistics program, which has emerged as a leading Data Science graduate program on campus. While there is some overlap in the curriculum between your new Business Analytics program and our Data Science program (e.g. programming tools including R and Python, machine learning), your new program appears to be geared toward students interested in business requiring less math background, whereas our program provides a more comprehensive and rigorous training in Data Science requiring statistical data analysis, computing skills, and domain science knowledge.

We believe that your new program will serve graduate students in Business very well. In addition, we view your new program as a useful addition to the broader Data Science initiatives at UW-Madison and anticipate mutual benefits from coordination and collaboration between our programs.

The comments above also apply to your proposed named option Business Analytics within the Master of Science - Operational and Tech Management program.

We wish you the very best in developing the Business Analytics named option and the new Master of Science in Business Analytics program.

Yours sincerely,

Jun Zhu
Professor and Chair of Statistics
University of Wisconsin - Madison
5 February 2019

TO: Ella Mae Matsumura, Senior Associate Dean of Academic Programs, Wisconsin School of Business
FROM: John Karl Scholz, Dean
RE: Notice of Intent to Offer a New Program: MS-Business Analytics
CC: Elaine Klein, Associate Dean for Academic Planning, L&S
Marty Gustafson, Assistant Dean for Academic Affairs, Continuing Studies
Jocelyn Milner, Vice Provost and Director, Academic Planning and Institutional Research
James Montgomery, Associate Dean for Fiscal Initiatives, L&S
Joshua Morril, Assistant Dean, Graduate School
Jennifer Noyes, Associate Dean for Operations and Staff
Parmesh Ramanathan, Associate Dean, Graduate School
Eric Wilcots, Deputy Dean, L&S

Thank you for affording the College of Letters & Science an opportunity to review the Notice of Intent to plan and to offer a new academic program, the MS-Business Analytics, at UW-Madison. As you are already aware, a number of L&S units have already expressed their support for this new program and the related request, in the short term, to create a new “Business Analytics” named option under the MS-OTM – a program we understand to be slated for retirement if the new degree program is approved and implemented.

We have conferred with our colleagues (in particular, the Department of Economics, which has the strongest connections to your school) regarding any impact of your new program on their existing courses and programs. We appreciate the nuanced differences in the approaches to this topic that might be taken by Economics vs. the School of Business. At this time, I am satisfied that the program does not significantly overlap with L&S programs. In turn, I trust that the existence of this new program will not impinge upon the work in analytics that has long been part of the curricula in Economics, Statistics, and Computer Sciences.
As designed, the proposed degree program does not require students to take courses offered in the College of Letters & Science. However, the NOI envisions that L&S students will “take advantage of the business applications classes in various industries offered under the umbrella of the MSBA” and conversely that Business students “will have the possibility of deepening and broadening their modeling and computational skills by accessing classes” in L&S programs.

The NOI further indicates that the MS-Business Analytics will operate as a traditional pooled-tuition (fund 101) program. However, under the current budgetary arrangement between central campus and the School of Business, any incremental tuition revenue generated by this program will augment the 101 base budget for Business. Thus, while tuition for the new program is nominally pooled, Business will in fact capture tuition revenue for this new program in much the same manner as non-pooled (fund 131) programs in other schools and colleges.

Because non-pooled programs capture all tuition revenue for their students, there is a need for revenue-sharing agreements to defray any instructional costs incurred by other units. Within L&S, whenever students in 131 programs enroll outside the home department, we thus require the 131 program to pay the instructional department. L&S recently created a formal Memorandum of Understanding with the College of Engineering to extend this revenue-sharing agreement to cross-college enrollments. Under this MOU, Engineering pays L&S for any enrollments of Engineering 131 students in L&S courses, and conversely L&S pays Engineering for any enrollments of L&S 131 students in Engineering courses.

Recognizing that students in the new Business program are not required to take any L&S courses, we anticipate that the cross-college enrollments envisioned in the NOI will at least initially be small. Thus, L&S will not immediately request the creation of a revenue-sharing agreement with Business. However, L&S will monitor cross-college enrollments, and will contact Business to create an MOU should the need arise.

I discussed this matter with the L&S Academic Planning Council on February 5, 2019. The APC and I support the proposed MS-Business Analytics, with the understanding that L&S will monitor student enrollments and will contact Business about developing a revenue-sharing agreement should the need arise.