

Wichita State University
Master of Science in Business Analytics
Program Approval

I. General Information

A. Institution Wichita State University

B. Program Identification

Degree Level:	Master's
Program Title:	Business Analytics
Degree to be Offered:	Master of Science in Business Analytics (MSBA)
Responsible Department or Unit:	Finance, Real Estate, and Decision Sciences Department (FREDS)
CIP Code:	52.1301
Modality:	Hybrid ¹
Proposed Implementation Date:	Spring 2021

Total Number of Semester Credit Hours for the Degree: 30

II. Clinical Sites:

Does this program require the use of Clinical Sites? No

III. Justification

Over the past five years, Wichita area companies have increasingly asked WSU to provide business analytics training for their current employees and future employees. As a result, the Center for Management Development (WSU's non-credit professional training organization) began to offer business analytics classes for these companies' employees. The Barton School of Business created a business analytics undergraduate certificate and minor, as well as a graduate MBA concentration. These options have allowed students to specialize in business analytics at the MBA level or while majoring in a traditional business discipline (e.g., Finance, Human Resource Management, and Marketing) at the undergraduate level. However, the demand for business analysts has increased significantly in recent years. Wichita companies have indicated the need for higher level analytical skills, which the Barton School is proposing to address through a Master's of Science degree in Business Analytics (MSBA). This program will help the Wichita area businesses, and their employees, gain the skills they need to be successful in the future.

Wichita State University is strongly dedicated to supporting and making teaching and research of data science and analytics an institutional priority. In support, WSU has recently invested in a High-Performance Computing (HPC) infrastructure and personnel. In this light, the MS in Business Analytics is one of the three distinct albeit aligned programs being proposed (the other two are in Engineering - MS in Data Science, and Liberal Arts and Sciences - MS in Mathematical Foundations of Data Analysis) to further this priority. All three share foundational coursework in business analytics, as well as other electives offered among the three colleges.

IV. Program Demand

¹ In hybrid modality, the students will take classes in face-to-face, online, and hybrid (combination of face-to-face and online) format. Classes may be 8-week or 16 weeks long.

A. Survey of Student Interest

A survey was sent to Barton School graduate and undergraduate students (i.e., business students) asking about their interest in a graduate Business Analytics program at WSU. The key findings of the survey were:

Number of surveys administered:	1,983
Number of completed surveys returned:	128
Percentage of students interested in program:	66%

- Of the 34 graduate students who responded, 24 (70.6%) indicated they would be interested in pursuing a MSBA.
- Of the 94 undergraduates who responded, 60 (64%) indicated they would be interested in studying business analytics.
- The survey asked, on a scale 0-10, to what degree “would you be interested in seeking work that involves business analytics?” The mean score was 7.40.
- The survey asked, on a scale 0-10, to what degree “would you be interested in business analytics training to grow your skill set?” The mean score was 8.00.

B. Market Analysis

The FREDS department conducted a roundtable discussion of 12 Wichita area business leaders to assess their need for employees with business analytic skills. The business leaders represented Cargill, Koch, Spirit, Airbus, Textron Aviation, CURO Financial Technologies, IMA Financial Group, and Thrive Restaurant Group. The roundtable participants indicated they were interested in hiring full-time employees with business analytics skills in the near future. They were interested in hiring student interns, and they would be interested in conducting class projects with business analytic classes.

The key insights gained from the roundtable discussion are as follows:

- 84% of the participants indicate a need for graduates or students in the Analytics area.
- 91% agreed the need will be for both graduate and undergraduate students
- Participants indicated employees with analytics skills should have some experience with tools such as Excel, Power BI, Tableau, Alteryx, SQL, R, Python, and SAP.

A list of business analytics programs at competitor and peer universities is provided in Appendix 1. Specifically, our MSBA program is distinct from other programs in Kansas in multiple ways. The focus of the MSBA program at the Barton School will be primarily to serve full time and part time students and requires a capstone class that emphasizes applied learning. Our emphasis on an applied capstone experience is congruent with the mission and vision of Wichita State, which includes dynamic partnerships with our community businesses and organizations. Our students will be working closely with our community partners in their capstone project. We believe the program will also be attractive to potential students living in the I-35 corridor due to the competitive pricing offered by WSU.

V. Projected Enrollment for the Initial Three Years of the Program

Year	Headcount Per Year			Semester Credit Hrs. Per Year		
	Full- Time	Part- Time	Total	Full- Time	Part- Time	Total
Year 1	3	7	10	54	105	159
Year 2	5	20	25	126	405	531
Year 3	10	25	35	240	675	915

VI. Employment

The Bureau of Labor Statistics' (BLS) Occupational Outlook Handbook demonstrates the growing need of students with Analytics backgrounds in Business. The projected growth for operational research (OR) analysts from 2018 to 2028 is 26%. The BLS also shows the Wichita metropolitan area has a high demand for OR jobs with a 2018 annual mean wage of \$89,630 (highest range in the nation). The table below shows a summary of 2018 annual median salaries, 2018 actual jobs, and 2018-2028 growth projections for various Analytics jobs.

Occupation	2018 Annual Median Pay	2018 Number of Jobs	Job Outlook (2018-28)
Operations Research (OR) Analysts	\$83,390	109,700	+ 26% (average growth)
Budget Analysts	\$76,220	56,900	+ 4% (average growth)
Compensation, Benefits, and Job Analysis Specialists	\$63,000	88,700	+ 6% (average growth)
Financial Analysts	\$85,660	329,500	+ 6% (average growth)
Management Analysts	\$83,610	876,300	+14% (average growth)
Market Research Analysts	\$63,120	681,900	+20% (average growth)

In addition to the BLS data, results of the roundtable discussion of 12 Wichita area companies shows strong demand for talent with business analytics skills.

VII. Admission and Curriculum

A. Admission Criteria

Admission to the MSBA program will be granted to applicants who show a high likelihood of success in postgraduate business education. Previous academic training in business is not required for admission to the MSBA program. Applicants may have backgrounds in diverse fields such as engineering, liberal arts, education and health related areas. The specific content of a student's previous education is less important than the evidence that the student has sound scholarship, strong personal motivation, and the ability to develop business analytics skills.

To be admitted to the MSBA program, an applicant must:

- 1) possess an undergraduate degree
- 2) have a minimum GPA 3.00 (out of 4.00) in the last 60 hours of coursework (graduate and/or undergraduate). Students with a GPA lower than 3.00 may apply with GRE or GMAT scores for consideration
- 3) submit a personal statement that clearly states the applicant's reason for seeking admission to the program (500 words maximum)
- 4) submit a professional resume
- 5) meet the minimum TOEFL and IELTS requirements set by the WSU Graduate School (only for students with English as a second language)

Applicants needing a F1 visa must also provide documentation for financial support.

B. Curriculum

The program is designed to attract a wide range of domestic and international professionals. The curriculum will focus on developing contemporary competencies via innovative hands-on activities and industry practices. To serve the needs of professionals in the field, the MSBA program will offer two tracks - Management and Data Science:

Management track focuses on developing capabilities and mastery in leading analytics initiatives.

Data Science track aims to impart mastery in the use of innovative tools and techniques in data analytics.

The overall objectives of the proposed M.S. in Business Analytics are to ensure that graduating students possess the following:

- The ability to understand the different business domains and communicate with stakeholders to frame the business problem
- Learn to collect data form various sources, transform it, organize it into a database, then query it to get the necessary data for analysis
- Understand the different statistical and mathematical models, and accompanying software, used in Descriptive, Predictive, and Prescriptive Analytics
- Manage and deploy a complete Analytics solution to a real business problem, from data collection to finding the appropriate Analytics solution to communicating the solution with stakeholders

Both programs require pre-requisites (preparatory requirements) that can be waived based on the undergraduate degree and professional background of the applicant. The students will be required to complete 24 credit hours of core courses and select six credit hours of elective courses for a total of 30 credits.

Preparatory Requirements (May be waived with equivalent courses as the undergraduate or graduate levels or with appropriate professional experience)

- Calculus
- Statistics
- Fundamentals of Accounting
- Fundamentals of Finance
- Basics of Marketing
- Basics of Management
- Operations Management

M.S. in Business Analytics (MSBA) – Management Track

Year 1: Fall

SCH = Semester Credit Hours

Course #	Course Name	SCH....
BSAN 775	Perspectives on Business Analytics	3
MIS 884	Database Management and Planning	3
MGMT 803	Decision Making Analysis	3

Year 1: Spring

Course #	Course Name	SCH....
BSAN 875	Advanced Business Analytics	3
MIS 750	Business Intelligence and Analytics	3
ECON 803	Analysis of Business Conditions and Forecasting (or IME 880Y – Forecasting and Analytics)	3

Year 2: Fall

Course #	Course Name	SCH....
BSAN 734	Introduction to Data Mining and Analytics (or IME 734)	3
	Elective 1	3

	Elective 2	3
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Year 2: Spring

Course #	Course Name	SCH....
BSAN 885	Business Analytics Capstone	3

Total Number of Semester Credit Hours [30]

Elective Courses (6 credits)

- ACCT 860 – Accounting Information Systems
- DS 755 – Project Management
- DS 860 – Enterprise Resource Planning
- HRM 803 – Human Resource Analytics
- FIN 790A – Finance Analytics: Contemporary and Traditional Topics
- FIN 865 – Advanced Investment and Portfolio Management
- MIS 690D – Cloud Computing
- CS 697AK – Perspectives on Data Science
- IME 883 – Supply Chain Analytics
- MATH 746 – Perspectives on Mathematical Foundations of Data Science
- SMGT 800 – Analytics & Decision Making in Sports
Any COURSE with program director consent

M.S. in Business Analytics (MSBA) – Data Science Track

Year 1: Fall

SCH = Semester Credit Hours

Course #	Course Name	SCH....
BSAN 775	Perspectives on Business Analytics	3
CS 697AK	Perspectives on Data Science	3
MATH 746	Perspectives on Mathematical Foundations of Data Science	3

Year 1: Spring

Course #	Course Name	SCH....
BSAN 875	Advanced Business Analytics	3
BSAN 734 or IME 734	Introduction to Data Mining and Analytics	3
CS 697AB	Machine Learning	3

Year 2: Fall

Course #	Course Name	SCH....
MIS 884	Database Management and Planning	3
	Elective 1	3
	Elective 2	3

Year 2: Spring

Course #	Course Name	SCH....
BSAN 885	Business Analytics Capstone	3

Total Number of Semester Credit Hours [30]

Elective Courses (6 credits)

- DS 860 – Enterprise Resource Planning
- MIS 690D – Cloud Computing
- MIS 750 – Business Intelligence and Analytics
- FIN 790A – Finance Analytics: Contemporary and Traditional Topics
- FIN 865 – Advanced Investment and Portfolio Management
- ECON 803 – Analysis of Business Conditions and Forecasting or IME 880Y – Forecasting and Analytics
- IME 780AN – Big Data Analytics in Engineering
- IME 780AP – Neural Networks and Machine Learning
- PSY 902/903 – Advanced Statistics
- Any course with program director consent

VIII. Core Faculty

Faculty Name	Rank	Highest Degree	Tenure Track Y/N	Academic Area of Specialization	FTE to Proposed Program
Sue Abdinnour	Program Director, Professor	PhD	Y	Decision Sciences	0.5
New Faculty Member (start in Fall 2022)	Assistant Professor	PhD	Y	Business Analytics	1.0

FTE: 1.0 FTE = Full-Time Equivalency Devoted to Program

In addition to the faculty listed in the table, four additional faculty members from the Barton School of Business will teach classes that are included in the core curriculum of the program. These classes are currently included in other master’s programs at the Barton School of Business and are taught on a regular basis. Similarly, three additional faculty from the College of Engineering and one faculty from the College of Liberal Arts will teach classes that are included in the core curriculum of the program, but are also already offered in those colleges on a regular basis. Support letters from the department chairs in those colleges, and the availability of capacity in the existing classes, are available in appendix 2. This comes to a total of 3.5 FTE faculty required for teaching the core classes of this program. The inter-disciplinary nature of the program and the data science track opens opportunities for engaging faculty members from other colleges as well. There are many courses from various colleges listed as elective courses that students can take to fulfill the requirements for this program.

Other faculty from the Business School teaching in the MSBA program include:

Khawaja Saeed	Professor	PhD
Steve Farmer	Professor	PhD
Akmal Mirsadikov	Assistant Professor	PhD
Farhad Tadayon	Adjunct, Spirit Aero systems	PhD
Mike Bush	Senior Research Economist, CEDBR	PhD

Number of graduate assistants assigned to this program: first year: 1; second and third years: 2.

IX. Expenditure and Funding Sources (List amounts in dollars. Provide explanations as necessary.)

A. EXPENDITURES	First FY	Second FY	Third FY
Personnel – Reassigned or Existing Positions			
Faculty	\$74,300	\$74,300	\$74,300
Administrators (<i>other than instruction time</i>)	TBD	TBD	TBD
Graduate Assistants	0	0	0
Support Staff for Administration (<i>e.g., secretarial</i>)	0	0	0
Fringe Benefits (<i>total for all groups</i>)	\$22,290	\$22,290	\$22,290
Other Personnel Costs	0	0	0
Total Existing Personnel Costs – Reassigned or Existing	\$96,590	\$96,590	\$96,590
Personnel – New Positions			
Faculty	0	\$126,000	\$126,000
Overloads and Adjuncts	\$16,000	0	\$0
Administrators (<i>Program Coordinator Stipend</i>)	0	0	0
Graduate Assistants	\$12,000	\$24,000	\$24,000
Support Staff for Administration (<i>e.g., secretarial</i>)	0	\$10,000	\$10,000
Fringe Benefits (<i>total for all groups</i>)	\$6,480	\$44,160	\$44,160
Other Personnel Costs	0	0	0
Total Existing Personnel Costs – New Positions	\$34,480	\$204,160	\$204,160
Start-up Costs - One-Time Expenses			
Library/learning resources	0	0	0
Equipment/Technology	0	0	0
Physical Facilities: Construction or Renovation	0	0	0
Other	0	0	0
Total Start-up Costs	0	0	0
Operating Costs – Recurring Expenses			
Supplies/Expenses	\$1,000	\$3,000	\$3,000
Library/learning resources	0	0	0
Equipment/Technology	\$5,000	\$10,000	\$10,000
Travel	0	\$8,000	\$8,000
Other	\$4,000	\$9,000	\$9,000
Total Operating Costs	\$10,000	\$30,000	\$30,000
GRAND TOTAL COSTS	\$141,070	\$330,750	\$330,750

B. FUNDING SOURCES <i>(projected as appropriate)</i>	Current	First FY (New)	Second FY (New)	Third FY (New)
Tuition / State Funds	0	\$61,076	\$191,787	\$335,610
Student Fees	0	\$11,206	\$36,900	\$62,822
Barton School Program Fees	0	\$7,950	\$26,550	\$45,750
Other Sources – School Support	0	0	0	0
GRAND TOTAL FUNDING	0	\$80,232	\$255,237	\$444,182
C. Projected Surplus/Deficit (+/-) (Grand Total Funding <i>minus</i> Grand Total Costs)		(\$60,838)	(\$75,513)	\$113,432

X. Expenditures and Funding Sources Explanations

A. Expenditures

Personnel—Reassigned or Existing Positions

- **For the first, second, and third year:**
 - Faculty: Half FTE of an existing faculty position will be reassigned to the program.
 - A significant number of the courses in the MSBA program are currently offered, and existing faculty members will continue to teach these courses.
 - Fringe is calculated based on the current WSU fringe rates.
- **For the second year:**
 - Faculty overload and adjunct instructor pay is eliminated with hiring of a new faculty
 - Administrative support staff is budgeted at \$10,000
- **For the third year:**
 - Administrative support staff is budgeted at \$10,000

Personnel—New Positions

- **For the first year:**
 - The necessary MSBA courses will be taught by an adjunct professor or/and faculty receiving overload compensation. \$16,000 is budgeted for this purpose.
 - Program launch will be assisted by the hiring of one graduate research assistant (GRA)
 - Fringe is calculated based on the current WSU fringe rates.
- **For the second and third year:**
 - The estimated growth of enrollments requires an additional new faculty. The cost is 100% of the new faculty’s salary. This eliminates the budget for adjuncts/overloads in year 1.
 - The estimated enrollment growth also requires an additional GRA.
 - Fringe is calculated based on the current WSU fringe rates.

Start-Up Costs—One-Time Expenses

- **For the first year:**
 - Current resources are sufficient.
- **For the second year:**
 - Estimated that current resources will be sufficient
- **For the third year:**
 - Estimated that current resources will be sufficient

Operating Costs—Recurring Expenses

- **For the first year:**
 - Supplies (copying, office supplies) are estimated at \$1,000.
 - Equipment/Technology is estimated at \$5,000
 - Other expenses estimated at \$4,000
- **For the second year:**
 - Supplies are estimated at \$3,000.
 - Equipment/Technology expenses are estimated at \$10,000
 - Travel expenses are estimated at \$8,000
 - Other Expenses are estimated at \$9,000
- **For the third year:**
 - Supplies are estimated at \$3,000.
 - Equipment/Technology expenses are estimated at \$10,000
 - Travel expenses are estimated at \$8,000
 - Other Expenses are estimated at \$9,000

B. Revenue: Funding Sources

Revenue is calculated based on the enrollment table from Section V:

- \$307.98 per credit of graduate tuition is calculated for half the full-time student credit hours.
- \$756.38 per credit of graduate tuition (out-of-state) is calculated for the other half of full-time student credit hours since are expecting a portion of the students to be international.
- All part-time student credit hours are calculated using the \$307.98 per credit tuition.
- Student fee:
 - 7.00 or more credit hours \$679.18/fall or spring semester
 - 4.00-6.75 credit hours \$452.78/fall or spring semester
 - Summer Fees \$113.12/summer session
- Program fee:
 - \$50 per credit is applied as a program fee for to all College of Business programs

C. Projected Surplus/Deficit

The reassignment of an existing faculty member and hiring of the new faculty in year 2, the program will generate a deficit in years 1 and 2 and a surplus in year 3 as (\$60, 838), (\$75,513), and \$113, 432 respectively. Once the cost of a new faculty member hire is absorbed in year 2, the surplus in year 3 will continue to grow with growth of enrollments in years 4 and beyond.

XI. References

- Association to Advance Collegiate Schools of Business. (2019). 2018-19 Staff Compensation and Demographics Survey: Executive Summary. <https://www.aacsb.edu/data/data-reports/survey-reports/staff-compensation-and-demographics>
- U.S. Department of Labor. (2018). Occupational Outlook Handbook – Business and Financial Occupations. Bureau of Labor Statistics. <https://www.bls.gov/ooh/business-and-financial/home.htm>.

Appendix 1: Analysis of Program at Peer and Competitor Institutions

	College/School	Analytics Graduate Program
WSU Peer Institutions	New Mexico State University	College of Business NA
	University of Massachusetts – Lowell	Manning Business School M.Sc. in Business Analytics
	University of Nevada Reno	College of Business Online M.Sc. in Business Analytics
	University of North Dakota	College of Business NA
	Wright State University	College of Business Business Analytics Certificate
WSU Aspirant Institutions	Auburn University	School of Business NA
	Clemson University	College of Engineering MBA in Business Analytics
	Oklahoma State University	School of Business Online M.Sc. in Business Analytics and Data Science
	University of Akron	College of Business Administration MBA Concentration
	University of Texas El Paso	College of Business Administration NA
I-35 Major City Universities	UT – Austin	School of Business M.Sc. in Business Analytics
	UT – Dallas	School of Management M.Sc. in Business Analytics
	University of Dallas	College of Business M.Sc. in Business Analytics
	UT – San Antonio	College of Business M.Sc. in Data Analytics
	Texas A&M – San Antonio	College of Business M.Sc. in Business Analytics
	Oklahoma State University	School of Business M.Sc. in Business Analytics
	University of Kansas	School of Business M.Sc. in Business Analytics
	University of Missouri - KC	School of Management NA
	Texas Christian University	School of Business Analytics Certificate
	University of Minnesota	School of Management M.Sc. in Business Analytics
Kansas State University	College of Business M.Sc. in Data Analytics	