Missouri Department of Higher Education

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NEW PROGRAM PROPOSAL FORM

Sponsoring Institution(s): Rockhurst University

Program Title: Bachelors of Science in Anaytics and Technology

Degree/Certificate: Bachelors of Science

Options: Click here to enter text.

Delivery Site(s): Rockhurst University- Main Campus

CIP Classification: 521301

*CIP code can be cross-referenced with programs offered in your region on MDHE's program inventory highered.mo.gov/ProgramInventory/search.jsp

Implementation Date: Fall 2017

Cooperative Partners: none

*If this is a collaborative program, form CL must be included with this proposal

AUTHORIZATION:

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Name/Title of Institutional Officer	Signature	Date

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Rockhurst University
Bachelor of Science in Analytics and Technology

Rationale for the program

1. New Program Proposal Form

See attached NP form

2. Rationale for New Program

More than ever, organizations exist in a world of data. There is a growing need to determine patterns in complex business data, perform analytical monitoring, and to use data to answer important business questions. However, the availability of highly qualified candidates trained in this field continues to fall well short of the demand. Based on McKinsey Global Institute's analysis, there will be a shortfall of 140,000 to 190,000 candidates with "deep analytical" talent, plus a need for an additional 1.5 million data savvy managers by 2018.

In 2013, Rockhurst gathered several executives from the Kansas City area as an advisory board to discuss their needs with business intelligence and analytics. This included executives from Cerner, BKD, Blue Cross, AMC Theaters, Swiss Re, DST, Federal Reserve of Kansas City and Sprint. These executives all agreed they were collecting tremendous amounts of data from various sources on their customers, employees, vendors and markets. These executives knew this data was a valuable asset to their company, but expressed concern whether they knew the best ways to gain insight from the data and to train and keep the proper staff to handle it. These executives helped Rockhurst create graduate certificates in both Business Intelligence and in Data Science and Analytics, which began in January 2014. These companies were some of the first to send their employees to the new certificate program. These programs were extended into an MS in Business Intelligence and Analytics in 2015. Currently, we have 125 graduate students in one of the above programs with consistent new demand.

Further, our analytics program has a specific teaching philosophy. Based on the feedback of our industry stakeholders, we chose to house this program in the Helzberg School of Management as opposed to our math or computer science departments. While this is a true interdisciplinary offering, our students are trained to think of analytics tools in the context of business problems. Each of our classes uses a very specific model for analytic thinking. We start with identifying and discussing the business problem, leaning heavily on different domain experiences. Then we use advanced analytics to find and understand the opportunities. Finally, we emphasize the communication skills needed to explain the observations and recommendations to both a technical and non-technical audience. We have found this method of teaching produces a well-rounded analyst or data scientist ready to contribute to their company's strategy.

Kansas City is a data rich area. Some of the largest employers (Cerner, DST, Sprint, Federal Reserve) as well as multiple engineering and health care firms produce tremendous amounts of data. A simple query conducted on Glassdoor.com found 147 job openings in the Kansas City area with the keyword "data science," 282 open jobs with

"business intelligence" and 384 openings with "Business Analytics." This confirms that the comments of our advisory committee can be generalized to the overall area.

The median salary for a data scientist in the US is $118,000. According to Burtch Works' 2015 study of salaries for data scientist, those responsible for a team of 1-3 analysts earn a median salary of $140,000, and those responsible for a team of 10 or more earn $232,500. While the salary values are skewed as many Data Scientists are employed in the Northwest and Southwest, the median salary for Data Scientists in the Midwest is $100,000, with managerial pay between $140,000-$174,000.

3. Student Enrollment Projections

Please see attached form SE

4. Evidence of Market Demand and Societal need.

Pease see Q1 for Market Demand.

Societal need: According to the 2016 McKinsey Institute report titled the "Age of Analytics", there are ethical questions surrounding machine intelligence. One set of ethical concerns relate to real-world biases that might be embedded into training data. Another question involves deciding whose ethical guidelines will be encoded in the decision making of intelligence and who is responsible for the algorithm's conclusions. Leading artificial intelligence experts, through OpenAI, the Foundation for Responsible Robotics, and other efforts, have begun tackling these questions. Because of the inherent ethical issues involved with data gathering, data privacy, and data interpretations, students graduating with an analytics and technology degree at a Rockhurst University will be well prepared to identify and respond to the societal and ethical issues inherent in data analytics.

5. Address Program Duplication and Opportunities for Collaboration

There are no current opportunities being investigated with other universities.

6. Details on Program Structure

Please see attached form PS.

7. Financial Projections

As an independent institution: not applicable

8. Program characteristics and Performance Goals

Please see attached form PG.

9. Plans for accreditation, including rationale if it is not not a goal for the program

Information is included in attached form PG.

10. Institutional characteristics on demonstrating why your institutions is particularly well equipped to support this program.

Information is included on form PG.

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STUDENT ENROLLMENT PROJECTIONS

Year	1	2	3	4	5
Full Time	**5**	**10**	**10**	**10**	**10**
Part Time					
Total	**5**	**10**	**10**	**10**	**10**

Please provide a rationale regarding how student enrollment projections were calculated:

Current enrollment in our CS and IT programs, anticipated demand, and competitor enrollments.

Provide a **rationale** for proposing this program, including **evidence of market demand and societal need supported by research:**

Data analytics is a relatively new field, and as such as no specific Standard Occupational Classification (SOC) has been designated by the U.S. Bureau of Labor Statistics. Currently, the closest occupation designation is an Operations Research Analyst, which is described as an individual who uses advanced mathematical and analytical methods to help organizations investigate complex issues, identify and solve problems, and make better decisions. The job outlook over the next decade is anticipated to grow by 30%. The average growth for all occupations over the next decade is 7%. Median 2015 salary is $78,630. (Occupational Outlook Handbook Online).In a 2015 MIT Sloan Management Review survey, 43% of companies report their lack of appropriate analytical skills as a key challenge. As a result of the scarcity of data scientists, 63 percent of the companies surveyed are providing formal or on-the-job training in-house. While the majority of pure data analyst, analytics and data science jobs are in located in the Northeast and Northwest, the Midwest employs 16% of these positions (Burtchworks.com, 2015). Related specifically to the seven state Midwest region, Glassdoor.com and Indeed.com currently list between 400-500 "data analyst" or "analytics" jobs open as "entry level". The COO of Cerner, a Rockhurst University graduate, stated in a planning meeting that they would like to hire as many students as we can graduate from this degree program.

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PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

Institution Name Rockhurst University
Program Name Bachelor of Science Analytics and Technology
Date June 22, 2017

(Although all of the following guidelines may not be applicable to the proposed program, please carefully consider the elements in each area and respond as completely as possible in the format below. Quantification of performance goals should be included wherever possible.)

1. Student Preparation

- Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.
  None other than standard admission criteria.

- Characteristics of a specific population to be served, if applicable.
  This is a STEM designed degree to assist students and organinzations to work with the ever increasing amounts of data.

2. Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.
  Faculty will meet the required HLC qualifications to teach.

- Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.
  It is estimated that 75% of the faculty will be full time with education and experience in a data, business, statistics or computer science field.

- Expectations for professional activities, special student contact, teaching/learning innovation.
  Faculty are expected to meet the required Roles and Responsibilities of the specific college they teach within.

3. Enrollment Projections

- Student FTE majoring in program by the end of five years.
  At the end of five years, it is expected there are at least 30 delared majors.

- Percent of full time and part time enrollment by the end of five years.
  All students are estimated to be enrolled full time.

4. Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.
  5-10 graduates minimum for each year.

- Special skills specific to the program.
  Skills in basic applied statistics, computer science, communications and business.

- Proportion of students who will achieve licensing, certification, or registration.
  Students will be expected to be Excel certified.

- Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.
  Not applicable

- Placement rates in related fields, in other fields, unemployed.
  While some students may chose to enter the employment arena upon completion of the BSAT, it is estimated that 40-50% of the students will decide to continue in a graduate program for analytics or data science.

- Transfer rates, continuous study.
  It is estimated that 40-50% of the students will decide to continue in a graduate program for analytics or data science.

5. Program Accreditation

- Institutional plans for accreditation, if applicable, including accrediting agency and timeline. **If there are no plans to seek specialized accreditation, please provide a rationale.**
  RU is accredited by HLC with respect to this degree.

6. Alumni and Employer Survey

- Expected satisfaction rates for alumni, *including timing and method of surveys.*
  This data is gathered through the Office of Alumni annually.

- Expected satisfaction rates for employers, including timing and method of surveys.
  This data is gathered through employer meetings, Dean's Advisory board and feedback from alumi.

7. Institutional Characteristics

- Characteristics demonstrating why your institution is particularly well-equipped to support the program.

The Helzberg School of Management created a post-bachelor, graduate level certicate in data science and in business intelligence in 2013. We currently have 40 students enrolled in these certificates. Further a MS in Business Intelligence and Analytics was created in 2014. We currently have over 60 graduate students enrolled in this program. Much of the skills, knowledge and faculty for the Bachelor degree in Anlytics and Technlogy is transferable from the certifcates and Master of Science degree to the BSAT.

PROGRAM STRUCTURE

A. Total credits required for graduation: 128

B. Residency requirements, if any: final 30 hours must be in residence

C. General education: Total credits: 52-53

Courses (specific courses OR distribution area and credits):

Core Course Modes	Credits	Course Title
Artistic	3	Art, Music, or Theatre
Historical I	3	Western or World Civilization
Literature I	3	World Literature
Writing Proficiency	6	English Composition I and II
Math	3	College Level Math
Communication	3	Fundamentals of Communication
Historical or Lit. II	3	Upper division History or Literature
Scientific Causal	4	Hard Science with Lab
Scientific Relational	6	2 Social Science courses from 2 different disciplines
Sci Caus. or Rel.	3-4	Upper division hard science with lab or social science
Theology I	3	Christianity, Introduction to New Testament, or Introduction to World Religions
Theology II	3	3000 level course or above
Philosophy I	3	Reality and Human Existence
Philosophy II	3	Ethical Theory
Philosoph, or Theol.	3	1 upper division course
Global Persp. Req.	3-6	2 semesters of foreign language or approved GPR course

D. Major requirements: Total credits: 53-55

The proposed Bachelor of Science has 16-20 hours of lower division requirements, 22-25 upper division requirements (depending on the selected track) for a total of 41-43 credit hours. In addition, students must complete at least 12 hours of upper-division coursework which can provide opportunities for minors or double majors.

Course Number	Credits	Course Title
CS 1000	3	Programming for Analytics
PY 2100	3	Statistics for the Social Sciences
MT 1800	4	Calculus I
BIA 1800	3	Data Analysis
BIA 2000	3	Foundations of Business Intelligence
CS 3000	3	Data Structures
CS 3100	3	Database Programming and Design
BIA 3000	3	Data Visualization
BIA 3200	3	Fundamentals of Data Mining
EN 3180	3	Business Writing

Students choose one of two tracks:

Data Science and Analytics Track (11-12 cr)	Business Analytics (10 cr)
MT 1810 Calculus II (4)	BIA 3300 Project Management (3)
MT 3400 Probability and Statistics (3)	BIA 3201 Prescriptive Analytics for Business Decision Making (3)
MT 3410 Statistical Learning (3)	MK 4100 Marketing Research (3)
Experiential Learning Requirement and 1-2 credit hours as detailed below.	Experiential Learning Requirement and 1 credit hour as detailed below.

E. Free elective credits: 20-23
(Sum of C, D, and E should equal A.)

F. Requirements for thesis, internship or other capstone experience:

The undergraduate experiential learning requirements for the Analytics and Technology major at Rockhurst University can be satisfied as follows:

1. Students in the Data Science and Analytics Track may fulfill the experiential learning requirement in one of two ways.
    a) By completing an off-campus internship/work experience (in an approved, analytics-related field) and enrolling in CP 3910 (1) Co-op Work Projects I and MT 4960 (1) Mathematics Seminar.
    or
    b) By completing an undergraduate data science research project (with a faculty advisor) through enrollment in MT 3990 (1) - Introductory Research Projects.

2. Students in the Business Analytics Track may fulfill the experiential learning requirement in one of two ways.
    a) By completing an off-campus internship/work experience (in an approved, analytics-related field) and enrolling in CP 3910 (1) Co-op Work Projects I.
    or
    b) By completing an undergraduate analytics research project (with a faculty advisor) through enrollment in BIA 3990 (1) Independent Study.

G. Any unique features such as interdepartmental cooperation:

Major classes completed between the School of Business, Department of Mathematics, Department of English, Department of Psychology and Computer Science area.