Memorandum of Verification
August 2013

This is to verify that the Proposal for an Undergraduate Bachelor of Science in Business Data Analytics degree has been reviewed by the Department of Information System's Undergraduate Curriculum Committee and approved by Department Faculty on August 20, 2013 in accordance with the *By-Laws of the Department of Information Systems* and the associated *IS Department Committees and Charges* document (both last revised 12/2/2011). The entire faculty had given conceptual approval of the degree program in May of 2013, and an ad hoc committee was appointed by the Department Chair to develop the proposal over summer. That committee was composed of Professors Altaf Ahmad, Bin Gu, Uday Kulkarni, Tim Olsen, Kathleen Moser, Benjamin Shao, Robert St. Louis, Ajay Vinze and Senior Lecturers/Lecturers Chris Olsen, Matt McCarthy and Linda Prince. The new degree will not require any additional faculty resources to deliver the program to students.

Michael Goul

Michael Goul
Chair, Department of Information Systems
W. P. Carey School of Business
Arizona State University

ARIZONA STATE UNIVERSITY

PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE PROGRAM

This template is to be used only by programs that have received specific written approval from the Provost's office to proceed with internal proposal development and review. The proposal template should be completed in full and submitted to the University Provost's Office [mailto: curriculumplanning@asu.edu]. It must undergo all internal university review and approval steps including those at the unit, college, and university levels. A program may not be implemented until the Provost's Office notifies the academic unit that the program may be offered.

College/School/Institute: W. P. Carey School of Business

Department/Division/School: **Information Systems**

Proposing Faculty Group (if applicable)**:**

Is this is an official joint degree program? No, this is not a joint degree program

If "Yes" List all the additional college(s)/school(s)/institute(s) that will be involved in offering the degree program and providing the necessary resources. Note: All units offering this program must have collaborated in the proposal development and completed the appropriate unit and college/school approvals.

Degree type: BS-Bachelor of Science

If other; provide degree type title and proposed abbreviation:

Name of degree program (major)**:** Business Data Analytics

Are any concentrations to be established under this degree program? No, concentrations will not be established.

A separate "Proposal to Establish an Undergraduate Concentration" is required for each concentration.

Is a program fee required? No, a program fee is not required.

Requested effective catalog year? 2014-15

For deadline dates see: Curriculum Workflow Calendars.

Delivery method: On-campus only (ground courses and/or iCourses)

Once students elect a campus or On-line option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (*Executive Vice Provost and Dean*) is required to offer programs through ASU Online.

Campus/Locations:

Indicate **all** locations where this program will be offered.

☐ Downtown Phoenix ☐ Polytechnic ☒ Tempe ☐ West Other:

Proposal Contact

Name:	Michael Goul	Title:	Professor and Chair
Phone number:	480-965-5482	Email:	Michael.Goul@asu.edu

Dean Approval(s)

This proposal has been approved by all necessary unit and College/School levels of review. I recommend implementation of the proposed program.

College/School/Division Dean name:

Signature Amy Hillman **Date:** 9/25/2013

College/School/Division Dean name (if more than one college involved)**:**

Signature _____ **Date:** / /20

An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.

ARIZONA STATE UNIVERSITY

PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE PROGRAM

1. Purpose and Nature of Program

Provide a brief program description. Include the distinctive features of the program that make it unique.

The Information Systems Department of the W. P. Carey School of Business proposes a Bachelor of Science in Business Data Analytics (BSBDA) degree program. The program consists of six 3-credit-hour required core courses to be taught by faculty in the Information Systems Department. Program specific electives are included in marketing, supply chain management and computer information systems. The proposed BSBDA degree addresses a predicted 50-60% gap by 2018 in the supply of talent capable of performing deep analytics to address business problems and opportunities. Four trends are fueling data growth and job demand for in-depth analytics: a shift towards data-driven organizations and data-driven decision-making (commonly reported as "Big Data" initiatives in the business press); the exponential growth of structured and unstructured data due to wide-spread usage of mobile devices, cloud computing and online social media; the shift in business computing from "transaction processing" to now include "interaction processing" whereby customer and business partner engagement are facilitated by a growing array of IT-based platforms and associated experiences possible through those platforms; and significant improvements in data software and systems. The proposed Program will leverage the data, analytics and systems expertise of faculty in the Information Systems Department in data modeling, data warehousing and analytics, business intelligence, data visualization and enterprise data management. Analytic vendor support (e.g., IBM, SAS, Cloudera, Teradata) is anticipated to mitigate the need for substantial ASU resource investments.

The goal of the proposed BSBDA program is to produce graduates with significant quantitative skills that can create and manage big data infrastructure to facilitate large-scale business data analytics. The Bachelor's degree cultivates technical competencies to implement data gathering, cleansing, integration and modeling tasks and data asset analysis, whereas the W. P. Carey School's Master's degree in Business Analytics cultivates decision-making and data science skills required to manage Bachelor degree graduates and to ultimately utilize the data resources produced by Bachelor degree graduates. Industry surveys suggest a clear delineation between graduates from the proposed BSBDA program and graduates from the existing MSBA program. Specifically, surveys suggest five new job titles related to big data initiatives: data scientists, data architects, data visualizers, data change agents and data operators. Data scientists are the high-level managers who supervise sophisticated data modeling and analysis, while the remaining four job titles provide critical support to data scientists to facilitate the data modeling and analysis effort. We believe the graduates from the MSBA program will be an ideal fit for the data scientist positions, while the graduates from the BSBDA program will be an ideal fit for the remaining four job titles.

Besides providing students with fundamental big data resource and infrastructure management skills, the program is also designed to provide graduates with exposure to applied areas (specifically marketing, supply chain management or information systems) through program specific electives. Graduates will be business professionals who will work as applied data architects, data visualizers, data change agents and data operators. It is anticipated that healthcare, public administration, mobile services, retail and manufacturing will be areas where analytics talent will initially provide significant near-term business value. The field of business analytics education is becoming increasingly competitive with the growing demand for data specialists. Creating a new degree on data analytics resource management is important for the visibility and competitiveness of ASU and the WPC School as well as the creation of graduates with the skills and capabilities needed by employers.

2. Student Learning Outcomes and Assessment Methods

A. Knowledge, competencies, and skills

List the knowledge, competencies, and skills students should have when they graduate from the proposed degree program.(You can find examples of program Learning Outcomes at (http://www.asu.edu/oue/assessment.html)

There are three primary areas of knowledge, skills and competencies students will have upon graduating from the degree: critical thinking, communication and discipline specific skills. For *critical thinking*, students will need to be able to analyze and determine an organization's data analytics requirements to ascertain an as-is state and to think through and design a to-be state. They must assess and establish benchmark improvements to business processes, technologies and data stores. Graduates will need to be able to effectively communicate with stakeholders to gather and aggregate opinions on current state, explain to stakeholders alternatives for improving the current state, and be able to engage stakeholders to bring about and implement necessary changes. There are many *discipline specific skills* graduates will master to deploy the proper methodologies, modeling approaches, computer-based tool suites and data warehouse software systems.

B. **Assessment**

Describe the plan and methods to assess whether students have achieved the knowledge, competencies and skills identified in the Learning Outcomes. (You can find examples of assessment methods at (http://www.asu.edu/oue/assessment.html)

1. Graduates should be able to analyze an organization's data analytics requirements and develop a comprehensive solution to those business requirements, thereby demonstrating critical thinking and analysis.
Measure CIS 450 - Enterprise Analytics Capstone Course:
Performance Criterion - 75% of students will earn a 70% or better in development of analytics requirement solutions

2. Understand and apply data modeling techniques including dimensional modeling, predictive modeling and visual analytics to the solution of business problems.
Measure CIS 450 - Enterprise Analytics Capstone Course:
Performance Criterion - 75% of students will earn a 70% or better in application of analytics requirement solutions

3. Graduates will be able to effectively communicate their solution to satisfy an organization's complex data analytics needs.
Measure CIS 450 - Enterprise Analytics Capstone Course:
Performance Criterion - 75% of students will earn a 70% or better in presentation of analytics requirement solutions

4. Graduates will be able to demonstrate their solution to satisfy an organization's complex data analytics requirements.
Measure CIS 450 - Enterprise Analytics Capstone Course:
Performance Criterion - 75% of students will earn a 70% or better in presentation of analytics requirement solutions

5. Understand and apply concepts and methods for creating, populating and managing a business data warehouse.
Measure CIS 450 - Enterprise Analytics Capstone Course:
Performance Criterion - 75% of students will earn a 70% or better in application of analytics requirement solutions

6. Develop skill in modeling and quantifying in unstructured and data streaming environments.
Measure CIS 450 - Enterprise Analytics Capstone Course:
Performance Criterion - 75% of students will earn a 70% or better in development of analytics requirement solutions

3. Academic Curriculum and Requirements

A. Major Map.
Attach a copy of the "proposed" major map for this degree program and each concentration(s) to be offered. Instructions on how to create a "proposed major map" in BAMM can be found in the Build a Major Map Training Guide.

See attachment

B. Summary of credit hours required for this program
Total credit hours must be 120 and include first year composition, general studies, core/required courses, program specific electives, and any additional requirements (e.g., concentration credits). – **120 hours**

C. Core/Required Courses.
   i. Total required and/or core course credit hours: 18 hours

   ii. List the name, prefix, and credit hours for each required/core course for this program
      1. CIS 235 Introduction to Information Systems, 3 credits
      2. CIS 315 Introduction to Business Data Analytics, 3 credits
      3. CIS 355 Business Data Warehouses and Dimensional Modeling, 3 credits
      4. CIS 375 Business Data Mining, 3 credits
      5. CIS 415 Big Data Analytics and Visualization in Business, 3 credits
      6. CIS 450 Enterprise Analytics (Capstone Course), 3 credits

Business Core
ACC 231: Uses of Accounting Information I, ACC 232, or ACC 261 Honors section, 3 credit
ACC 241: Uses of Accounting Information II, ACC 242, or ACC 271 Honors section, 3 credit
CIS 105: Computer Applications & Information Technology or CIS 236 Honors section, 3 credit
ECN 211: Macroeconomic Principles or ECN 213 Honors section, 3 credit
ECN 212: Microeconomic Principles or ECN 214 Honors section, 3 credit
ECN 221: Business Statistics or ECN 231 Honors section, 3 credit
MGT 300: Organization and Management Leadership or MGT 303 Honors section, 3 credit
SCM 300: Global Supply Operations or SCM 303 Honors section, 3 credit
FIN 300: Fundamentals of Finance or FIN 302 or FIN 303 Honors Finance, 3 credit
LES 305: Legal, Ethical, and Regulatory Issues in Business, 3 credit
MKT 300: Marketing and Business Performance or MKT 302 or MKT 303 Honors section, 3 credit
WPC 480: W. P. Carey Capstone Course, 3 credit
WPC 101: Student Success in Business, 1 credit
WPC 301: Business Forum, 1 credit
International Business Core course

D. Program Specific Electives.
   i. Total required program elective credit hours: 0

ii. List the name, prefix, and credit hours for any program specific electives for this program:

MKT 440 Digital Marketing in Practice, 3 credits
MKT 450 Social Media and Content Mkt, 3 credits
SCM 315 Business Decision Models, 3 credits
SCM 345 Logistics Management, 3 credits
SCM 432 Planning and Control Systems for Supply Chain Management, 3 credits
CIS 340 Business Info Systems Development I, 3 credits
CIS 345 Business Info Systems Development II, 3 credits
CIS 308 Advanced Excel in Business, 3 credits
CIS 300 Web Design and Development, 3 credits
CIS 365 Business Database Systems Development, 3 credits
AGB 481 Microeconomics of Food Markets, 3 credits

E. Additional Program Requirements (if any):
List and describe any capstone experiences, milestone, and/or additional requirements.

F. Concentrations
i. Are any concentrations to be established under this degree program? No, concentrations will not be established.
If yes, are concentrations required? (Select One)

ii. List courses & additional requirements for the proposed concentration (s):

Concentration Name	**Total credit hours**	**Core/Required Courses for Concentration** (Prefix, # & Title)	**Total Core credit hours**	**Program Specific Electives** (include course name and prefix)	**Total Elective credit hours**	**Additional Requirements** (i.e. milestones, capstones)

4. New Course Development

A. Will a new course prefix (es) be required for this degree program? No
If yes, list prefix name(s) (i.e. ENG- English)

Note: A request for a "New/Change to Prefix Request Form" must be completed for each new prefix required and submitted with this proposal: http://provost.asu.edu/files/shared/curriculum/Prefix_Request.doc.

B. New Courses Required for Proposed Degree Program.
List all new courses required for this program, including course prefix, number and course description.

1. **CIS 315 - Introduction to Business Data Analytics** - Overview of analytics in the business context; concepts of strategic and operational analytics; overview of concepts like dimensional modeling, the Model Lifecycle (e.g., Requirements, Problem Framing, etc., Data Needs Assessment, Methods and tools Selection, Model Building, deployment and Maintenance); what data mining is; big data issues and approaches, KPIs and metrics, ERP and analytics, in-database/memory analytics; real-time analytics and data stream analysis.

2. **CIS 355 - Business Data Warehouses and Dimensional Modeling**: Introduction to SQL, Stored Procedures and Data

Warehouse Architectures; Data Warehouse requirements definition, design and analysis; Overview of the steps in building information-enabled business models; Data Staging, ETL, ELT (cleansing and integrating data, master data management, meta-data, temporal data, etc.); Workload Management; Dasboards and Scorecards; OLTP, OLAP, MOLAP, ROLAP, Hybrid OLAP; From E/R Models to Dimensional Models; role of Data Warehousing in Data Mining and Analytics; Hands-on experience with building dimensional models, cubes and pivot tables

3. **CIS 375 - Business Data Mining**: Introduction to building predictive analytics for business (SEMMA, KDD, etc.); Exposure to logistic regression, machine learning and decision tree methods; Understanding lift factors, ROC curves; Hands-on use of data mining software; Business Case Studies

4. **CIS 415 Big Data Analytics and Visualization in Business**: Text and stream mining for business; visualizations for big data; Hadoop; Cloud-based solutions; Fundamentals of Big Data Programming; Social Media and Big Data; NoSQL; Software tool support for visualizations; GIS; Business Case Studies

5. **CIS 450 - Enterprise Analytics**: Model lifecycle analysis; Analytics governance; Aligning firm and analytics strategy; Big Data security issues; Enterprise search; Applied Projects

Note: New course requests must be submitted electronically via Curriculum ChangeMaker and undergo all internal university review and approval steps including those at the unit, college, and university levels.

5. Program Need

Explain why the university needs to offer this program (include target audience and market).

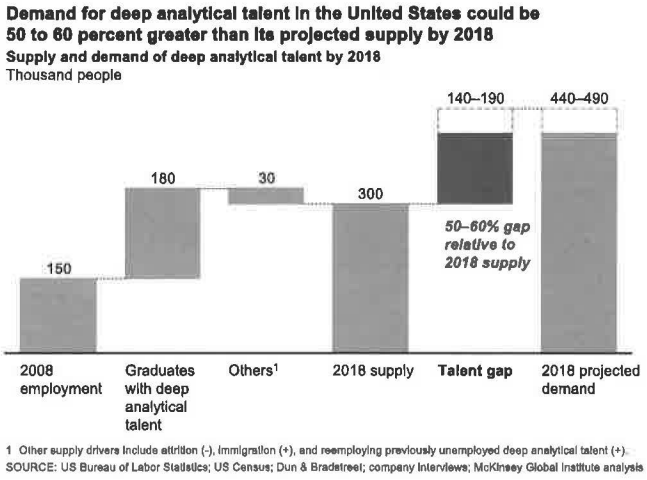
This degree is in response to market conditions that demand a formal education in data analytics – a domain specialization that is only expected to increase in importance as the digital economy continues its rapid rise. This degree positions us to compete with the top business schools while complementing and drawing upon our traditional CIS degree. With this twin offering we can more effectively meet the demand for the technical training related to data management and data driven decision making while also meeting the need for our existing program focused on management of information systems. Offering a degree in business analytics will strengthen the ASU's ability to enhance our standing as a TOP-Ranked Business School and University.

It is a well-known fact that the era of "big data" has arrived. It is now accepted not just by the experts in the field, but also by those working in every industry sector and government that this not a fad, but a trend that is bound to continue [1]. Harnessing this data will require specialized skills such as data scientists, data architects, data modelers, data visualizers, data infrastructure operators, etc. [2]. The potential economic value of big data is just starting to be discovered [3]. IBM's CEO recently characterized data as akin to a new 'natural resource,' like oil, but data has only begun to be tapped for its promise in supporting business.

The student awareness and market demand for data analytics graduates is expected to grow unabatedly for years to come. Two recent surveys (2010 and 2012), conducted to understand the progress of the state of business analytics in academia, paint a comprehensive picture of this phenomenon from the viewpoints of industry, the academic community, and students. The demand for hires with business analytics skills shows no indication of slowing down with close to 89 percent of employers indicating that their needs for business intelligence/data analytics (BI/DA) skilled recruits will increase in the future. Students are more aware of the growth of BI/DA related employment opportunities, compared to the 2010 data. They are increasingly taking classes in BI/DA because they "want to prepare themselves for these jobs"; their confidence in the availability of job opportunities is higher than before. The survey identified 47 undergraduate degree programs, compared to 3 two years earlier. Additionally, forty-one percent of professors reported that their universities increased the number of BI/DA courses since 2010. Although a number of new degree programs have mushroomed in response to the anticipated growth in demand, ASU is still in a position to gain an early mover's advantage and quickly establish itself as a leader in this field. ASU has the unique opportunity to not only be the regional leader, but also contribute graduates to meet the national demand, given its already established reputation in the information

systems area. Figure 1 illustrates this gap [1].

Figure 1: Hiring Gap Analysis



The student interest for this degree will be derived from the increase in the size of the pie of potential applicants both in-state and out-of-state – especially as the Phoenix metropolitan area is more widely recognized as a new technology hub. For this new offering we expect interest from:

- Students who are now accustomed to interacting with and personally managing vast amounts of data available to them in applications like Facebook, linked-in, Instagram, Google, youtube, etc. who seek a career in supporting business in the harnessing of the potential of these vast new data resources.

- Students who see the explosive growth of new digital businesses and business events that are increasingly 'born digital' see the need for training in the fundamentals of big data management.

- Students who have an interest and acumen in the quantitative aspects of business management and who plan to seek further education afterwards to become a data scientist.

[1] Manyika, J. et al., "Big data: The next frontier for innovation, competition and productivity." McKinsey Global Institute, 2011, 1-158.

[2] See the Curriculum section in this document for definitions of these new roles.

[3] "Data, data everywhere: A special report on managing information", The Economist, February 27, 2010.

[4] Wixom, B. H., T. Ariyachandra, and J. Mooney (2013) "State of Business Intelligence in Academia 2012," Business Intelligence Congress 3 report, www.TeradataUniversityNetwork.com.

6. Impact on Other Programs

List other academic units that might be impacted by the proposed program and describe the potential impact (e.g., how the implementation of this program might affect student headcount/enrollment, student recruitment, faculty participation, course content, etc. in other programs). Attach letters of collaboration/support from impacted programs.

There will be no impact on headcount, enrollment, recruitment, faculty participation, course content, etc. to other programs. The Department of Biomedical Informatics, the School of Computing, Informatics and Decision Systems, and the Department of Technology and Innovation have been contacted and provided impact statements on new courses. There will likely be many new

programs that leverage analytics and big data technologies and solutions, and there may be disciplines with new programs designed to teach how to develop new data mining algorithms and other technical means for managing big data – each program tuned to the respective domain and growing need for qualified graduates. The focus of the business data analytics degree will be solely in the domain of commerce, and on the utilization of existing algorithms and tool suites for managing business data and business analytics. Students admitted to the program will be full time W. P. Carey School of Business students.

7. Projected Enrollment

How many new students do you anticipate enrolling in this program each year for the next five years?

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year (Yr 1 continuing + new entering)	3rd Year (Yr 1 & 2 continuing + new entering)	4th Year (Yrs 1, 2, 3 continuing + new entering)	5th Year (Yrs 1, 2, 3, 4 continuing + new entering)
Number of Students Majoring (Headcount)	50	150	300	450	450

8. Accreditation or Licensing Requirements

If applicable, provide the names of the external agencies for accreditation, professional licensing, etc. that guide your curriculum for this program, if any. Describe any requirements for accreditation or licensing.

This degree will be covered by the AACSB accreditation currently held by the W. P. Carey School of Business. Degree requirements are written to meet all AACSB requirements.

9. Faculty & Staff

A. **Current faculty**

List the name, rank, highest degree, area of specialization/expertise and estimate of the level of involvement of all current faculties who will teach in the program.

Faculty teaching core Data Analytics course will be current faculty in the Computer Information Systems Degree program.
Dr. Michael Goul, Professor, Business Data Analytics, 100% involvement
Dr. Uday Kulkarni, Associate Professor, Enterprise Analytics, 100% involvement
Dr. Michael Zhan Shi, Assistant Professor, Business Data Analytics, 100% involvement
Dr. Shin-yi Wu, Associate Professor, Business Data Mining, 100% involvement
Dr. Bin Gu, Associate Professor, Business Data Mining, 100% involvement
Dr. Timothy Olsen, Clinical Assistant Professor, Big Data Analytics and Visualization in Bus., 100% involvement
Dr. Altaf Ahmad, Clinical Assistant Professor, Business Data Warehousing & Dimensional Modeling, 100% involvement
Dr. Kathleen Moser, Clinical Assistant Professor, Big Data Analytics and Visualization in Bus., 100% involvement

Faculty teaching approved Electives
Dr. Detra Montoya, Clinical Associate Professor, Marketing
Dr. John Schlacter, Professor Emeritus, Marketing
Dr. Lonnie Ostrom, Professor, Marketing
Charles Giles, Professor of Practice, Marketing

Dr. Arnold Maltz, Associate Professor, Supply Chain Management
James Kellso, Instructor, Supply Chain Management
Dr. John Fowler, Professor, Supply Chain Management
Dr. Srimathy Mohan, Associate Professor, Supply Chain Management
Dr. Thomas Choi, Professor, Supply Chain Management
Dr. Joseph Clark, Information Systems
Christopher Olsen, Instructor, information Systems
Colleen Hayes, Instructor, Information Systems

B. **New Faculty:**
Describe the new faculty hiring needed during the next three years to sustain the program. List the anticipated hiring schedule and financial sources for supporting the addition of these faculty members.
- No new faculty needed

C. **Administration of the program.**
Explain how the program will be administered for the purposes of admissions, advising, course offerings, etc. Discuss the available staff support.
The BS in Business Data Analytics will be administered by the Department of Information Systems and by current admission, advising and additional staff.

10. Resources (necessary to launch and sustain the program)

A. **Required resources:**
Describe any new resources required for this program's success, such as new support staff, new facilities, new library resources, new technology resources, etc.
None

B. **Resource acquisition:**
Explain how the resources to support this program will be obtained.
N/A

ARIZONA STATE UNIVERSITY

PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE

APPENDIX
OPERATIONAL INFORMATION FOR UNDERGRADUATE PROGRAMS
(This information is used to populate the Degree Search/catalog website.)

1. **Program Name (Major):** BS in Business Data Analytics

2. **Program Description** (150 words maximum)

The BS in business data analytics program prepares business graduates with requisite knowledge, skills and experience to create and manage big data infrastructure and the associated business processes to facilitate large-scale business data analytics in organizations. The program cultivates organizational and technical competencies to implement data gathering, cleansing, integration and modeling tasks, as well as data asset analysis for business applications. Graduates will serve as architects, change agents and analytics tool suite operators for business and government. The program covers data warehousing, dimensional modeling, big data analytics methods, visualization tools and techniques, and it introduces topics including data mining and predictive analytics.

3. **Contact and Support Information**

Building Name, code and room number: *(Search ASU map)*	BA 301 P
Program office telephone number: (*i.e. 480/965-2100*)	480/965-3252
Program Email Address:	wpcareyis@asu.edu
Program Website Address:	http://wpcarey.asu.edu/is/data-analytics

4. **Delivery/Campus Information Delivery:** On-campus only (ground courses and/or iCourses)
Note: Once students elect a campus or On-line option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.

5. **Campus/Locations:** *indicate **all** locations where this program will be offered.*

☐ Downtown Phoenix ☐ Polytechnic ☒ Tempe ☐ West Other:

6. **Additional Program Description Information**

A. Additional program fee required for this program? No
B. Does this program have a second language requirement? No

7. **Career Opportunities & Concentrations**
Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration. (150 words maximum)
The demand for hires with business analytics skills are strong with close to 89 percent of employers indicating that their needs for skilled new recruits in business data analytics will increase in the future. Students can become data analysts, data architects, data visualization developers, data change agents and data operators.

8. **Additional Admission Requirements**
If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)
a) Freshmen admission requirements: 1160 SAT Reasoning OR 25 ACT score, OR graduated in the top eight percent of high school class, OR an overall high school GPA of 3.60 in ASU competency courses (A=4.00).
b) Freshmen should select an additional major when applying for admission. Additional choices may include any of the W.

P. Carey's Business BA programs or any other business or other degree program outside W. P. Carey School of Business. Students who are not admissible to a W. P. Carey Business BS major and who did not select a second major or are not admissible to their second major choice will be placed in a Business BA program in W. P. Carey School of Business.

c) Transfer admission requirements (30 or more semester hours of credit after high school): 3.00 transfer GPA AND 1160 SAT score OR 25 ACT score OR graduated in the top eight percent of high school class.

d) Transfer students should select an additional major when applying for admission. Additional choices may include any of the W. P. Carey's Business BA programs or any other business or other degree program outside W. P. Carey School of Business.

e) Students with less than 45 transfer hours who are not admissible to a W. P. Carey School of Business major and who did not select a second major or are not admissible to their second major choice will be placed in Exploratory Social and Behavioral Sciences in the School of Letters and Sciences.

f) Students with more than 45 transfer hours who are not admissible to the School of Letters and Sciences will be contacted to select an appropriate major.

9. Keywords

List all keywords used to search for this program. Keywords should be specific to the proposed program.
Analytics, Intelligence, Data, Information, Business, Modeling, Visualization, Enterprise

10. Advising Committee Code

List the existing advising committee code to be associated with this degree. TEMPE: UGBATC
Note: If a new advising committee needs to be created, please complete the following form:
Proposal to create an undergraduate advising committee

11. First Required Math Course

List the first math course required in the major map. MAT 210

12. Western Undergraduate Exchange (WUE) Eligible:

Has a request been submitted to the Provost by the Dean to consider this degree program as eligible for WUE?No
Note: No action will be taken during the implementation process with regards to WUE until approval is received from the Provost.

13. Area(s) of Interest

A. Select **one (1)** primary Area of Interest from the list below that applies to this program.

- ☐ **Architecture, Construction & Design**
- ☐ **Artistic Expression & Performance**
- ☐ **Biological Sciences, Health & Wellness**
- ☒ **Business, Management & Economics**
- ☐ **Communication & Media**
- ☐ **Computing & Mathematics**
- ☐ **Education & Teaching**
- ☐ **Engineering & Technology**
- ☐ **Environmental Issues & Physical Science**
- ☐ **Interdisciplinary Studies**
- ☐ **Languages & Cultures**
- ☐ **Law & Justice**
- ☐ **Social Science, Policies & Issues**

B. Select **any** additional Areas of Interest that apply to this program from the list below.

- ☐ **Architecture, Construction & Design**
- ☐ **Artistic Expression & Performance**
- ☐ **Biological Sciences, Health & Wellness**
- ☐ **Business, Management & Economics**
- ☐ **Communication & Media**
- ☒ **Computing & Mathematics**
- ☐ **Education & Teaching**
- ☒ **Engineering & Technology**
- ☐ **Environmental Issues & Physical Science**
- ☐ **Interdisciplinary Studies**
- ☐ **Languages & Cultures**
- ☐ **Law & Justice**
- ☐ **Social Science, Policies & Issues**

ARIZONA STATE UNIVERSITY

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The following fields are to be completed by the Office of the Executive Vice President and Provost of the University.

CIP Code: _____

Plan Code:

ARIZONA STATE UNIVERSITY

2014 - 2015 Major Map
Business Data Analytics, BS (Proposed)

KZSIJJP

Term 1 0 - 16 Credit Hours Critical course signified by ◆	Hours	Minimum Grade	Notes
◆ CIS 105: Computer Applications and Information Technology (CS)	3	C	• An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses • ASU Math Placement Exam score determines placement in Mathematics course • ASU 101 or College specific equivalent First Year Seminar required of all freshman students. • See academic advisor for appropriate Student Success course requirement if not a first-time freshman.
◆ MAT 210: Brief Calculus (MA)	3-4	C	
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
WPC 101: Student Success in Business	1		
Historical Awareness (H)	3		
Humanities, Fine Arts and Design (HU)	3		
◆ Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	16-17		

Term 2 17 - 31 Credit Hours Critical course signified by ◆	Hours	Minimum Grade	Notes
◆ ACC 231: Uses of Accounting Information I	3	C	
◆ ECN 211: Macroeconomic Principles (SB) OR ECN 212: Microeconomic Principles (SB)	3	C	
◆ MAT 211: Mathematics for Business Analysis	3-4	C	
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
PSY course (SB)	3		
◆ Complete ENG 101 OR ENG 105 OR ENG 107 course(s).			
◆ Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	15-16		

Term 3 32 - 47 Credit Hours Critical course signified by ◆	Hours	Minimum Grade	Notes
◆ ACC 241: Uses of Accounting Information II	3	C	
◆ ECN 211: Macroeconomic Principles (SB) OR ECN 212: Microeconomic Principles (SB)	3	C	
◆ ECN 221: Business Statistics (CS)	3	C	
COM 100: Introduction to Human Communication (SB) OR COM 225: Public Speaking (L) OR COM 230: Small Group Communication (SB) OR COM 259: Communication in Business and the Professions	3		
Natural Science - Quantitative (SQ)	4		
◆ Minimum 2.00 GPA ASU Cumulative.			
Complete Mathematics (MA) requirement.			
Term hours subtotal:	16		

Term 4 48 - 61 Credit Hours Critical course signified by ◆	Hours	Minimum Grade	Notes
◆ CIS 235: Introduction to Information Systems	3	C	
WPC 301: Business Forum	1	C	
SOC course (SB)	3		
Cultural Diversity in the U.S. (C)	3		
Natural Science - General (SG) OR Natural Science - Quantitative (SQ)	4		
◆ Minimum 2.00 GPA ASU Cumulative.			

Term hours subtotal:	14	

Term 5 62 - 76 Credit Hours **Necessary course signified by** ☆	Hours	Minimum Grade	Notes
☆ CIS 315: Introduction to Business Data Analytics	3	C	
☆ CIS 355: Business Data Warehouses and Dimensional Modeling	3	C	
☆ ENG 302: Business Writing (L)	3		
☆ MKT 300: Marketing and Business Performance	3	C	
☆ SCM 300: Global Supply Operations	3	C	
Term hours subtotal:	15		

Term 6 77 - 91 Credit Hours **Necessary course signified by** ☆	Hours	Minimum Grade	Notes
☆ CIS 375: Business Data Mining	3	C	
☆ CIS 415: Big Data Analytics and Visualization in Business	3	C	
☆ FIN 300: Fundamentals of Finance	3	C	
☆ LES 305: Legal, Ethical, and Regulatory Issues in Business	3	C	
Literacy and Critical Inquiry (L)	3		
Term hours subtotal:	15		

Term 7 92 - 106 Credit Hours **Necessary course signified by** ☆	Hours	Minimum Grade	Notes
☆ MGT 300: Organization and Management Leadership	3	C	
☆ Upper Division International Business Elective AND Global Awareness (G)	3	C	
Upper Division Data Analytics Recommended Electives OR Upper Division Elective	6		
Upper Division Humanities, Fine Arts and Design (HU)	3		
Term hours subtotal:	15		

Term 8 107 - 120 Credit Hours **Necessary course signified by** ☆	Hours	Minimum Grade	Notes
☆ CIS 450: Enterprise Analytics	3	C	
☆ WPC 480: W. P. Carey Capstone Course	3	C	
General Education Elective	6		
Upper Division Elective	2		
Term hours subtotal:	14		

- For a list of General Education Elective course options, please visit the following website: http://my.wpcarey.asu.edu/gened.

Data Analytics Recommended Electives

CIS 300: Web Design and Development

CIS 308: Advanced Excel in Business

CIS 340: Business Information System Development I

CIS 345: Business Information System Development II

CIS 365: Business Database Systems Development

MKT 440: Digital Marketing in Practice

MKT 450: Social Media and Content Marketing

SCM 315: Business Decision Models

SCM 345: Logistics Management

SCM 432: Planning and Control Systems for Supply Chain Management

Upper Division International Business Elective

ECN 306: Survey of International Economics (SB & G)

MGT 302: Principles of International Business (G)

MKT 425: Global Marketing Management

SCM 463: Global Supply Chain Management (G)

Notes:

- Total UD Hours: 51 Upper Division Hours Required for all W. P. Carey School of Business degree programs.
- Transfer UD Business Course Hours: 9 Hours Maximum.
- Community College Business Hours: 30 Hours Maximum.
- Minimum 2.0 W. P. Carey School Business Courses GPA

Total Hours: 120
Upper Division Hours: 45 minimum
Major GPA: 2.00 minimum
Cumulative GPA: 2.00 minimum
Total hrs at ASU: 30 minimum
Hrs Resident Credit for Academic Recognition: 56 minimum
Total Community College Hrs: 64 maximum

General University Requirements Legend

General Studies Core Requirements:

- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative Applications (CS)
- Humanities, Fine Arts and Design (HU)
- Social and Behavioral Sciences (SB)
- Natural Science - Quantitative (SQ)
- Natural Science - General (SG)

General Studies Awareness Requirements:

- Cultural Diversity in the U.S. (C)
- Global Awareness (G)
- Historical Awareness (H)

First-Year Composition

General Studies designations listed on the major map are current for the 2014 - 2015 academic year.

Jane Lamal Henschler

Subject: FW: New Courses - Impact Statement Request

------ Forwarded Message
From: Ronald Askin <Ron.Askin@asu.edu>
Date: Thu, 29 Aug 2013 10:05:08 -0700
To: Michael Goul <michael.goul@asu.edu>
Subject: RE: New Courses - Impact Statement Request

Mike,
I spoke with our undergraduate committee and also George Runger who is Acting Chair for Biomedical Informatics. We have one basic concern. We would like to see the term "business" or "enterprise" added to the course titles to both reflect the intended content and avoid confusion with our courses and those in BMI. Our undergraduate committee expressed it as

The CS-UPC examined the proposed CIS courses and we found that, although the courses focus on business applications according to the course descriptions, the course titles are too general (except CIS 450). This may give the impression that these courses overlap significantly with our CSE or CPI courses (such as CSE 412 Database Management, CSE 414 Advanced Database Concepts, CPI 310 Web-based Information Management Systems, CPI 400 Scientific Computing & Visualization , and some graduate-level course, if that matters, such as CSE 591 - Data Visualization, CSE 572 - Data Mining).

The CIS program may need to explicitly use terms like "business" or "enterprise" in their course titles. (Interestingly, CIS 375 was mentioned as "Business Data Mining" in Mike's email but the full course proposal calls it simply "Data Mining".)

Can you make this change in the course titles?
Ron

****
Ronald G. Askin, Professor and Director
School of Computing, Informatics, and Decision Systems Engineering
Arizona State University
Tempe, AZ 85287-8809
e-mail: ron.askin@asu.edu
Phone: 480-965-2567
http://cidse.engineering.asu.edu <http://www.engineering.asu.edu/>
****

From: Michael Goul
Sent: Monday, August 26, 2013 5:13 PM
To: Ronald Askin
Cc: Kay Faris; Angelina Saric
Subject: New Courses - Impact Statement Request

Dear Professor Askin,

The Department of Information Systems in the W. P. Carey School of Business is proposing new curriculum to meet the needs of business recruiters. Many organizations are clamoring for individuals trained in data-driven business analytics, and we have been working with our Executive Advisory Board to provide the right courses to meet their needs. As part of the process for getting the courses approved, I am writing to ask that you provide an impact statement. Please do not hesitate to contact me if would like further information. A form is attached for your assessment, and relevant syllabi are attached for your review. Following are the courses:

CIS 315 Introduction to Data Analytics, 3 credits
CIS 355 Data Warehousing and Dimensional Modeling, 3 credits
CIS 375 Business Data Mining, 3 credits
CIS 415 Big Data Analytics and Visualization, 3 credits
CIS 450 Enterprise Analytics, 3 credits

Thank you – I know how busy this time of year is. Unfortunately, we have been given a short fuse to get the courses evaluated through all of our internal School committees, and your statements are a very important

part of that process. If it is possible, I would really appreciate receiving your assessment by this coming Thursday.

Sincerely,
Mike

Michael Goul . Professor and Chair

W. P. Carey School of Business
Department of Information Systems
Arizona State University
P.O. Box 874606
Tempe, AZ 85287-4606
p. 480 .965 .5482
f. 480 .727 .0881
e. Michael.Goul@asu.edu

For Department News and Analysis, visit http://www.wpcarey.asu.edu/knowIT

------ End of Forwarded Message

Jane Lamal Henschler

Attachments: George Runger Impact Form Aug2013.pdf

From: George Runger <George.Runger@asu.edu>
Date: Thu, 29 Aug 2013 09:52:24 -0700
To: Michael Goul <michael.goul@asu.edu>
Subject: RE: New Courses - Impact Statement Request

Michael
I added the following to the comments for each course except CIS 450. There is no objection to the courses being offered, but the concern is with the titles. Hopefully this relatively minor change can be made.

```
There is no objection to the courses, but the titles are too broad in scope (except for CIS 450).
We have a number of undergraduate courses on similar topics but with a health care or
bioinformatics focus and our courses indicate the focus in the title. My recommendation is that
the titles for the proposed courses include the application/domain focus.
```

From: Michael Goul
Sent: Monday, August 26, 2013 5:15 PM
To: George Runger
Cc: Kay Faris; Angelina Saric
Subject: New Courses - Impact Statement Request

Dear Professor Runger,

The Department of Information Systems in the W. P. Carey School of Business is proposing new curriculum to meet the needs of business recruiters. Many organizations are clamoring for individuals trained in data-driven business analytics, and we have been working with our Executive Advisory Board to provide the right courses to meet their needs. As part of the process for getting the courses approved, I am writing to ask that you provide an impact statement. Please do not hesitate to contact me if would like further information. A form is attached for your assessment, and relevant syllabi are attached for your review. Following are the courses:

CIS 315 Introduction to Data Analytics, 3 credits
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CIS 415 Big Data Analytics and Visualization, 3 credits
CIS 450 Enterprise Analytics, 3 credits

Thank you – I know how busy this time of year is. Unfortunately, we have been given a short fuse to get the courses evaluated through all of our internal School committees, and your statements are a very important part of that process. If it is possible, I would really appreciate receiving your assessment by this coming Thursday.

Sincerely,
Mike

Michael Goul . Professor and Chair
W. P. Carey School of Business
Department of Information Systems
Arizona State University
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e. Michael.Goul@asu.edu

For Department News and Analysis, visit http://www.wpcarey.asu.edu/knowIT

------ End of Forwarded Message

Impact Assessment

TO: George Runger
UNIT: Department of Bioinformatics

FROM: Michael Goul
UNIT: Department of Information Systems, W. P. Carey school of Business

DATE: 8/26/2013

As a step in the procedures governing new course approval, the attached course proposals and syllabi are provided for your review and response.

Please complete this form and return to Michael Goul by Thursday, August 29, 2013.

Proposed New Course Prefix/Number: CIS 315
Title: Introduction to Data Analytics

☐ I have no objection to the proposed course.
☒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

There is no objection to the courses, but the titles are too broad in scope (except for CIS 450). We have a number of undergraduate courses on similar topics but with a health care or bioinformatics focus and our courses indicate the focus in the title. My recommendation is that the titles for the proposed courses include the application/domain focus.

Proposed New Course Prefix/Number: CIS 355
Title: Data Warehouses and Dimensional Modeling

☐ I have no objection to the proposed course.
☒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

There is no objection to the courses, but the titles are too broad in scope (except for CIS 450). We have a number of undergraduate courses on similar topics but with a health care or bioinformatics focus and our courses indicate the focus in the title. My recommendation is that the titles for the proposed courses include the application/domain focus.

Proposed New Course Prefix/Number: CIS 375
Title: **Data Mining**

☐ I have no objection to the proposed course.
☒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

There is no objection to the courses, but the titles are too broad in scope (except for CIS 450). We have a number of undergraduate courses on similar topics but with a health care or bioinformatics focus and our courses indicate the focus in the title. My recommendation is that the titles for the proposed courses include the application/domain focus.

Proposed New Course Prefix/Number: CIS 415
Title: **Big Data Analytics & Visualization**

☐ I have no objection to the proposed course.
☒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

There is no objection to the courses, but the titles are too broad in scope (except for CIS 450). We have a number of undergraduate courses on similar topics but with a health care or bioinformatics focus and our courses indicate the focus in the title. My recommendation is that the titles for the proposed courses include the application/domain focus.

Proposed New Course Prefix/Number: CIS 450
Title: **Enterprise Analytics**

☒ I have no objection to the proposed course.
☐ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

George Runger
Signature

8/29/2013
Date

Impact Assessment

TO: **Ann McKenna**
UNIT: **Department of Engineering, College of Technology and Innovation**

FROM: **Michael Goul**
UNIT: **Department of Information Systems, W. P. Carey school of Business**

DATE: 8/26/2013

As a step in the procedures governing new course approval, the attached course proposals and syllabi are provided for your review and response.

Please complete this form and return to Michael Goul by Thursday, August 29, 2013.

Proposed New Course Prefix/Number: CIS 315
Title: **Introduction to Data Analytics**

- ❒ X I have no objection to the proposed course.
- ❒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

Proposed New Course Prefix/Number: CIS 355
Title: **Data Warehouses and Dimensional Modeling**

- ❒ X I have no objection to the proposed course.
- ❒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

Proposed New Course Prefix/Number: CIS 375
Title: **Data Mining**

- ❒ X I have no objection to the proposed course.
- ❒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

Proposed New Course Prefix/Number: CIS 415
Title: **Big Data Analytics & Visualization**

- ❒ X I have no objection to the proposed course.
- ❒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

Proposed New Course Prefix/Number: CIS 450
Title: **Enterprise Analytics**

- ❒ X I have no objection to the proposed course.
- ❒ I object to the proposed course.

Reasons for objection and/or other comments/recommendations:

Ann McKenna

Signature

9/12/13

Date