

PROGRAM PERFORMANCE REVIEW  
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY (MSIT)  
AY 2015 - 2016

Submitted by:

Bhushan Kapoor, Chair – Information Systems & Decision Sciences Department

Pramod Pandya, Director – MSIT Graduate Degree Program

## **Introduction**

Our online Master of Science in Information Technology (MSIT) program was ranked No. 1 in California, and ranked No. 6 nationally by *U. S. News & World Report* in the 2015 Online Business Graduate Programs report list. The schools that were nationally ranked above us were all Ph.D. granting institutions, such as Indiana University Bloomington, University of Texas at Dallas, Arizona State University, and University of Connecticut.

The online MSIT program is offered as one of the graduate programs in the Information Systems & Decision Sciences (ISDS) department at the Mihaylo College of Business and Economics (MCBE). The program is in its 11<sup>th</sup> year, having admitted Cohort 11 in the fall of 2015. The program is conducted via an asynchronous learning environment, and is designed to appeal to professionals working in Information Technology (IT), who are seeking to advance their careers by developing skills in the business management of IT. The program is not biased towards any particular undergraduate discipline, however applicants lacking basic skills in computer programming, and data networks are advised to develop those skills at a community college prior to beginning the MSIT program, so as to acquire a basic understanding of data communications, networking, and computer programming before embarking on their graduate-level studies. Applicants to the program are drawn from a wide variety of industries, including aerospace, engineering, manufacturing, financial, educational, information technology, and retail sales. The program requires that every applicant obtain a minimum score of 500 on the GMAT exam, or an equivalent score on the GRE exam. In conjunction with the GMAT requirement, the need to have worked for a minimum of 1 to 3 years in IT further filters out applicants who are merely curious from professionals who are seeking to advance their career in IT. In addition to the admission requirements, every applicant is interviewed at least once, to determine whether the applicant is a correct match for the online program. These interviews seek to identify whether the applicant is highly motivated, self-disciplined, and willing and able to put about 10 to 12 hours per week into his or her graduate studies. In light all of these factors, the typical retention rate for any cohort in the program is nearly 90%, and admitted into the program are very encouraged by this fact. Together, all of these considerations have enabled the program to sustain a high academic standard over the years.

GMAT/GRE score range: 560 to 580

Undergraduate GPA range: 3.10 to 3.30

Mean professional working experience in IT: 7 to 12 years

Applicants to the MSIT program generally hold full-time positions in various capacities, and most of them have their educational expenses reimbursed by their employers. This speaks to the quality of the MSIT program, since indicates that employers' view the knowledge gained by the students in the program as very valuable, and can enhance the organization's productivity, and competitiveness. Further, our survey of MSIT graduates indicates that on average graduate of our program realizes a financial gain of 25% to 35% within 6 to 12 months after graduation. In addition to financial gain, about 80% of the graduates have successfully advanced their positions in IT. In light of these observations, we can generally conclude that the MSIT program endows its students with skills that are both marketable and highly valued by employers.

The MSIT faculty is a group of dedicated scholars who have considerable experience in online teaching, and who rely on technology-based tools to deliver their lectures. Furthermore, the MSIT faculty has published original scientific research in a wide array of highly ranking journals, and they remain active in their respective fields. MSIT faculty is closely associated in various capacities with academia/IT industry in positions such as Board of Directors, Consultants, and Residence Scholars.

Evidence for this can be found in the rankings published by the Association for Information Systems (AIS), which ranks the ISDS department at Cal State Fullerton as 4<sup>th</sup> in California in Information Systems (IS) research in top journals. The only other California universities ranked above us in IS research are UCI, UCSD, and USC. Our department offers a number of training programs in business analytics and information technologies through the "Center for Information Technology and Business Analytics", housed in the ISDS department.

## **I. Department /Program Mission, Goals and Environment**

### **A. Program Mission Goals and Environment**

The Masters of Science in Information Technology (MSIT) degree program falls under the mission for the Information Systems and Decision Sciences (ISDS) Department whose Mission Statement is as follows:

*The ISDS department aims to create and disseminate knowledge related to the disciplines of Information Systems, Business Analytics and Decision Sciences. It does so to prepare students for job opportunities in alignment with industry needs. The ISDS department strives to foster student success and advance our reputation through collaboration across the college, university, and the community.*

The goals of the MSIT program as stated in the degree proposal are as follows:

“The MSIT program is designed to afford a quality graduate education in a growing technological field to individuals who may not be able to get to campus to take classes in a traditional format. The objective of this program is to offer a Master’s degree in Information Technology to serve the needs of those working in the field of information technology who wish to advance their managerial and technical skills in areas critical for success as well as for those individuals who have suitable business experience and wish to enter the field of information technology.”

Subject areas required by the program are programming, data communications, management of an IT organization, systems analysis and design, e-commerce, database development, and data warehousing and business intelligence. Students who graduate from the program will be able to understand and develop code for computer programs, prepare and analyze financial statements and management reports, have the ability to assess how data is communicated both in local and wide area networks and implement strategies to meet the organization’s telecommunications needs, implement the managerial concepts associated with good leadership, implement the managerial and technical aspects of e-commerce, be able to design an information system, and be able to set up a database system.

The MSIT program was designed to implement the University’s, and the College Mission, Goals and Strategies in several ways.

### **CSU Fullerton Mission, Goals, and Strategies**

- To ensure the preeminence of learning
- To provide high-quality programs that meet the evolving needs of our students, community and region
- To enhance scholarly and creative activity
- To make collaboration integral to our activities
- To create an environment where all students have the opportunity to succeed
- To increase external support for university programs and priorities
- To expand connections and partnerships with our region
- To strengthen institutional effectiveness, collegial governance and our sense of community

### **College Mission Statement**

*We leverage the diversity and entrepreneurial spirit of Southern California to produce globally-aware business leaders through innovative teaching and high-quality applied research.*

**Program Quality.** Maintaining national accreditation, recruiting and sustaining high quality faculty and ensuring positive student learning outcomes.

**Balancing Theory & Practice.** Preparing our graduates to make a difference.

**Expanding Outreach & Visibility.** Enhancing visibility by developing programs, resources and relationships.

**B. Changes and Trends in the Discipline since the Last Program Review**

As this is the second Program Performance Review, there have been changes implemented since the last review. Since the first PPR, we have hired high ranking faculties with expertise in IS and IT field, and excellent track record in publications. These faculties form a core group, who are assigned to teach in the MSIT program.

**Trends in Discipline**

Both nationwide and in California, enrollment trends in the academic field of information systems, and business analytics have trended upwards over the past seven years. Enrollment trend in information technology seems to remain steady at an average rate of 47. We do attribute this even trend due to the part-time nature of the program, which bars many foreign students from enrolling in the MSIT program. Of course, the move towards outsourcing of IT to foreign countries has adversely affected the enrollment numbers. The current trend in IT is suitably qualified Data Scientists, and with growing demand for those qualified professionals, we have revised the current program. MSIT program has been approved with one concentration in IT Management, and the other concentration in Data Science. We will offer admission to both of these concentrations in fall 2016, and thus increase enrollment levels.

	<b>Enrollment (Headcount)</b>						
	<b>Fall 2009</b>	<b>Fall 2010</b>	<b>Fall 2011</b>	<b>Fall 2012</b>	<b>Fall 2013</b>	<b>Fall 2014</b>	<b>Fall 2015</b>
<b>BA – Business IS Concentration</b>	121	137	158	173	173	195	224
<b>MS in Information Systems</b>	34	28	29	41	50	78	122
<b>MS in Information Technology</b>	47	54	49	45	50	40	40

Source – CSUF Analytical Studies Website  
[http://www.fullerton.edu/analyticalstudies/census\\_data/university/programs.html](http://www.fullerton.edu/analyticalstudies/census_data/university/programs.html)

MSIT admission process requires that an applicant has to satisfy the university, college, and the department requirements. The purpose of all three requirements is to maintain certain academic standard that is critical for both to the college as well to the students entering in the program:

University admission requirement: undergraduate GPA 2.5

College admission requirements: GMAT score 530

Department requirement: 1 to 3 years of IT profession experience + half-an-hour of interview to qualify the applicant for admission.

All applicants to the MSIT program hold full-time position in the IT industry – most of them get reimbursed by their employer, so a decision to provide financial support to an employee seeking admission may not be made early in the calendar year – prospective applicant may be seeking newer opportunities in their field – as well as having to prepare for the GMAT.

### **C. Future Program Priorities**

One important issue facing the program is to increase the pool of applicants, thus leading to a wider selection of students from different undergraduate disciplines. The program director has established contacts with major IT employers such as Aerospace, IBM, Kaiser Permanente, Cisco, Financial Institutions, Educational Institutions, and IT Service companies to have “open house” sessions to increase enrollments. Some foreign universities have shown interest in partnering with us in this program. While we have not, to date, moved forward in working with foreign universities, it is possible that we may move in this direction during the next few years.

One attractive features of the MSIT program is its cost. For California residents, excluding the cost of text materials, the entire degree program costs under \$8,000. The fact that exams are given on weekends or at approved testing centers allows students anywhere in the state to take advantage of this degree program.

The field of information technology is rapidly changing and it is important that our curriculum stays up to date. Hence, another priority of the program is to ensure that the curriculum offered to students is as current as possible.

## **II. Department /Program Description and Analysis**

### **A. Curricular Changes**

We have made 2 substantial curriculum changes in the program upon the feedback from the MSIT student body, and the MSIT Industry Advisory Board (IAB). Each year we hold one meeting with IAB members, and explore the changing trend of use of IT in various industries. Consensus is arrived at jointly with the MSIT faculty and IAB members to factor in the curriculum for changing trend in IT. The one course for which we have had substantial negative comments was Accounting 509. Since the last PPR, Accounting 509 has been placed as an elective rather than one of the requirement courses in the program. ISDS 556 – Data Warehousing and Foundations of Business Intelligence, was an elective prior to the PPR, and now is placed as one of the required course.

We have introduced a new elective - ISDS 557 – Issues in Information Technology – since the last PPR, thus still keeping the number of electives the same. This course will offer additional perspective to current offering in Information Technologies, and deem the MSIT program more relevant.

The MSIT program has both an Internal and External Program Council. The internal Program Council consists of faculty who teach in the program. They meet approximately once a month to discuss the curriculum and any concerns brought forth by students in the program. Members of the Internal Program Council also assist in conducting the required interviews of candidates who have applied to the program. The External Program Council consists of faculty who teach in the program, business professionals in the information technology field, and student graduates from the program. This group meets once a year to discuss the program and to gain feedback from industry professionals as to current issues and directions in the field of information technology. Our goal is to ensure that the program stays current and relevant for our students.

### **B. The structure of the degree program**

The specifics of the 30-unit MS in Information Technology degree program are as follows: The MS in Information Technology program is a cohort-based online program. It currently consists of 8 (24 units) required courses and 2 (6 units) electives.

#### **Required courses (21 units)**

ISDS 505 – Programming Concepts for Information Technology

ISDS 550 – Telecommunications and Business Networks

ISDS 551 – Information Resource and IT Project Management  
ISDS 552 – Systems Analysis, Design, and Development  
ISDS 553 – Electronic Commerce: Analysis and Evaluation  
ISDS 555 – Business Database: Design and Processing  
ISDS 556 – Data Warehousing and Foundations of Business Intelligence

**Elective courses (6 units)**

ISDS 418 – Information Privacy and Security (\*)  
ISDS 557 – Issues in Information Technology (\*)  
ISDS 413 Business Programming Applications for ERP  
ISDS 414 Internet Technologies and Applications  
ISDS 415 Decision Support and Expert Systems  
ISDS 431 Enterprise Systems Implementation, Configuration, and Use  
ISDS 433 Enterprise Systems Administration  
ISDS 435 Integrated Enterprise Information Systems  
ISDS 518 Quantitative Tools for Information Technology Management  
ISDS 554 E-Commerce: Technologie Perspective  
ISDS 558 Advanced Software Development with Web Applications  
ACCT 509 Accounting for Information

\* The cohort students collectively select 2 elective courses. The commonest electives chosen in the past are ISDS 418 – Information Privacy and Security and ISDS 557 – Issues in Information Technology.

**Capstone (3 units)**

ISDS 577 – Seminar in IS Implementation

ISDS 577 is a capstone project oriented class that functions as the terminal requirement. This class covers among other things, current trends in information technology. Students are expected to write an individual research paper focusing on one or more of these current trends as well as participate in a project team developing an information system for an enterprise. They write up both a group report as well as an individual report detailing their contribution to the project. The research paper and project reports are used for the terminal evaluation for the degree.

Classes in the program are offered in five 16-week terms, with students taking two classes each term. The fall, and the spring semester are 16-weeks long, and aligned with



university program. The summer semester is split in two terms with each term 5 weeks long, and aligned with summer sessions offered by university. However, by allowing students to complete three terms in a year, the entire program can be completed within approximately 20 months.

Titanium learning management system is used in all of the courses that are taught in the program. Additionally, the Program Director has a Titanium site to communicate with the students in the program and to post relevant information for these students.

Prior to beginning their coursework, students are required to attend a one-day boot-up camp at which time they meet fellow students, the faculty who will be teaching in the program, get introduced to using the Titanium learning management system, and learn about university resources such as the library. They also learn about the software that will be used in the program and the discount plans offered to students to procure such software.

At the end of their third semester in the program students are again brought to campus to discuss their progress to date and to provide feedback on the program and the classes they have taken.

### **C. Student demand for the Program**

We would like to see increased enrollment in the program while maintaining the quality of the program at the desired level. The retention rate in any cohort in the program is almost 90%, and the students are very encouraged by this fact. Hence the program has sustained a high academic standard over the years. Graduation rate for the students is 80% within 3 years. We attribute this to our stricter admission standards.

### **D. Enrollment Trends for the Program**

While enrollment in the program has been steady more or less, class sizes are still within acceptable limits for graduate classes. Enrollment level is still at 90% of the applicants, and this mostly due to stricter entrance requirements. We have addressed the enrollment trend issues in the MSIT program by offering 2 concentrations within the MSIT program, namely the IT Management, and Data Science. Students in MSIT program with 2 concentrations should be able to mix and match their skills, and take advantage of the course offerings.

## **E. Plans for Curricular Changes**

The current program focuses on information technology and its management. While information technology continues to be a field high in demand in industry, the demand for business school graduates with skills in Data Science is rapidly growing, and is expected to continue growing well into the next decade. To cater to the growing market demand for data science professional, we have created two concentrations in the MSIT program; a 'Data Science', and, 'Information Technology Management' concentration within the MSIT program. The Data Science concentration will provide students with knowledge, skills, and experience in data processing and analytics in the context of business.

The program will leverage existing CSUF faculty and educational resources to provide the appropriate training and certifications (i.e., SAS) sought by employers. It is predicted that the North American workforce will face a shortage of 140,000 to 190,000 employees with strong data science skills in the next several years, and an unmet need for more than 1.5 million data science-savvy managers. These are the sorts of employees that need business, information systems, and data analytics skills, and this should motivate business schools to develop appropriate data science courses and programs.

The lucrative job market created by the abovementioned shortage is presumed to be appealing to prospective students. Consequently, the demand for at least some data science courses and programs has increased beyond capacity. To illustrate, last fall, the Master of Science in Analytics at North Carolina State University received close to 800 applications for about 100 openings. Similarly, Northwestern University's Master of Science in Analytics received 600 applications for 30 openings. The analytics skills gap, however, is not evident solely in terms of data science professionals (e.g., data warehousing experts and data miners), but also in terms of workers in different lines of business who are now expected to use data science tools and apply a data science mindset in various situations; this may threaten the harvesting of the abovementioned benefits of investments in data science.

### **Data Science Concentration**

30 units of coursework, including 3 units of a capstone course:

ISDS 415 – Principles of Business Intelligence

ISDS 462 – Applied Business Regression Analysis

ISDS 526 – Forecasting, Decision Analysis and Experimental Design

ISDS 540 – Statistics for Data Science (**New Course**)

ISDS 551 – Information Resource and IT Project Management

- ISDS 555 – Business Database: Design and Processing
- ISDS 556 – Data Warehousing and Foundations of Business Intelligence
- ISDS 570 – Business Data Transformation (**New Course**)
- ISDS 574 – Data Mining for Business Applications (**New Course**)
- ISDS 577 – Seminar in IS Implementation (Capstone)

Data Science and IT Management concentrations will have four overlapping courses. We expect to increase the enrollment numbers in the MSIT program with two concentrations. Students in the MSIT program will be offered much more flexibility in learning new knowledge, thus leading to wider marketability of their skills.

**III. Documentation of Student Academic Achievement/Assessment of Student Learning Outcomes.**

**A. Student Learning Goals and Assessment Plan for Student Learning**

We have designed two methods to assess student academic achievement consistent with student learning outcomes. The first method is the “Direct Assessment” whereby students are evaluated in group projects, short essays, and tests, as outlined in the next section B - Assessment and Outcome Matrix. The second method employed is the “Indirect Assessment”, which is undertaken at the end of the 3<sup>rd</sup> semester for very cohort. Students from the cohort that have successfully moved to their 4<sup>th</sup> semester are required to come to the campus in mid-September for a Mid-Point Seminar meeting. At his meeting, which is held in an open forum, students engage with the faculty in expressing their viewpoints regarding the content of the courses they have taken so far in the program, as well as the delivery of the course material. The input provided by the students is recorded. The MSIT faculty then would take appropriate measures to address the outcome of the Mid-Point Seminar.

**Direct Assessment Schedule**

Courses(s)	Semester
ISDS 551	Fall 2015
ISDS 550	Fall 2015
ISDS 552	Spring 2016
ISDS 555	Summer 2016
ISDS 505	Spring 2016
ISDS 577	Spring 2017
ISDS 577	Spring 2017

The learning goals for Information Technology Management and Data Science concentrations are presented in the following section.

**B. Assessment and Outcome Matrix.**

Each course contains a multi-modal assessment methodology to document learning via projects, demonstrations, applications, research papers, and examinations. Each learning goal is linked to specific course assignments and learning outcomes. The culminating experience includes research and a practicum grounded in the theoretical foundations covered in the study plan coursework. Each student enrolled in the program creates an electronic portfolio of culminating experiences and preparatory coursework. The student portfolios provide a comprehensive assessment of the program. The Assessment Matrix is as follows:

**Student Learning Goals and proposed Assessment of Student Learning in the Information Technology Management concentration**

Student Learning Objectives	Course(s) Assessed	Methods of Assessment
1. Articulate strategies and methods that allow for the effective management of information technology within an organization.	ISDS 551	Application of techniques in projects, and exams
2. Identify the tele-communications infrastructure and components that are necessary to support organizational data communication requirements.	ISDS 550	Short Essays and group projects
3. Demonstrate an understanding of the information systems design and development process.	ISDS 552	Individual and group projects

4. Analyze organizational data requirements and design data structures to support those requirements.	ISDS 555	Application of techniques in projects, and exams
5. Understand the foundational concepts of software programming and demonstrate the ability to implement those concepts.	ISDS 505	Application of techniques in projects, and exams
6. Collaborate effectively in a group in order to solve problems associated with information technology and its management.	ISDS 577	Group Projects
7. Plan and conduct research on contemporary issues relating to information technology and its management.	ISDS 557 ISDS 577	Research Papers

**Student Learning Goals and proposed Assessment of Student Learning in the Data Science concentration**

<b>Student Learning Objectives</b>	<b>Course(s) Assessed</b>	<b>Methods of Assessment</b>
1. Identify, design, and implement data storage mechanisms to support organizational decision-making	ISDS 556	Application of techniques in projects, and exams
2. Prepare, process, and integrate disparate data sets	ISDS 570	Short Essays and group projects

for use in organizational decision-making		
3. Select appropriate analytic methods and perform data analysis in support of organizational decision-making	ISDS 526 ISDS 574	Individual and group projects  Exams
4. Design and create tabular and graphical reports to effectively convey results obtained from data analysis activities	ISDS 556	Application of techniques in projects, and exams
5. Recognize strategies and methods that allow for the effective use and management of analytics within an organization.	ISDS 556	Application of techniques in projects, and exams
6. Collaborate effectively in a group in order to solve data science and analytics-related problems	ISDS 577	Group Projects
7. Plan and conduct research on contemporary issues relating to data science and analytics in the context of business.	ISDS 557	Research Papers

Each of the MSIT faculty is responsible for teaching the course material within the defining guideline of the course description. They interact with their class population in the manner they deem best for delivering the course content. With this in mind, the MSIT instructor is free to develop his/her methodology as outlined in the above matrix to assess and capture student learning. Summaries of the course descriptions, learning goals, and assessment strategies for the courses in the degree program are presented in Appendix I.

**C. Assessment outcomes: Improvement in teaching/learning practices**

Since the last PPR review, the following changes have been implemented as a result of the indirect assessment and outcomes. The one course for which we have had substantial negative comments was Accounting 509. Since the last PPR, Accounting 509 has been placed as an elective rather than one of the requirement courses in the program. The programming class, ISDS-505, was considerably impacting student performance in the first semester where it was offered, thus it is now being offered in the second semester. This move has resulted in much higher satisfaction in the student body, and improved teaching, and learning practices. In addition to this change, the ISDS-505 is concurrently placed in the second semester with ISDS-552, Object-Oriented Systems Analysis and Design (OOSAD). Students have provided much desirable and positive feedback, as it helped them to better grasp the concepts from Object Oriented Programming (OOP). This has resulted in a very successful learning environment on the part of the student body, and a higher degree of teaching performance. The accounting class was relegated to an elective level as per student feedback, since it did not serve the desirable need at the current state in the program. This change has permitted us to move ISDS-556, Data Warehousing and Foundations of Business Intelligence as a mandatory class in the program.

The current focus in IT seeks out students trained in “Big Data”, thus this change has significantly improved the program. IT is continuously evolving, and embracing new technologies in business practice, hence we have supplemented the elective courses with a new course – “ISDS-557: Issues in Business Information Technology”, have received a very positive feedback on this new elective. Current feedback from the student evaluations seem to suggest that the method of delivery of instructions is in line with the student expectation and this fact is supported with the success rate of MSIT degrees awarded.

**D. Quality indicators that demonstrates a higher degree of success and effectiveness**

U.S. News selects factors, known as ranking indicators, to assess each program in the categories outlined as below:

<b><u>Faculty Credentials &amp; Training;</u></b>	<b><u>Student Services &amp; Technology;</u></b>	<b><u>Student Engagement;</u></b>	<b><u>Admissions Selectivity</u></b>
---	--	-----------------------------------	--------------------------------------

A program's score for each ranking indicator is calculated using data that the program reported to U.S. News in a statistical survey. The value for each ranking indicator is

standardized about its mean to account for statistical variance. Our MSIT program received 93, 67, 80, and 92 points in the above categories.

- **Student engagement (33 percent):** Quality business programs promote participation in courses, allowing students opportunities to readily interact with their instructors and fellow classmates, as is possible in a campus-based setting. In turn, instructors are not only accessible and responsive, but they are also tasked with helping to create an experience rewarding enough that students stay enrolled and complete their degrees in a reasonable amount of time.

- **Admissions selectivity (20 percent):** Student bodies entering with proven aptitudes, ambitions and accomplishments can handle the demands of rigorous course work. Furthermore, online degrees that schools award judiciously will have greater legitimacy in the job market.

- **Peer reputation (20 percent):** A survey of high-ranking academic officials in business helps account for intangible factors affecting program quality that are not captured by statistics. Also, degrees from programs that are well respected by academics may be held in higher regard among employers.

- **Faculty credentials and training (13.5 percent):** Strong online business programs employ instructors with academic credentials that mirror those of instructors for campus-based programs, and they have the resources to train these instructors on how to teach distance learners.

- **Student services and technology (13.5 percent):** Programs that incorporate diverse online learning technologies allow greater flexibility for students to take classes from a distance. Outside of classes, strong support structures provide learning assistance, career guidance and financial aid resources commensurate with quality campus-based programs. Furthermore, applicants to the MSIT program hold full-time position in the IT industry, and most of them get fee reimbursed by their employer. This speaks to the quality of our program, as employers take the perspective that the knowledge gained by the students in the program very valuable. Thus the graduates command gainful and marketable skills. Our survey of MSIT graduates indicates that on the average the graduates see a financial gain of 25% to 35% within 6 to 12 months on graduation. In addition to financial gain, about 80% of the graduates have successfully advanced their positions in IT.



Graduation rate for the MSIT students is about 80%. The table below illustrates for a cohort graduation rates in 3, 4, 5, and 7 years. The graduation rate within 3 years is consistent with the length of the MSIT program, and majority of students, about 80%, graduate in that time period. The MSIT program requires that each student must maintain an average of 3.0 GPA to proceed to the next semester. However, if a student fails to maintain a 3.0 point GPA in a given semester, then the student is given one more semester to raise his/her grade to 3.0, or else is dropped from the program.

**Graduation Rates for Master’s-Seeking  
Students**

All Master’s Enrolled	Headcount	% Graduated within 3 years	% Graduated in 4 years	% Graduated in 5 years	% Graduated in 6 years plus 7 year persistence
Fall 2008	16	87.50%	87.50%	87.50%	87.50%
Fall 2009	33	72.73%	72.73%	75.76%	75.76%
Fall 2010	26	84.62%	84.62%	84.62%	
Fall 2011	21	76.19%	76.19%		
Fall 2012	25	84.00%			

**E. MSIT is an online program; hence student learning is assessed using the following formats/modalities.**

Each class in the program is conducted in an asynchronous learning environment. Since the students in the program are full-time working professionals, the format, and the delivery of course material has many advantages over in class program. Every examination is either taken at the campus, or proctored, thus offers a degree of flexibility not available in class program. Each course contains a multi-modal assessment methodology to document learning via projects, demonstrations, applications, research papers, and examinations. Each learning goal is linked to specific course assignments and learning outcomes. The culminating experience includes research and a practicum grounded in the theoretical foundations covered in the study plan coursework. Each student enrolled in the program creates an electronic portfolio of culminating experience and preparatory coursework. The student portfolios provide a comprehensive assessment of the program.

## ***Communications***

Almost every course has group projects in which, the students collaborate online to deliver the final report. In addition, there is a discussion assignment every week, which requires the students to post their discussion, evaluate all other posts and submit responses to other posts.

Students communicate with the instructor and their peers in completing weekly assignments, completing project reports, and preparing for examinations. Online asynchronous communications were used on a weekly basis. In addition, students and the instructor use the virtual classroom synchronous online communications in reviewing for examinations. Team members used email and text messaging to communicate while working on their project reports. Use of both synchronous and asynchronous online communications allowed students to refine their communications skills beyond the traditional face-to-face techniques used in classroom settings.

## ***Collaboration***

Students have demonstrated collaborative abilities through their active participations in weekly online discussions, which are formally evaluated and given grades. In these discussions, students collaborate to arrive at answers to questions posted in the form of discussion threads, which address different issues that face the information technology needs of a business.

## **IV Faculty**

### **A. Department FTEF**

The ISDS Department currently has 18 tenured and tenure-track faculty (including one faculty member on leave to work in the Chancellor's Office), 7 full-time lecturers (of who six have Ph.D. degrees), 1 faculty member in the FERP program, and 8 part time lecturers. Our most recent FTEF budget was approximately 25 FTEF. For the information systems courses in the program only full-time faculty currently teach in the MSIT program, however for the first three cohorts a recently retired tenured faculty also served as the program coordinator taught one class.

Faculty members in the department fall into three disciplinary areas: information systems, statistics, and management science. Due to the close relationship of these academic disciplines, faculty members who were trained in one discipline frequently will

teach in one or both of the other disciplines. The department has had a major emphasis in recruiting faculty in the area of information systems over the past eight years.

At the start of the MSIT program the department had five tenure-track faculty members and two Ph.D. lecturers who normally taught information systems classes. During the four year period since the inception of the MSIT program the department hiring and retirements have been as followed:

	Prior to 2009	2015
Tenure-track/tenured faculty	5	7
Full-time lecturers	2	1

At present, of the 18 tenured and tenure-track faculty members in the department, there are 10 full professors, 2 associate professors, and 6 assistant professors in the department. Of the faculty members teaching in the MSIT program five are full professors, one associate professor, an assistant professor, and one full-time Ph.D. lecturer.

#### **B. Priorities for Additional Faculty Hires**

At this point in time we have sufficient resources in the field of information systems to staff the courses for the Masters of Science in Information Technology and Masters of Science in Information Systems degrees as well as the undergraduate concentration in information systems, decision sciences, and business analytics.

#### **C. Faculty Teaching in the Program**

Each course in the MSIT program is taught by a full time ISDS faculty. No part time faculty or teaching assistants teach in the program.

The following faculty members have been involved in the MS in Information Technology Program.

##### **Dr. Rahul Bhaskar**

Professor

##### **Dr. Samuel Yang**

Professor

##### **Dr. Ester Gonzalez**

Assistant Professor

**Dr. Pawel Kalczynski**

Professor

**Daniel Soper**

Associate Professor

**Ofir Turel**

Professor

**Jenny Zhang**

Professor, Associate Dean, Academic Programs & Student Success

**Dr. Pramod Pandya**

Program Director, MSIT

**D. Instructor Participation in Special Sessions Programs Offered by the Department**

The ISDS Department is scheduled to offer Certificate in Health Care Analytics thru Extended Education, beginning in fall 2016. The Certificate in Health Care Analytics is designed to respond to the demand for trained analytics professionals in the health care industry. The Certificate promotes the effectiveness, efficiency and quality of health care organizations, health care IT companies, and consulting firms by leading industry professionals to make data-driven decisions and deliver analytical expertise. Students who successfully complete the certificate program, can transfer 9-units of course work to either MSIT or MSIS program.

**V. Student Support and Advising**

**A. Student Advising**

At the undergraduate level, all business students receive academic advisement through the College of Business and Economics Advising Center. The department faculty has undertaken to advise and mentor students for career opportunities. Advising for graduate students occurs in two phases. Prior to admission into the program, MCBE staff members provide advisement regarding the admissions process. The Department Chair and Program coordinators for the MS in Information Systems and the MS in Information Technology programs also assist the staff in advisement. For the MS in Information Systems program, the Department Chair also advises students on the course work that

makes up the degree program, helping them select their elective courses and approving any substitutes in course work. The MSIT Program Director provides student advisement for students in the MSIT program.

### **B. Student Participation in Research with Faculty**

Students who have maintained a very high standing in the program are offered an opportunity to engage on a research topic under the supervision of an instructor. The student is required to suggest a research topic, give a breakdown of research methodology, specify the milestones, and meet the approval from the assigned instructor. Research is presented for review for oral presentation and grading.

## **VI. Resources and Facilities**

### **A. State and Non-State Resources Received**

The MSIT program is being run under state support. Faculty allocations in the Mihaylo College of Business are funded by position. Hence, the funding we receive corresponds to a FTES target, based on an SFR of around 30 to 1. As the classes in the MSIT program have had fewer than 30 students enrolled in them, and this shortfall was made-up by having other classes that had larger class sizes.

In addition to the funding of faculty positions, the program also collects supplemental student fees. Students pay \$300 for the Boot Camp and an additional \$180 for the midpoint session held at the end of their first year in the program. Monies collected for these endeavors have gone to cover the cost of food for the meetings and a small faculty stipend to those faculty members who participate in these events. Additionally, students in the program pay a technology fee of \$99 for each course that they take. This helps subsidize the technology needs of the ISDS Department relative to this program.

### **B. Special Equipment Used by the Program**

The ISDS Department purchased digital voice recorders and microphones for faculty interested in using this as a means of posting audio lectures on Blackboard. We also purchased USB thumb drives, external hard drives for faculty to back up their hard drives, web cams, and a digital video camera that can be used by faculty and students in the program. A number of faculty members also have dedicated servers that can be used for class work that is part of the program.

### **C. Library Resources**

Resources provided by the CSUF library are adequate. Due to the on-line and topical nature of the courses taught in the program, students use electronic journals to a far greater degree than print versions. These resources have been adequate for the program. The MCBE and Economics as well as the ISDS Department are a member of academic alliances with several software firms including: Microsoft, IBM, SAP, ESRI, and Oracle. Through these alliances, faculty and students are able to procure access to software used in the program at a substantially lower cost than paid by the public. The MCBE also subscribes to WRDS financial databases that can be used by classes in the program.

### **VII. Long-term Plans**

The major long-term plan for the MSIT degree program is to supplement the present structure of the MSIT program with a Data Science concentration. The program is run on a state-support basis. Our long-term planning is to ensure that course content adapts to rapid changes in the field of information technology, and Data Science. Fortunately, the faculty members who teach in the MSIT program are active researchers who stay current in their fields of expertise so this should not be a great challenge for them.

The current program focuses on information technology management. While information technology continues to be a field high in demand in industry, the demand for business school graduates with skills in Data Science is rapidly growing, and is expected to continue growing well into the next decade. We will be offering the Data Science concentration in fall 2016, and this should address the level enrollment from year to year, and thus lead to an upward trend in the enrollment.

The long-term plans for the MSIT degree program will continue to support the University's, and College's Mission, Goals, and Strategies as well as the ISDS Department's Mission Statement as detailed in Section I A. of this report. Further details on the long-term plan for the Data Science concentration, and the budget are presented in Appendix IV.

## **APPENDIX I. SUMMARIES: COURSE DESCRIPTIONS, LEARNING GOALS, AND ASSESSMENT STRATEGIES**

### **ISDS-505: Programming Concepts for Information Technology**

#### ***Description***

Application programming fundamentals for IT systems: structured and object-oriented programming, accessing and management of database tables and external files; layout design and data extraction for advanced output; testing, debugging and analysis tools.

#### ***Learning Goals***

The ability to code a program using fundamental concepts of programming, as well as to write proper documentation of the program. Additionally, analyze and determine a particular programming environment suitable to implement the computer based application or information systems.

#### ***Assessment Strategies***

- Programming assignment every week to assess the learning outcomes.
- An individual programming project to manipulate database records.
- One exam to assess the foundation concepts of programming logic.

### **ISDS-418: Privacy and Security**

#### ***Description***

Security and privacy issues associated with the use of computer systems and data networks. The focus of the course is to introduce software tools to minimize risks, and thus prevent corporate data losses.

#### ***Learning Goals***

Introduce information privacy and security domains such as cryptography, software security, operating system security, database security, network security, computing privacy, and legal and ethical issues relating to information security. The functional capabilities of security and privacy mechanisms as intrinsic components of information systems

#### ***Assessment Strategies***

The outcome of the learning objectives was determined using a combination of assessment methodologies, including examinations, a group project, and an individual project. Examinations were designed to assess the extent to which students were absorbing the conceptual material presented throughout the course. Each student also had to write a research paper on an approved topic of his or her choice.

### **ISDS-540: Statistics for Data Science**

#### **Description**

*The course presents statistical data analysis tools that are commonly used in business applications, and their implementation in the R statistical programming environment.*

#### **Learning Goals**

Perform quantitative analysis and data visualization in R programming. Be able to interpret R outputs. Describe data based on shape, location and variability. Understand random variables, and probability distributions. Apply the Normal distribution. Model sample variation using sampling distributions... Understand confidence intervals and margin of error, testing hypotheses, p-value and significance level. Perform inference on whether the means/proportions of two groups are different. Understand correlation and causation. Use regression analysis to measure relationships. Understand how to use ANOVA to analyze designed experiments

#### **Assessment Strategies**

Students were engaged in collaborative activities, such as individuals were asked to post online questions and discussion topics, as well as to respond to the postings of their peers. Students have demonstrated their proficiency with the course concepts in a midterm exam, a final exam, solutions to hands-on problems, and a project report.

### **ISDS-550: Telecommunications and Business Networks**

#### **Description**

This course examines the essential concepts for developing data communication architecture for a business enterprise. The course examines the issues of transmission media, speed, efficiency, protocols, and security in a variety of network architectures such as LAN, WAN, VPN, leading to “the state of the art”



wireless networks. The course concludes with a discussion on the technical implications of doing business on the Internet.

### ***Learning Goals***

Assess the telecommunications needs of an organization, and select the appropriate telecommunications hardware and software. Plan the development of a local or wide area data and communications network, so as to allow for future accessibility to the Internet in support of business operations.

### ***Assessment Strategies***

Students have demonstrated collaborative abilities through their active participations in weekly online discussions, which are formally evaluated and given grades. In these discussions, students collaborate to arrive at answers to questions posted in the form of discussion threads, which address different issues that face the telecommunications field today. Several communication modalities are used in this course, including weekly written assignments to be submitted, a major research report due at the end of the term, regular email exchanges among students and between students and the instructor, and weekly online discussions that are evaluated and graded.

## ***ISDS-551: Information Resource and IT Project Management***

### ***Description***

The expanding role of information systems in the overall strategy and management of organizations is examined. Topics include strategic value of information systems, management of information systems development and procurement process, E-commerce, and integrated enterprise systems.

### ***Learning Goals***

Upon the successful completion of the course, a student should be able to: Recognize the strategic role of information technology and information resources in business. Identify the new models of doing business. Distinguish the most important concepts related to managing and using information systems. Recognize how business is done on the Internet. Initiate, plan and oversee the process of implementation of IT projects.

### ***Assessment Strategies***

This course has group projects in which the students collaborate online to deliver the final report. In addition, there is a discussion assignment every week, which requires the students to post their discussion, evaluate all other posts and

(optionally) submit responses to other posts. The students are also required to submit a one page summary of a relevant article from a magazine every week. One midterm exam, one final exam, six individual homework assignments, graded discussion, and two group projects are used to determine the learning outcomes.

### **ISDS-552: Systems Analysis, Design, and Development**

#### ***Description***

Business organizations are complex entities that must be studied with a systematic approach. An information system is a computer-aided system that helps users of a particular organization to store, search, manage, analyze, and present information. Systems analysis and design studies the complex process of developing and maintaining an information system by identifying it as a system, visualizing and translating it into abstract terms. A core set of skills is required of system analysts and project managers regardless of what approach or methodology is used. This course focuses on these skills by discussing the four phases of the Systems Development Life Cycle (SDLC): (1) Project Management and Planning, (2) Systems Analysis, (3) Systems Design, and (4) Systems Implementation and Operation. The Object-Oriented Systems Analysis and Design (OOSAD) approach is emphasized in this course.

#### ***Learning Goals***

Upon the successful completion of this course, a student should be able to: Recognize the foundations of Object Orientation and OOSAD. Identify the basic concepts of project management. Apply requirements determination and use-case analysis. Apply conceptual data modeling, object-relational modeling, and analysis classes. Design and construct storage, architecture, and user interface. Conduct the processes of implementation and maintenance of information systems using the OO paradigm.

#### ***Assessment Strategies***

This course has group projects in which the students collaborate online to deliver the final report. In addition, there is a discussion assignment every week, which requires the students to post their discussion, evaluate all other posts and (optionally) submit responses to other posts. The students are also required to submit a one-page summary of a relevant article from a magazine every week. One midterm exam, one final exam, six individual homework assignments, graded discussion, and two group projects are used to determine the learning outcomes.

## **ISDS-553: Electronic Commerce: Analysis & Evaluation**

### ***Description***

This course studies electronic commerce with focus on understanding the technical infrastructure needs of e-commerce web sites. Further it examines organizational challenge for developing an appropriate business model for emergence of electronic business. The course also explores social and economic impact of electronic commerce activities on the consumers.

### ***Learning Goals***

Integrate electronic commerce into the business functions of an organization. Understand the marketing, legal, and supply chain issues associated with the successful implementation of electronic commerce. Make an appropriate choice of software and systems to support electronic commerce transactions.

### ***Assessment Strategies***

In this course, students had to collaborate in two ways. First, they had to work on a group project that required them to set goals; distribute and delegate tasks among team members and be accountable to other team members so that each group could submit project deliverables on time. The quality of the reports indicates good collaboration skills and the effort that team-members had put into this task. The business plans were scoped well showing that students had understood the concepts taught. Second, individuals were asked to respond to online questions and discussion issues, as well as to comment on the postings of their peers. Students had demonstrated their proficiency with e-Commerce concepts by implement their e-commerce website. In addition to projects, one midterm and one final examination was administered.

## **ISDS-555: Business Databases: Design & Processing**

### ***Description***

Internet and multi-user databases; Web servers; data warehouse, structured query language, client-server database systems and programming; object-oriented databases

### ***Learning Goals***

Design a database system to serve the needs of an organization. Select appropriate software to operate and manage the database system.

### ***Assessment Strategies***

Students were engaged in collaborative activities, such as individuals were asked to post online questions and discussion topics, as well as to respond to the postings of their peers. Students have demonstrated their proficiency with the course concepts in a midterm exam, a final exam, solutions to hands-on problems, and a project report.

## **ISDS 556 – Data Warehousing and Foundations of Business Intelligence**

### ***Description***

This course introduces the principles and procedures related to the design and use of Business Analytics (BA) systems. It focuses on the Data Warehouse (DW) as a platform for BA applications, such as reporting, dashboards, Online Analytical Processing (OLAP) and data mining. In this course you will learn a core set of skills for initiating and managing business intelligence projects, as well as designing data storage for analytical purposes, and using stored data for business intelligence.

### ***Learning Goals***

Upon successful completion of this short course you should understand the technologies used in business intelligence projects, and possess valuable data warehouse analysis skills, as well as good business intelligence comprehension.

### ***Assessment Strategies***

Students have demonstrated their proficiency with the concepts in the midterm examination, and in their project reports. The quality of the reports indicates good collaboration skills and the effort that team-members had put into this task. Second, individuals were asked to respond to online questions and discussion issues, as well as to comment on the postings of their peers.

## **ISDS-557: Issues in Business Information Technology**

### ***Description***

Over the last three years Southern California has quietly built momentum in venture capital investment in technology firms, establishing the foundation to become the next hot place for technology entrepreneurship (Silicon Valley II). This course will focus on these current issues, and will teach you the basics of online consumer psychology and behavior, and how you can harness human nature for improving the success of online products/services in the market. It is designed to

teach project and product managers, entrepreneurs, investors, and system developers to be able to identify winning online products/services and to improve the long-term consumer appeal of existing online products/services.

### ***Learning Goals***

This course advances the understanding of online product/service management in organizations. Students will: Gain the awareness of transformation of online product/service management. Develop understanding of the needed features and infrastructure for online product/service success. Gain ability to analyze and evaluate different online products/services. Gain an ability to apply this understanding to their work life. Explore the socio-economic and organizational impacts of, issues and opportunities related to online products/services.

### ***Assessment Strategies***

Students have demonstrated their proficiency with the concepts in the midterm examination, and in their project reports. The quality of the reports indicates good collaboration skills and the effort that team-members had put into this task. Second, individuals were asked to respond to online questions and discussion issues, as well as to comment on the postings of their peers.

## **ISDS-558: Advanced Software Development with Web Applications**

### ***Description***

Advanced client/server software development techniques with specific emphasis on the Internet. Topics include file structure, managing relational databases with data control and SQL, and ActiveX components and objects.

### ***Learning Goals***

The ability to design and code client-server network architecture using MS Visual Studio and .NET tools such as ASP.NET and WEB tools. Integrate this architecture with a database system to serve the needs of an organization.

### ***Assessment Strategies***

- Programming assignment every week to assess the learning outcome.
- An individual project to determine the understanding of the client-server architecture.
- Two exams to assess the understanding of the concepts learnt in the class.

## **ISDS-570: Business Data Transformation**

### ***Description***

This hand-on course focuses on the ETL/ELT aspects of business data analysis. Topics covered include: relational and multidimensional data extraction from local and remote sources; designing ETL processes; querying multidimensional cubes; dimensions and time-based hierarchies; and adding calculated members.

### ***Learning Goals***

Prepare, process, and integrate disparate data sets for use in organizational decision-making.

### ***Assessment Strategies***

Students have demonstrated their proficiency with the concepts in the midterm examination, and in their project reports. The quality of the reports indicates good collaboration skills and the effort that team-members had put into this task. Second, individuals were asked to respond to online questions and discussion issues, as well as to comment on the postings of their peers.

## **ISDS-574: Data Mining for Business Application**

### ***Description***

This is a Graduate level course in managerial data analysis and data mining. The emphasis is on understanding the application of a wide range of modern techniques to specific decision-making situations, rather than on mastering the theoretical underpinnings of the techniques. Upon successful completion of the course, you should possess valuable practical analytical skills that will equip you with a competitive edge in almost any contemporary workplace. The course covers methods that are aimed at prediction, classification, and clustering. It also introduces cutting edge interactive data-visualization tools, as well as data reduction techniques and presents overviews of current topics like analytics in healthcare, social media, big data, etc. along with relevant software applications.

### ***Learning Goals***

To appreciate the enhanced data rich environment of today's global economy and get exposed to the related business intelligence service opportunities that exist. Provide a practical understanding of the key methods of classification, prediction, reduction and exploration that are at the heart of data mining.

Decide *when* to use *which* technique, understand the limitations of various techniques

### ***Assessment Strategies***

Students have demonstrated their proficiency with the concepts in the midterm examination, and in their project reports. The quality of the reports indicates good collaboration skills and the effort that team-members had put into this task. Second, individuals were asked to respond to online questions and discussion issues, as well as to comment on the postings of their peers.

### **ISDS-577: Seminar in Information Systems Implementation**

#### ***Description***

This course integrates the information systems development concepts of information systems project management, analysis, design, and implementation with telecommunications, database design, coding, testing, and system integration issues. Students will develop information systems from concept to completion through individual and team effort. The individual project will fulfill the terminal degree requirement.

#### ***Learning Goals***

The ability to conduct, evaluate and synthesize research and apply concepts to computer based information systems.

#### ***Assessment Strategies***

*An individual research paper was required to assess the following requirements of the course.*

1. Research in Information Systems.
2. Ability to engage in reading and understanding research literature, both printed and electronic.
3. Develop critical thinking about the content of the research material.
4. Formulate a specific research topic that can be defend through persuasive and logical arguments.
5. Develop a thesis statement that encapsulates stated objectives.
6. Search for research sources which support your thesis position.
7. Create an abstract that shares the vision of your thesis.
- 8 Generate a research paper outline based on your thesis statement and the sources.
9. Write a research paper, which communicates your body of knowledge.

**APPENDIX II. GRADUATE DEGREE PROGRAMS**

**TABLE 1. Graduate Program Applications, Admissions, and Enrollments**

For each graduate degree program, a table will be provided showing the number of student applications, number of students admitted, the percentage of students admitted, the number of new enrollments, and the percentage of new enrollments. Percentage of students admitted is equal to the number of students admitted divided by the number of students who applied. Percentage of students enrolled is equal to the number of students enrolled divided by the number of students admitted.

TABLE 1. Graduate Program Applications, Admissions, and Enrollments

Academic Year	# Applied	# Admitted	% Admitted	# Enrolled	% Enrolled
2010-2011	60	28	47%	26	93%
2011-2012	45	23	51%	21	91%
2012-2013	49	27	55%	25	93%
2013-2014	57	30	53%	25	83%
2014-2015	38	16	42%	16	100%

**TABLE 2. Graduate Program Enrollment in FTES**

For each graduate degree program, tables will be provided showing student enrollment for the past five years.

TABLE 2-A. Graduate Program Enrollment in FTES

Academic Year	Enrollment in FTES
2010-2011	20.7
2011-2012	18.3
2012-2013	17.7
2013-2014	19.2
2014-2015	16.3

Table 2-B. Graduate Program Enrollment in Headcount

Academic Year	Headcount majors				FTES per headcount
	Master's	Doctoral	Credential	Total	
2010-2011	51.5				51.5
2011-2012	46.0				46.0
2012-2013	44.0				44.0
2013-2014	48.5				48.5
2014-2015	40.5				40.5



**TABLE 3. Graduate Student Graduation Rates**

For each graduate degree program, a table will be provided showing the graduate rate for Master's-seeking students.

**TABLE 3. Graduation Rates for Master's-Seeking Students**

All Master's Enrolled in:	Headcount	% Graduated within 3 years	% Graduated in 4 years	% Graduated in 5 years	% Graduated in 6 years plus 7 year persistence
Fall 2008	16	87.50%	87.50%	87.50%	87.50%
Fall 2009	33	72.73%	72.73%	75.76%	75.76%
Fall 2010	26	84.62%	84.62%	84.62%	
Fall 2011	21	76.19%	76.19%		
Fall 2012	25	84.00%			

**TABLE 4. Master's Degrees Awarded**

For each graduate degree program, a table will be provided with the number of master's degrees awarded.

**TABLE 4. Master's Degrees Awarded**

Academic Year	Degrees Awarded
2010-2011	23
2011-2012	24
2012-2013	16
2013-2014	22
2014-2015	25

### **APPENDIX III. FACULTY CURRICULUM VITAE**

#### **Dr. Rahul Bhaskar**

Professor

Ph.D. in MIS, University of Wisconsin – Madison (1995)

Industry (more than 20 years), Academic (more than 13 years)

Director, Board of Directors, Teradata University Networks, Teradata Corporation

Director: Center for Information Technology and Business Analytics

Faculty Advisor: Health Care Analytics Certification Program and Analytics Club

Consultant: Health Care Analytics, Marketing Analytics

#### **Dr. Samuel Yang**

Professor

Ph.D., Management of Information Systems, Claremont Graduate University

Research & Publications in Information Systems

Industry Experience: Verizon Wireless, Hughes Space and Communications

Data Communications, Wireless Networking, Systems Analysis and Design

#### **Dr. Ester Gonzalez**

Assistant Professor

Ph.D. in Information Systems, Baylor University (2012)

Research & Publications in internal social media, knowledge management, organizational culture

#### **Dr. Pawel Kalczynski**

Professor

Ph.D. in MIS, Poznan University of Economics (2002)

More than 20 scholarly journal publications and more than 20 other types of publications

Consultant: Financial Analytics, Healthcare Analytics, Energy Analytics

#### **Daniel Soper**

Associate Professor

Ph.D. in Information Systems, Arizona State University (2008)

Research & Publications in Information systems

**Ofir Turel**

Professor

Scholar in Residence at USC

Ph.D. in MIS, McMaster University, Canada (2007)

More than 10 years of IT project and program management experience as well as consulting experience.

Director at two boards

Published more than 50 scholarly articles

**Jenny Zhang**

Professor, Associate Dean, Academic Programs & Student Success

Ph.D. in MIS, New Jersey Institute of Technology

Research & Publications in Information systems

Industry experience in software engineering and application development

**Dr. Pramod Pandya**

Program Director, MSIT

Ph.D., Mathematics, University of London

Research & Publications in Information Security, Information systems

Industry experience in IT Management of Data Networks, Information Security

## **APPENDIX IV. RESOURCES & LONG-TERM PLANNING**

This appendix has tabulated data on the resources and long-term planning for the Data Science concentration which are presented in the following 3 sections:

Section A: Program Cost Analysis 2014 – 2015

Section B: Projected Operational Budget

Section C: Projected Revenue & Expense External review