<div align="center">Section I: The Request</div>

University of Utah requests approval to offer an M.S. degree in Information Systems (MSIS) effective Spring 2009. This program has been approved by the institutional Board of Trustees on xx Month 2008.

<div align="center">Section II: Program Description</div>

Complete Program Description

Enterprises in the private and public sectors need information systems (IS) executives, analysts and specialists with business and technology knowledge to align information technology with business strategies. Information systems (IS) courses are designed to offer courses that integrate technology into business processes or integrate management or business logic into technologies. There are growing needs for IS professionals to manage and secure data and systems that create business value. To better prepare students for challenges arising from these needs, the proposed MS IS program will allow students to take more comprehensive and focused IS courses than other existing undergraduate or graduate programs at the University of Utah and other universities within the Utah System of Higher Education do. The program seeks students with diverse backgrounds. Hence, applicants don't need to have prior IS or business degrees or course work at the time of application or admission. Once admitted, students without prior IS or business course work will need to take additional courses to satisfy the IS pre-requisite requirement or the business requirement prior to graduation.

The following highlights the requirements for completing an MS IS degree:

- 30 credit hours total of core, track and elective courses for students who meet the MS IS degree re-requisites or equivalent at the time of admission. Students without prior course work on business subjects will take 6 credit hours of business courses, while students without prior course work on IS subjects will take 6 credit hours of IS pre-requisites prior to graduation.
- 15 required core credit hours including a 3-credit master project that integrates IS and business knowledge to complete a real world project.
- 6 required track credit hours in either the data or security track.
- Students are not limited to choose one track only.
- Students need to take 9 credit hours of breadth elective courses from other non-core IS courses that are not chosen as track courses. With permissions from the MS IS curriculum committee, students can take courses in other departments or schools to expand their business, management, computing, statistics or other specialized knowledge.

The following figure shows the courses in the MS IS curriculum by category. Appendix A provides brief descriptions of these courses. All of the courses in the MS IS curriculum are or will be on 2008-2010 class schedules. Hence, we don't need to add new courses in order to offer the MS IS degree. The MS IS curriculum committee will review and, whenever necessary, revise the MS IS degree requirements every two years.
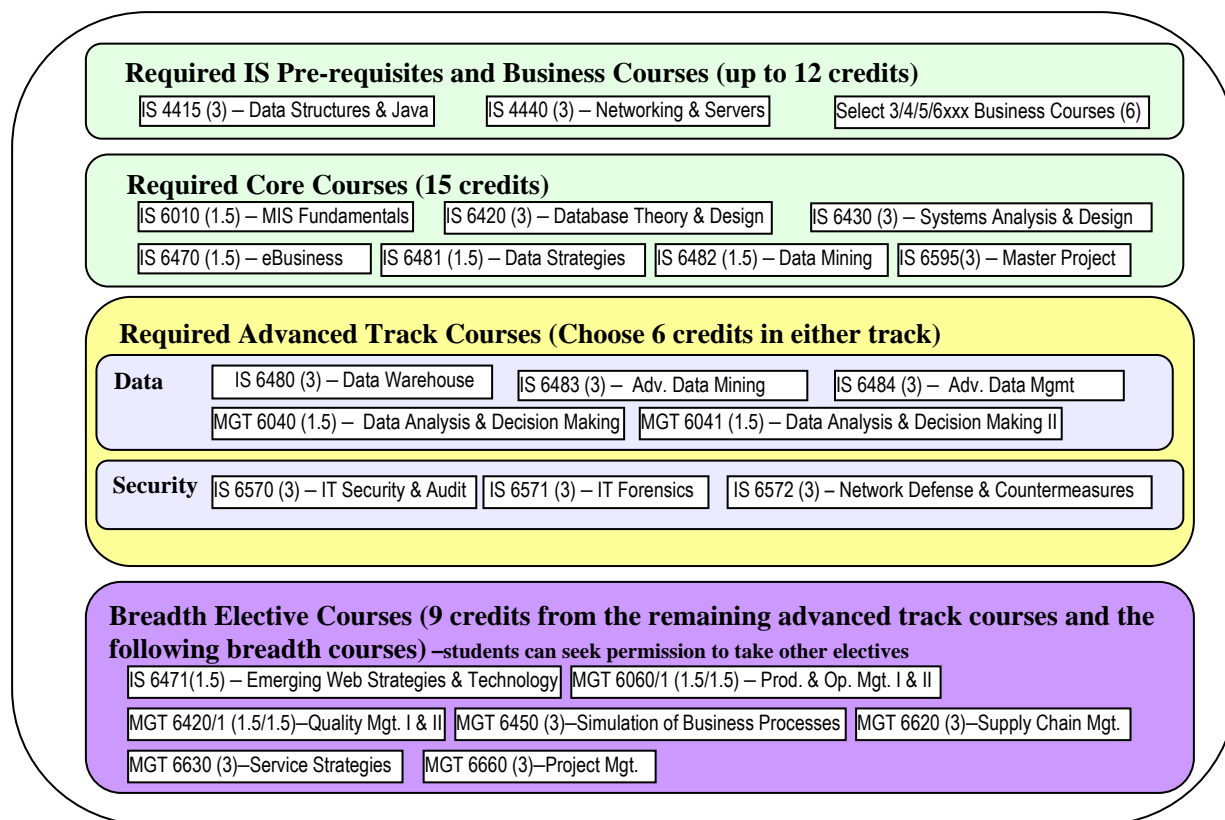
Required IS Pre-requisites and Business Courses (up to 12 credits)

IS 4415 (3) – Data Structures & Java   IS 4440 (3) – Networking & Servers   Select 3/4/5/6xxx Business Courses (6)

Required Core Courses (15 credits)

IS 6010 (1.5) – MIS Fundamentals   IS 6420 (3) – Database Theory & Design   IS 6430 (3) – Systems Analysis & Design

IS 6470 (1.5) – eBusiness   IS 6481 (1.5) – Data Strategies   IS 6482 (1.5) – Data Mining   IS 6595(3) – Master Project

Required Advanced Track Courses (Choose 6 credits in either track)

Data   IS 6480 (3) – Data Warehouse   IS 6483 (3) – Adv. Data Mining   IS 6484 (3) – Adv. Data Mgmt

MGT 6040 (1.5) – Data Analysis & Decision Making   MGT 6041 (1.5) – Data Analysis & Decision Making II

Security   IS 6570 (3) – IT Security & Audit   IS 6571 (3) – IT Forensics   IS 6572 (3) – Network Defense & Countermeasures

Breadth Elective Courses (9 credits from the remaining advanced track courses and the following breadth courses) –students can seek permission to take other electives

IS 6471(1.5) – Emerging Web Strategies & Technology   MGT 6060/1 (1.5/1.5) – Prod. & Op. Mgt. I & II

MGT 6420/1 (1.5/1.5)–Quality Mgt. I & II   MGT 6450 (3)–Simulation of Business Processes   MGT 6620 (3)–Supply Chain Mgt.

MGT 6630 (3)–Service Strategies   MGT 6660 (3)–Project Mgt.

Figure 1 MS IS Curriculum

Business Requirement - At the time of admission, MS IS students who haven't had prior course work on business subjects will be required to take 6 credits of business courses. Appendix A provides a sample of DESB courses that MS IS students can take to fulfill this requirement. Upon approvals by the MS IS committee, students may use other business courses not listed in Appendix A to fulfill the Business Pre-requisite requirement. Students can take courses for this requirement while taking the MS IS core, track or breadth elective courses.

IS Pre-requisite Requirement – At the time of admission, MS IS students who haven't had prior course work on IS subjects will be required to take the following two IS courses that also are pre-requisites to some of the MS IS core, track or elective breadth courses. Appendix A provides brief descriptions of these courses.

Course Number	Course Title	Credit Hours
IS 4415	Data Structures and Java	3
IS 4440	Networking and Severs	3

Required Core Courses – Each student is required to take 15 credits of required core courses in total for the MS IS degree requirement. The following table lists the required core courses for students admitted for 2009-10 if the program is approved.

Course Number	Course Title	Credit Hours
IS 6010	MIS Fundamentals	1.5
IS 6420	Database Theory and Design	3
IS 6430	Systems Analysis and Design	3
IS 6470	eBusiness	1.5
IS 6481	Data Driven Strategies and Products	1.5
IS 6482	Data Mining	1.5
IS 6595	Master Project	3

Track Courses – Each student must take 6 credits at the minimum for the track of his or her choice. The following table includes track courses in the data and security tracks.

Course Number	Course Track/Title	Credit Hours
	Data Strategies Track	
IS 6480	Data Warehouse	3
IS 6483	Advanced Data Mining	3
IS 6484	Advanced Data Management	3
MGT 6040	Data Analysis and Decision Making I	1.5
MGT 6041	Data Analysis and Decision Making II	1.5
	Information Security Track	
IS 6570	IT Security & Audit	3
IS 6571	IT Forensics	3
IS 6572	Network Defense and Countermeasures	3

Breadth Elective Courses - Each student must take at least 9 credits of breadth elective IS courses from the following list and the track courses not selected by the student for the track requirement.

Course Number	Course Title	Credit Hours
IS 6471	Emerging Web Strategies and Technology	3
MGT 6060/1	Product and Operations Management I & II	1.5/1.5
MGT 6420/1	Quality Management I & II	1.5/1.5
MGT 6450	Simulation of Business Processes	3
MGT 6620	Supply Chain Management	3
MGT 6630	Service Strategies	3
MGT 6660	Project Management	3

Students can also fulfill this requirement with courses offered by the DESB, the School of Computing or other colleges within the University of Utah with permission from the MS IS committee and the course instructors. Appendix A shows a list of other DESB courses that the students and advisors can consider to complement the students' interests in applying IS to the Accounting, Finance, Operations Management or Marketing field.

New Preps - The following table shows the four new preps of MS IS courses in 2009-2010.

Course Number	Course Title	Hours	Instructor
IS 6483	Advanced Data Mining	3	Dr. Olivia Sheng
IS 6484	Advanced Data Management	3	Dr. Olivia Sheng
IS 6571	IT Forensics	3	Dr. Randy Boyle

Purpose of Degree

The purpose of the degree is to prepare students for their pursuit of careers or more advanced studies in information systems with specialized foci on data driven strategies and information security. Enterprises need to create, manage and secure information systems that drive business processes and strategies. As will be elaborated in the Labor Market Demand section, the demand for information systems workforce and executives with both business and information systems knowledge has been growing rapidly in the State of Utah and the rest of the nation. Information systems courses integrate learning of information technology and management by providing opportunities for applying and practicing information, operations, systems and management knowledge in real world oriented contexts. The undergraduate information systems major is focused on IS fundamentals including: problem solving using computer programs, data management using databases, security of information systems, methods for analyzing and converting user requirements for information systems into implementation, as well as information system implementation for web applications. The proposed MS IS will also allow students to gain knowledge in advanced subjects including data mining, advanced data management, IT in business, data strategies and technology, web strategies and technology, as well as advanced IT security topics. No other master programs in the School of Business or non-business departments can offer the same extent of concentration in IS knowledge for management applications as MS IS.

The proposed MS IS program is expected to generate the following outcomes:

1. Graduates from the MS IS program will have the knowledge and skills required to fill the market needs for information and systems management, data analysis, and information security for employers within Utah and across the nation.

2. Graduates from the MS IS program will help with economic development in Utah and the rest of the nation through the application of IS knowledge and skills at work.

Institutional Readiness

By July 1, 2008, the David Eccles School of Business has five regular, tenure-track as well as two academically qualified and one professionally qualified fulltime non-tenure-track IS faculty. Current IS faculty members reside in the School of Accounting and Information Systems. They teach BS and Ph.D. programs in IS as well as additional undergraduate and master level courses in the business core, business minor, and MBA programs. Two of the tenure-track IS faculty members have received tenure. One adjunct part-time lecturer is scheduled to offer 6 credit hours of IS courses starting in 2009. Several graduate teaching assistants (GTAs) cover the multiple sections of a lower division IS course.

Five tenure-track and one non-tenure-track faculty members in Operations Management (OM) reside in the Management Department also offer elective courses in data analysis, simulation modeling, project management, supply chain management, service strategies and operations management that are synergistic to IS courses. These courses offer management principles, tools or contexts for applying information systems in business processes. The strong synergies between IS and OM courses are evident.

MS IS students are highly encouraged to take these OM courses for their track and elective breadth requirements.

All of the courses included in the MS IS curriculum have been scheduled as electives for MBA and other master or Ph.D. students at the University of Utah to take for 2008-2010. Hence, no additional faculty resources are required to offer MS IS. We project that the tuition-to-program revenues will support the hiring of faculty to meet additional faculty needs, if any, of MS IS after 2009-2010.

With support from the Director of School of Accounting and Information Systems, the Chair of the Management Department, and the Dean of the David Eccles School of Business, IS and OM faculty have submitted a proposal in parallel to establish a new department, named Operations and Information Systems, to house the IS and OM faculty and the proposed MS IS program. The new department will have administrative staff to provide support for the MS IS program as part of the departmental budget. The Masters Program office in the David Eccles School of Business will provide a full-range of master program services.

Faculty

The matrix below lists the faculty members who are academically qualified to teach the IS pre-requisites, core, track, and synergistic elective courses for the MS IS program if approved. Some of the faculty have already taught or are scheduled to teach these courses as the courses are already a part of the MBA elective courses or the undergraduate IS major courses. The faculty members most prepared to teach a course are marked with red squares. . At least two faculty members are qualified or most prepared to teach each of the IS courses. This level of preparedness is adequate throughout the first five years of the MS IS program. Ten out of the 16 faculty members in the matrix are regular full-time, tenure-track. In 2008-2010, all of the MS IS core courses will be taught by regular, tenure-track faculty. Four out of 16 faculty members are non-tenured contract faculty. Two of them are academically qualified. The remaining two faculty members are part-time adjunct faculty members. One of them has a Ph.D. One additional tenure-track IS and two additional tenure-track OM faculty positions are opened to be filled by fall 2009. The new IS and OM faculty hires are expected to cover teaching of various courses in the MS IS curriculum. The additional faculty resource needs depend on the growth of MS IS and BS IS programs as well as class enrollments past 2009-2010. We will utilize the increased tuition-to-program revenue for additional hires if necessary.

Faculty members are provided research accounts which can be used to subscribe to academic and professional publications and to attend conferences or meetings in IS research and education. We are also organizing a Board of Advisors for faculty and students. IS faculty are encouraged to seek opportunities to collaborate with the advisors on real world projects that also serve to help update faculty knowledge of real world practices.

		Course	RA	RB	DG	JH	PH	DM	TM	GP	JP	VR	GS	JS	OS	ST	WT	DW
IS	4415	Data Structures and Java	■					■		■		■			■			
IS	4440	Networking & Servers	■	■		■		■				■						
IS	6010	MIS Fundamentals	■				■			■		■			■			
IS	6420	Database Theory & Design	■			■	■	■		■		■			■			
IS	6430	Sys Analysis & Design	■			■	■	■		■	■	■			■			
IS	6470	E-Business	■				■			■		■			■			
IS	6471	Web Strategies & Technology	■				■	■		■		■			■			
IS	6480	Business Intelligence						■							■			
IS	6481	Data Strategies & Products					■								■			
IS	6482	Data Mining						■		■					■			
IS	6483	Advanced Data Mining						■		■					■			
IS	6484	Advanded Data Mgmt					■								■			
IS	6540	ERP					■				■							
IS	6570	IT Security & Audit		■	■	■												
IS	6571	IT Forensics		■	■	■												
IS	6572	Net Defense & Countermeasures		■		■												
IS	6595	Master Project	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Mgmt	6010/1	Prod Mgmt & Ops I & II							■				■	■		■	■	■
Mgmt	6040/1	Data Analysis & Decision Making I & II															■	■
Mgmt	6420/1	Quality Mgmt I & II															■	■
Mgmt	6450	Simulations of Biz Processes							■				■	■	■			
Mgmt	6620	Supply Chain Mgmt											■	■				
Mgmt	6630	Service Strategies											■	■				
Mgmt	6660	Project Mgmt				■					■						■	

(RA: Rohit Aggarwal, RB: Randy Boyle, DG: David Glod, JH: Jeff Hassett, PH: Paul Hu, DM: Dan McDonald, TM: Tariq Maghul, GP: Gautam Pant, JP: Joseph Pettit, GS: Glen Schmidt, GS: Jeff Stratman, OS: Olivia Sheng, ST: Sriram Thirumalai, WT: Weiyu Tsai, DW: Don Wardell)

Staff
The home department of the MS IS program will have an administrative assistant and possibly a part-time executive secretary for clerical assistance including course updates, scheduling, communication, and event coordination for the program. Since support can be provided by reallocating the responsibilities of current staff members, no additional staff will be required. Faculty members will be assigned Ph.D. and master students to serve as our TAs for teaching and laboratory assistance. Faculty in the IS and OM areas currently work with PhD and masters students, so no increases in funding are anticipated to provide for graduate student support.

The development and operation of an MS program require services on multiple fronts including recruiting, application and admission processing, orientation, advising, course signups and drops, as well as internship/placement and alumni support services. The DESB Master Programs Office has agreed to provide the following services

- Distribute and present marketing and application information about the MS IS program to prospective applicants at recruiting visits or fairs. Whenever possible, IS faculty will also organize or participate in recruiting visits and fairs the Master Programs Office organizes.

- In partnership with the Graduate School and the MS IS faculty coordinators, receive, file and coordinate applications and admission packages
- Support MS IS students' orientation and job seeking activities
- Provide MS IS students with internship and placement information
- Handle signups and drops of graduate IS courses

IS faculty members who serve as the MS IS Program Director and MS IS Track Coordinators will provide curricular and career advising.

Library and Information Resources

Because the courses in the MS IS program have already been offered or planned, library resources are already in place. Those resources (hard copy and online journals, books, interlibrary loan services, etc.) are able to meet both learning and teaching needs of the new program.

The information resources for MS IS courses and pre-requisites have already been in place and utilized by the courses. In particular, IS classes continue to require database, data warehouse, data mining and security software packages and computer classrooms where these packages are pre-installed and configured on workstations such that the students can use them in classes for hands-on learning. Scheduling IS 4440 (pre-requisite), IS 6420, 6460, 6480, 6481, 6482, and 6483 in such classrooms will be essential to the success of these courses. IS students also can benefit from conducting their exercises in open labs in DESB so that they can expect consistent computing environments with the packages needed for their class work. In addition, a significant number of server machines are used for students to learn about the concepts behind and the setup and use of networked servers and business intelligence software.

Admission Requirements

An applicant needs to have 3.0 or higher GPA from the last higher-education degree program completed and an adequate GRE or GMAT test score to receive consideration for admission. International applicants who haven't completed a degree program in the States need to provideTOEFL scores for consideration for admission. Working experiences or prior IS or business degrees are not required. Applicants also need to submit a goal statement and three letters of recommendations to complete their application packages. The MS IS admission committee can petition for applicants who don't meet the minimum GPA requirement of the Graduate School.

Student Advisement

Dr. Randy Boyle will receive appropriate support for his time allocation and commitment to serve as the MS IS Director to provide curricular and career advising. Dr. Randy Boyle will also serve as track coordinator for the Security Track, while Dr. Olivia Sheng will assume the role of Data Track coordinator. The track coordinators will provide track specific study and career advising. The MS IS admission committee will be responsible for reviewing applications and selecting applicants for admission.

Justification for Graduation Standards and Number of Credits

To receive the MS IS degree, a student must:
- Complete the required 30 credits of course work according to the MS IS curriclum of choice
- Complete up to 12 credits of pre-requisite courses required of the student at the time of student's admission
- Receive 2.75 GPA each year in the program

- Receive a B or higher grade from the Master Project advisor and committee members

External Review and Accreditation

The IS faculty have interacted with industry veterans in Google, IBM, Omniture, Overstock, Oracle, SAP, Sharp Analytics and Yahoo! as well as IS faculty in other similar programs about the need and curriculum design for the new MS IS program. We will officially invite executives from these and other companies as well as IS faculty from other universities to serve on the Board of advisors.

There are no nationwide accreditation standards for MS IS programs. As part of the David Eccles School of Business (DESB), the MS IS courses will be part of a School review by the Association to Advance Collegiate Schools of Business (AACSB). The next AACSB review date for DESB is in 2009. The MS IS courses are well covered by regular, tenure-track or academically qualified faculty members. This review is not likely to impact the program.

Projected Enrollment

Year	Student Headcount	# of Faculty	Student-to-Faculty Ratio	Accreditation Req'd Ratio
1	10	14	1.0 : 1.4	NA
2	20	16	1.0 : 0.8	NA
3	30	18	1.0 : 0.6	NA
4	40	19	2.1 : 1.0	NA
5	50	20	2.5 : 1.0	NA

Expansion of Existing Program

The MS IS program is not an extension or expansion of an existing program.

Section III: Need

Program Need

Enterprises in the private and public sectors need information systems (IS) executives, analysts and specialists with business and technology knowledge to align information technology with business strategies. As the Labor Market Demand section will elaborate, the demand for information systems workforce and executives with both business and information systems knowledge has been growing rapidly in the State of Utah and the rest of the nation. Information systems courses integrate learning of information technology and management by providing opportunities for applying and practicing information, operations, systems and management knowledge in real world oriented contexts. The undergraduate curriculum of information systems is focused on the information systems fundamentals on problem solving using computer programs, data management using databases, security of information systems, methods for analyzing and converting from user requirements for information systems into implementation as well as information system implementation for web applications. More comprehensive and focused IS courses than those currently available at the undergraduate and graduate levels at the University of Utah and other universities within the Utah System of Higher Education would better prepare students for challenges arise from these needs.

The proposed MS IS will allow students who finished undergraduate studies in IS or non-IS fields to enhance their applications and practices of IS and business fundamentals, and gain knowledge in

advanced subjects including data mining, IT in business, data strategies and technology, web strategies and technology, and advanced IT security topics.   Similar MS IS programs have placed graduates across governments, industries, and academia since 1970s. The growing demand for such graduates has led to new programs recently established at other reputable schools such as UC Irvine and North Carolina State. University of Maryland and NYU also are considering to re-instate their MS IS programs. The local community has echoed the same growing demand. The proposal is a necessary move to stay competitive with the other IS programs in the nation and to meet the market and student needs.

The following sections provide evidence that highlight several reasons for providing a new MS IS program at the University of Utah.

Labor Market Demand
The IT job market is growing fast in Utah and elsewhere in the United States. IT is one of the fast-growing employment areas in the State of Utah, with high salary jobs awaiting competent IT managers, business analysts, software developments, and systems administers. The Bureau of Labor Statistics of the U.S. Department of Labor has published similar encouraging forecasts.

According to our market demand analysis, we anticipate our MS-IS students will be sought by technology vendors (e.g., systems development, business applications/process analysis and design, technical marketers, systems integration and ERP, and technology-enabled business solutions), In-house IT shops (e.g., data management, application development, business process analysis/design, systems integration, business intelligence using data warehouse and mining, systems integration and ERP, systems auditing, and network management and security), and consulting firms (e.g., business solutions, systems integrations, ERP, business intelligence, Web services, systems development, and systems auditing).

Local and multinational companies including Google, Omniture, Oracle, Overstock, Sharp Analytics, Yahoo! and Wasatch Advisors have been interacting with IS faculty members about their recruiting needs, which align with our MS IS curriculum. One common and increasingly important requirement that these and other companies often find lacking in otherwise qualified applicants is the ability to secure data assets and to extract from them actionable intelligence for enhancing their operations, services, products, and strategies. This requires effective database, data warehousing, business intelligence, and programming skills. Students can develop such IS capabilities through a focused graduate-level program that goes above and beyond a BS in IS curriculum.

As businesses continue to generate ever greater amounts of data and security risks as well as counter measures continue to increase, the demand for MS-IS graduates is expected to remain high. MS-IS programs have been offered by top, regional and local MIS programs and business schools including University of Arizona, Arizona State University, University of Florida, SUNY at Buffalo, Ohio State University, Utah State University, and BYU for more than three decades. The graduates from those programs are well placed with starting salaries averaging in the 50K range according to some programs' publicly available information. This is one more supporting evidence of a stable market for MS-IS graduates.

United States
Occupational Employment Statistics for the United States

Occupation (SOC code)	Employment[1]	Hourly mean wage	Annual mean wage[2]	Annual median wage[2]	Annual 90th percentile wage[2]
Computer and Mathematical Occupations(150000)	3,076,200	$33.29	$69,240	$66,130	$109,240
Computer and Information Scientists, Research(151011)	27,650	46.36	96,440	93,950	144,880
Computer Programmers(151021)	396,020	33.42	69,500	65,510	106,610
Computer Software Engineers, Applications(151031)	472,520	39.42	82,000	79,780	119,770
Computer Software Engineers, Systems Software(151032)	329,060	41.95	87,250	85,370	125,750
Computer Support Specialists(151041)	514,460	21.32	44,350	41,470	68,540
Computer Systems Analysts(151051)	446,460	34.73	72,230	69,760	106,820
Database Administrators(151061)	109,840	32.43	67,460	64,670	103,010
Network and Computer Systems Administrators(151071)	289,520	31.37	65,260	62,130	97,080
Network Systems and Data Communications Analysts(151081)	203,710	32.43	67,460	64,600	101,740
Computer Specialists, All Other(151099)	180,270	33.35	69,370	68,570	103,270

Footnotes:
(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.
(2) Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours; where an hourly mean wage is not published, the annual wage has been directly calculated from the reported survey data.

SOC code: Standard Occupational Classification code – see http://www.bls.gov/soc/home.htm
Data extracted on March 29, 2008

Area: National
Period: May 2006

References: Bureau of Labor Statistics of the U.S. Department of Labor, www.bls.gov;
Bureau of Labor Statistics of the U.S. Department of Labor Salary
Survey, http://www.bls.gov/oes/current/oes_nat.htm

State of Utah

Occupational Employment Statistics for the State of Utah

Occupation (SOC code)	Employment[1]	Hourly mean wage	Annual mean wage[2]	Annual median wage[2]	Annual 90th percentile wage[2]
Computer and Mathematical Occupations(150000)	30,680	$29.42	$61,180	$58,130	$96,160
Computer and Information Scientists, Research(151011)	130	37.01	76,990	74,990	102,770
Computer Programmers(151021)	6,290	32.80	68,220	61,670	101,000
Computer Software Engineers, Applications(151031)	3,250	33.06	68,770	67,240	103,330
Computer Software Engineers, Systems Software(151032)	5,000	36.10	75,090	75,080	105,250
Computer Support Specialists(151041)	5,470	17.97	37,370	34,890	57,620
Computer Systems Analysts(151051)	2,880	30.92	64,320	62,850	93,140
Database Administrators(151061)	830	31.35	65,210	63,370	99,420
Network and Computer Systems Administrators(151071)	2,000	28.72	59,730	56,460	89,460
Network Systems and Data Communications Analysts(151081)	1,930	28.63	59,540	53,960	96,810
Computer Specialists, All Other(151099)	2,280	26.35	54,810	57,480	85,070

Footnotes:
(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.
(2) Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours; where an hourly mean wage is not published, the annual wage has been directly calculated from the reported survey data.

SOC code: Standard Occupational Classification code – see http://www.bls.gov/soc/home.htm
Data extracted on March 29, 2008

Area: Utah
Period: May 2006

Reference: Bureau of Labor Statistics of the U.S. Department of Labor Statistics for Utah,
http://www.bls.gov/oes/current/oes_ut.htm#b15-0000

Salt Lake City

Occupational Employment Statistics for Salt Lake City

Occupation (SOC code)	Employment[1]	Hourly mean wage	Annual mean wage[2]	Annual median wage[2]	Annual 90th percentile wage[2]
Computer and Mathematical Occupations(150000)	18,730	$31.02	$64,520	$61,210	$98,850
Computer Programmers(151021)	3,970	35.84	74,540	66,250	112,320
Computer Software Engineers, Applications(151031)	1,700	31.45	65,420	60,790	100,910
Computer Software Engineers, Systems Software(151032)	3,780	37.54	78,090	78,660	108,020
Computer Support Specialists(151041)	3,050	18.88	39,260	36,850	57,970
Computer Systems Analysts(151051)	1,960	32.05	66,660	65,860	95,100
Database Administrators(151061)	490	31.37	65,250	66,930	96,560
Network and Computer Systems Administrators(151071)	1,230	29.72	61,820	58,460	91,180
Network Systems and Data Communications Analysts(151081)	1,060	28.15	58,550	54,520	90,950
Computer Specialists, All Other(151099)	950	26.80	55,750	57,010	86,020

Footnotes:
(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.
(2) Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours; where an hourly mean wage is not published, the annual wage has been directly calculated from the reported survey data.

SOC code: Standard Occupational Classification code – see http://www.bls.gov/soc/home.htm
Data extracted on March 29, 2008

Area: Salt Lake City, UT
Period: May 2006

Reference: Bureau of Labor Statistics of the U.S. Department of Labor Statistics for Utah,
http://www.bls.gov/oes/current/oes_ut.htm#b15-0000

Fastest Growing Occupations in the United States

Fastest growing occupations, 2006-16, in "Occupational employment projections to 2016," published in the November 2007 Monthly Labor Review.

Table 2. Fastest growing occupations, 2006-16
[Numbers in thousands]

2006 National Employment Matrix code and title		Employment Number		Change		Quartile rank by 2006 median annual earnings [1]	Most significant source of postsecondary education or training[2]
Title	Code	2006	2016	Percent	Numeric		
Network systems and data communications analysts	15-1081	262	402	53.4	140	VH	Bachelor's degree
Personal and home care aides	39-9021	767	1,156	50.6	389	VL	Short-term on-the-job training
Home health aides	31-1011	787	1,171	48.7	384	VL	Short-term on-the-job training
Computer software engineers, applications	15-1031	507	733	44.6	226	VH	Bachelor's degree
Veterinary technologists and technicians	29-2056	71	100	41.0	29	L	Associate degree
Personal financial advisors	13-2052	176	248	41.0	72	VH	Bachelor's degree
Makeup artists, theatrical and performance	39-5091	2	3	39.8	1	H	Postsecondary vocational award
Medical assistants	31-9092	417	565	35.4	148	L	Moderate-term on-the-job training
Veterinarians	29-1131	62	84	35.0	22	VH	First professional degree
Substance abuse and behavioral disorder counselors	21-1011	83	112	34.3	29	H	Bachelor's degree
Skin care specialists	39-5094	38	51	34.3	13	L	Postsecondary vocational award
Financial analysts	13-2051	221	295	33.8	75	VH	Bachelor's degree

Table 2. Fastest growing occupations, 2006-16
[Numbers in thousands]

2006 National Employment Matrix code and title		Employment		Change		Quartile rank by 2006 median annual earnings [1]	Most significant source of postsecondary education or training[2]
		Number					
Title	Code	2006	2016	Percent	Numeric		
Social and human service assistants	21-1093	339	453	33.6	114	L	Moderate-term on-the-job training
Gaming surveillance officers and gaming investigators	33-9031	9	12	33.6	3	L	Moderate-term on-the-job training
Physical therapist assistants	31-2021	60	80	32.4	20	H	Associate degree
Pharmacy technicians	29-2052	285	376	32.0	91	L	Moderate-term on-the-job training
Forensic science technicians	19-4092	13	17	30.7	4	H	Bachelor's degree
Dental hygienists	29-2021	167	217	30.1	50	VH	Associate degree
Mental health counselors	21-1014	100	130	30.0	30	H	Master's degree
Mental health and substance abuse social workers	21-1023	122	159	29.9	37	H	Master's degree
Marriage and family therapists	21-1013	25	32	29.8	7	H	Master's degree
Dental assistants	31-9091	280	362	29.2	82	L	Moderate-term on-the-job training
Computer systems analysts	15-1051	504	650	29.0	146	VH	Bachelor's degree
Database administrators	15-1061	119	154	28.6	34	VH	Bachelor's degree
Computer software engineers, systems software	15-1032	350	449	28.2	99	VH	Bachelor's degree
Gaming and sports book writers and runners	39-3012	18	24	28.0	5	VL	Short-term on-the-job training
Environmental science and protection	19-4091	36	47	28.0	10	H	Associate degree

Table 2. Fastest growing occupations, 2006-16
[Numbers in thousands]

2006 National Employment Matrix code and title		Employment		Change		Quartile rank by 2006 median annual earnings (1)	Most significant source of postsecondary education or training(2)
		Number					
Title	Code	2006	2016	Percent	Numeric		
technicians, including health							
Manicurists and pedicurists	39-5092	78	100	27.6	22	VL	Postsecondary vocational award
Physical therapists	29-1123	173	220	27.1	47	VH	Master's degree
Physician assistants	29-1071	66	83	27.0	18	VH	Master's degree

Footnotes:
(1) The quartile rankings of Occupational Employment Statistics Survey annual wages data are presented in the following categories: VH = very high ($46,360 or more), H = high ($30,630 to $46,300), L = low ($21,260 to $30,560), and VL = very low (up to $21,220). The rankings were based on quartiles, with one-fourth of total employment defining each quartile. Wages are for wage and salary workers.
(2) An occupation is placed into 1 of 11 categories that best describes the postsecondary education or training needed by most workers to become fully qualified in that occupation. For more information about the categories, see Occupational Projections and Training Data, 2006-07 edition, Bulletin 2602 (Bureau of Labor Statistics, February 2006) and Occupational Projections and Training Data, 2008-09 edition (Bureau of Labor Statistics, forthcoming)

US Percent change in total employment, 2006-2016

Detailed information about the quartile rankings is available at [quartile ranking definitions and data ranges](). Files containing this data are available for download at [ftp://ftp.bls.gov/pub/special.requests/ep/optddata/]()

| Occupation | Total employment (000's) | | 2006-2016 change in total employment | | 2006 Median annual earnings (Dollars) | Postsecondary-education or training category | Educational attainment cluster | Percent of workers aged 25 to 44, by educational attainment | | |
	2006	2016	Number (000's)	Percent				High School Or less	Some College	Bachelor's degree or higher
Computer software engineers, applications	507	733	226	44.6%	$79,780	Bachelor's degree	C	2.2	13.0	84.8
Computer systems analysts	504	650	146	29.0	69,760	Bachelor's degree	SC/C	7.0	24.6	68.4
Computer software engineers, systems software	350	449	99	28.2	85,370	Bachelor's degree	C	2.2	13.0	84.8
Computer and information scientists, research	25	31	5	21.5	93,950	Doctor's degree	SC/C	7.0	24.6	68.4
Computer and information systems managers	264	307	43	16.4	101,580	Degree plus work experience	SC/C	4.6	23.0	72.5
Computer specialists, all other	136	157	21	15.1	68,570	Associate's degree	SC/C	7.0	24.6	68.4
Computer support specialists	552	624	71	12.9	41,470	Associate's degree	SC/C	13.4	44.0	42.6
Computer hardware engineers	79	82	4	4.6	88,470	Bachelor's degree	SC/C	7.2	22.8	70.0
Computer programmers	435	417	-18	-4.1	65,510	Bachelor's degree	SC/C	5.5	21.8	72.7

- VH = Very High; H = High; L = Low; VL = Very Low; n.a. = not available

The education clusters are presented in the following categories: HS=High school occupations, HS/SC=High school/Some college occupations, SC=Some college occupations, HS/SC/C=High school/Some college/College occupations, SC/C=Some

college/college occupations, and C=College occupations. For information about the methodology, see methodological note at the end of table I-1 in Occupational Projections and Training Data, 2004-05 edition, available at http://www.bls.gov/emp/optd/home.htm

Future Employment Projections for the State of Utah
http://www.projectionscentral.com/projections.asp?page=DisplayResults

Area	Job Title	2004	2014	Numeric Change	Percent Change	Average Annual Openings
Utah	Computer and information scientists, research	320	470	160	49%	20
Utah	Computer and information systems managers	2,090	3,010	920	44	130
Utah	Computer programmers	6,090	7,270	1,180	19	260
Utah	Computer software engineers, applications	2,970	5,260	2,290	77	260
Utah	Computer software engineers, systems software	4,100	6,960	2,860	69	330
Utah	Computer support specialists	5,370	7,560	2,190	40	290
Utah	Computer systems analysts	4,690	6,930	2,240	47	280
Utah	Database administrators	620	1,010	400	64	50
Utah	Network and computer systems administrators	2,050	3,260	1,210	58	140
Utah	Network systems and data communications analysts	2,330	4,080	1,750	74	200
Utah	Telecommunications equipment installers and repairers, except line installers	2,350	2,760	410	17	90
Utah	Telecommunications line installers and repairers	660	900	240	36	40

Types of Jobs (Please see additional job descriptions for consulting and analyst positions in the Appendix)

SYSTEMS ANALYST

Description
Systems analysts solve computer problems and apply computer technology to meet the individual needs of an organization. They help an organization to realize the maximum benefit from its investment in equipment, personnel, and business processes. Systems analysts may plan and develop new computer systems or devise ways to apply existing systems' resources to additional operations. They may design new systems, including both hardware and software, or add a new software application to harness more of the computer's power. Most systems analysts work with specific types of systems--for example, business, accounting, or financial systems, or scientific and

engineering systems that vary with the kind of organization. Some systems analysts also are known as systems developers or systems architects.

Systems analysts begin an assignment by discussing the systems problem with managers and users to determine its exact nature. Defining the goals of the system and dividing the solutions into individual steps and separate procedures, systems analysts use techniques such as structured analysis, data modeling, information engineering, mathematical model building, sampling, and cost accounting to plan the system. They specify the inputs to be accessed by the system, design the processing steps, and format the output to meet users' needs. They also may prepare cost-benefit and return-on-investment analyses to help management decide whether implementing the proposed technology will be financially feasible.

Working Conditions

They usually work about 40 hours a week--the same as many other professional or office workers do. However, evening or weekend work may be necessary to meet deadlines or solve specific problems. Given the technology available today, telecommuting is common for computer professionals. As networks expand, more work can be done from remote locations through modems, laptops, electronic mail, and the Internet.

Earnings

Median annual earnings of computer systems analysts were $62,890 in 2002. The middle 50 percent earned between $49,500 and $78,350 a year. The lowest 10 percent earned less than $39,270, and the highest 10 percent earned more than $93,400.

DATABASE ADMINISTRATOR

Description

With the Internet and electronic business generating large volumes of data, there is a growing need to be able to store, manage, and extract data effectively. Database administrators work with database management systems software and determine ways to organize and store data. They identify user requirements, set up computer databases, and test and coordinate modifications to the systems. An organization's database administrator ensures the performance of the system, understands the platform on which the database runs, and adds new users to the system. Because they also may design and implement system security, database administrators often plan and coordinate security measures. With the volume of sensitive data generated every second growing rapidly, data integrity, backup systems, and database security have become increasingly important aspects of the job of database administrators.

Working Conditions

They usually work about 40 hours a week the same as many other professional or office workers do. However, evening or weekend work may be necessary to meet deadlines or solve specific problems. Given the technology available today, telecommuting is common for computer professionals. As networks expand, more work can be done from remote locations through modems, laptops, electronic mail, and the Internet.

Earnings

Median annual earnings of database administrators were $55,480 in 2002. The middle 50 percent earned between $40,550 and $75,100. The lowest 10 percent earned less than $30,750, and the highest 10 percent earned more than $92,910. In 2002, median annual earnings of database administrators employed in computer system design and related services were $66,650, and, for those in management of companies and enterprises, earnings were $59,620.

COMPUTER PROGRAMMER

Description
Programmers write programs according to the specifications determined primarily by computer software engineers and systems analysts. After the design process is complete, it is the job of the programmer to convert that design into a logical series of instructions that the computer can follow. The programmer then codes these instructions in a conventional programming language.

Working Conditions
Programmers generally work in offices in comfortable surroundings. Many programmers may work long hours or weekends to meet deadlines or fix critical problems that occur during off hours. Given the technology available, telecommuting is becoming common for a wide range of computer professionals, including computer programmers. As computer networks expand, more programmers are able to make corrections or fix problems remotely by using modems, e-mail, and the Internet to connect to a customer's computer.

Earnings
Median annual earnings of computer programmers were $60,290 in 2002. The middle 50 percent earned between $45,960 and $78,140 a year. The lowest 10 percent earned less than $35,080; the highest 10 percent earned more than $96,860.

PROJECT MANAGERS

Description
Project managers develop requirements, budgets, and schedules for their firm's information technology projects. They coordinate such projects from development through implementation, working with internal and external clients, vendors, consultants, and computer specialists. These managers are increasingly involved in projects that upgrade the information security of an organization.

Working Conditions
Project managers spend most of their time in an office. Most work at least 40 hours a week and may have to work evenings and weekends to meet deadlines or solve unexpected problems. Some computer and information systems managers may experience considerable pressure in meeting technical goals within short timeframes or tight budgets. As networks continue to expand and more work is done remotely, computer and information system managers have to communicate with and oversee offsite employees using modems, laptops, e-mail, and the Internet.

Earnings
Earnings for computer and information systems managers vary by specialty and level of responsibility. Median annual earnings of these managers in 2002 were $85,240. The middle 50

percent earned between $64,150 and $109,950. The lowest 10 percent earned less than $47,440, and the highest 10 percent earned more than $140,440.

MANAGEMENT INFORMATION SYSTEMS DIRECTOR

Description
Management information systems (MIS) directors manage information systems and computing resources for their entire organization. They may also work under the chief information officer and plan and direct the work of subordinate information technology employees. These managers oversee a variety of user services such as an organization's help desk, which employees can call with questions or problems. MIS directors also may make hardware and software upgrade recommendations based on their experience with an organization's technology. Helping to assure the availability, continuity, and security of data and information technology services are key responsibilities for these workers.

Working Conditions
MIS directors spend most of their time in an office. Most work at least 40 hours a week and may have to work evenings and weekends to meet deadlines or solve unexpected problems. Some computer and information systems managers may experience considerable pressure in meeting technical goals within short timeframes or tight budgets. As networks continue to expand and more work is done remotely, computer and information system managers have to communicate with and oversee offsite employees using modems, laptops, e-mail, and the Internet.

Earnings
Earnings for computer and information systems managers vary by specialty and level of responsibility. Median annual earnings of these managers in 2002 were $85,240. The middle 50 percent earned between $64,150 and $109,950. The lowest 10 percent earned less than $47,440, and the highest 10 percent earned more than $140,440.

NETWORK ADMINISTRATORS

Descriptions
Network administrators design, install, and support an organization's LAN (local-area network), WAN (wide-area network), network segment, Internet, or intranet system. They provide day-to-day onsite administrative support for software users in a variety of work environments, including professional offices, small businesses, government, and large corporations. They maintain network hardware and software, analyze problems, and monitor the network to ensure its availability to system users. These workers gather data to identify customer needs and then use that information to identify, interpret, and evaluate system and network requirements. Administrators also may plan, coordinate, and implement network security measures.

Working Conditions
They usually work about 40 hours a week, but that may include being "on call" via pager or telephone for rotating evening or weekend work if the employer requires computer support over extended hours. Overtime may be necessary when unexpected technical problems arise.

Earnings

Median annual earnings of network and computer systems administrators were $54,810 in 2002. The middle 50 percent earned between $43,290 and $69,530. The lowest 10 percent earned less than $34,460, and the highest 10 percent earned more than $86,440.

COMPUTER SUPPORT SPECIALIST

Description

Computer support specialists provide technical assistance, support, and advice to customers and other users. This occupational group includes technical support specialists and help-desk technicians. These troubleshooters interpret problems and provide technical support for hardware, software, and systems. They answer telephone calls, analyze problems using automated diagnostic programs, and resolve recurrent difficulties. Support specialists may work either within a company that uses computer systems or directly for a computer hardware or software vendor. Increasingly, these specialists work for help-desk or support services firms, where they provide computer support to clients on a contract basis.

Working Conditions

As computer networks expand, more computer support specialists and systems administrators may be able to connect to a customer's computer remotely, using modems, laptops, e-mail, and the Internet, to provide technical support to computer users. This capability would reduce or eliminate travel to the customer's workplace. Systems administrators also can administer and configure networks and servers remotely, although this practice is not as common as it is with computer support specialists.

Earnings

Median annual earnings of computer support specialists were $39,100 in 2002. The middle 50 percent earned between $29,760 and $51,680. The lowest 10 percent earned less than $23,060, and the highest 10 percent earned more than $67,550.

*Information was provided by http://isys.byu.edu/Menus/Careers/Overview.cfm .

Student Demand

Student demand is a key factor in the success of a new program. The IS market demand indicators show a strong growth rate for the market which should fuel long-term growth of the program as more job opportunities are created and recruiters witness the demand for these students.

Although the MS IS program will follow the national trend to attract out of state and international students, immediate and local student demand is what we have attempted to survey. The University of Utah has historically had a large portion of commuter students and tends to populate its undergraduate programs with local students. Gauging the interest of our current student population through a survey seemed most appropriate.

Survey Information

Participant Search

Students were sent an invitation for an online survey. The students receiving the survey were students in IS 2010 and IS 4410. These courses were selected because they contain a broad cross-section of business students both from major and class perspectives. These two classes are required for all business majors and IS 2010 is taken during the freshman/sophomore year and IS 4410 is taken during the sophomore/junior years. Approximately 800 students are currently enrolled in these two courses. We expected at least a 30 percent response rate or approximately 250 student responses.

Survey Format
The survey was conducted near the end of the Fall 2007online using SurveyMonkey. A link was emailed out to each student either through WebCT if the instructor used WebCT heavily or through class email lists if WebCT was not used heavily. The following is the detail of the survey:

Email Message
The David Eccles School of Business is currently designing a one-year Masters Program in Information Systems. Part of this process includes gathering data relevant to offering this program. One such data point is student's interest in this degree if we were to offer it.

The degree makeup for courses is still being discussed, but the program layout will be a one-year program designed to primarily be a 5th year graduate program similar to our current MAcc and MS in Finance degrees.

Please complete the survey (follow the link) by Tuesday November 6th morning at 11:00 am.

http://www.surveymonkey.com/s.aspx?sm=bnFbzgOsHl3pjg_2bYBOyrFg_3d_3d

Thanks for your support and cooperation.

Survey Questions

1. If the Business School offered a one-year Masters Program in Information Systems how interested would you be in gaining that degree?
   I would definitely pursue that degree.
   I would STRONGLY consider that degree.
   I would consider that degree.
   I would not be interested in that degree.

2. If you selected that you would not be interested, please select the most applicable reason why you are not interested.
   I am not planning on pursuing a masters degree.
   I am planning on pursuing my masters degree somewhere else.
   I have chosen a different degree and am too far along to change.
   I am not interested in Information Systems.
   Other (please specify)

3. What is your current major? (If double major please select both).

Accounting

Business Administration

Entrepreneurship

Finance

Information Systems

Management

Marketing

Non-Business Major

Undecided

4. What is your current status?

Freshman

Sophomore

Junior

Senior

5. If you are a current student in IS 2010 or IS 4410 please indicate which one you are in.

IS 2010

IS 4410

Section

6. Please type in your UID (i.e. u0123456) - this is only used for single-vote verification, your answers WILL NOT be tracked with your UID.

Questions 1, 2 and 4 were single-answer checkmarks. Question 3 allowed for multiple answers for double majors. Question 5 asked which class and section they were in so we verify a good cross-section. Question 6 was just for control purposes.

Survey Responses

Question 1 – Interest in IS Masters Program

I would definitely pursue that degree.	8.1%	40
I would STRONGLY consider that degree.	18.4%	91

I would consider that degree.	41.1%	203
I would not be interested in that degree.	32.4%	160

Question 2 – If not, why?

I am not planning on pursuing a masters degree.	10.9%	25
I am planning on pursuing my masters degree somewhere else.	26.1%	60
I have chosen a different degree and am too far along to change.	20.4%	47
I am not interested in Information Systems.	34.8%	80
Other (please specify)	7.8%	18

Question 3 – Current degree.

Accounting	21.9%	108
Business Administration	16.8%	83
Entrepreneurship	4.1%	20
Finance	21.9%	108
Information Systems	9.3%	46
Management	7.1%	35
Marketing	15.0%	46
Non-Business Major	9.3%	46
Undecided	9.3%	46

Question 4 – Current year in class.

Freshman	17.8%	87
Sophomore	23.3%	114
Junior	38.9%	190
Senior	20.0%	98

Results/Conclusions

We had 494 responses to the survey. The high response rate, within a few days of releasing the survey, shows a strong interest from our current students. The data also points to a number of important observations.

1. There is a strong interest of current students to take advantage of an MS-IS program. Having 40 students stating that they would take advantage of this program immediately and another 91 students state they would strongly consider it points to a class that could easily start out to be at least half as large as some of our DESB's current graduate programs.

2. Information Systems is an area of great interest to our students. Only one-third of those not interested in the program stated (less than 17 percent of all surveyed) stated they had no interest in this field of study. Many students are realizing the importance of this field and also the industry is continuing to grow and will become one of the fastest growing areas over the next decade (see Market Demand).

3. We have only surveyed the current DESB students. Other institutions are seeing growth in IS undergraduates and we will also be able to capitalize on this market as our program grows and gains reputation. We plan to conduct a similar survey to collect more degree/program specific information and will include students from our feeder institutions as well as other institutions that have historically sent students to other graduate programs at DESB.

Similar Programs

To support the creation of a Master of Science in Information Systems (MS-IS) graduate degree it is important to compare the proposed program with existing comparable programs. We have gathered data on 17 similar graduate programs in information systems offered at other schools. Our list includes programs in schools that were identified as top graduate schools in information systems[1], peer schools, programs in the region, as well as some large or visible programs across the nation. The following table lists the program names and websites from which data was gathered.

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[1] US News & World Report Best Graduate Schools 2007: Business – Information Systems

	University	Program Name	Link
1	Carnegie Mellon University (Tepper)	Master of Information Systems Management	http://ism.cmu.edu/Full-Time/index.asp
2	University of Arizona (Eller)	Master's degree in Management Information Systems	http://mis.eller.arizona.edu/content/view/45/117/
3	Georgia State University	Master of Science, Information Systems	http://www2.cis.gsu.edu/cis/program/mscis.asp
4	Indiana University–Bloomington (Kelley)	Master of Science in Information Systems	http://www.kelley.iu.edu/ODT/Masters/page11075.html
5	Arizona State University–Main Campus (Carey)	Master of Science in Information Management (MSIM)	http://wpcarey.asu.edu/is/msim/index.cfm
6	University of Illinois–Urbana-Champaign	MS-Tech	http://www.ms-tech.uiuc.edu/program/index.html
7	University of Georgia (Terry)	Master of Internet Technology	http://ebiz.terry.uga.edu/mit/
8	Bentley College (McCallum)	Master of Science in Information Technology	http://www.bentley.edu/cis/Programs/MSIT/MSIT.cfm
9	University of Rochester (Simon)	MS Business - Information Systems Management	http://www.simon.rochester.edu/ms/concentration.aspx?ISM
10	University of Texas - Dallas	Master of Science in Information Technology & Management	http://som.utdallas.edu/graduate/graduate_ms_itm_degree_plan.htm
11	George Washington University	Master of Science - Information systems Technology (MIS, ISD, ISPM)	http://www.msist.gwu.edu/programs/traditional.asp
12	University of Florida	Master of Science degree in Decision and Information Sciences	http://www.cba.ufl.edu/isom/programs/msdis/
13	University of South Florida	Master of Science in Management Information Systems	http://www.coba.usf.edu/departments/isds/programs/master/index.html
14	SUNY-Buffalo	Master of Science in Management Information Systems	http://www.mgt.buffalo.edu/mba/msmis/
15	Utah State University	Master of Science in MIS	http://www.huntsman.usu.edu/cob/degreesmajors/bisms.cfm
16	BYU	Masters of Information Systems	http://isys.byu.edu/Menus/Masters/Overview.cfm
17	University of Cincinnati	Master of Science in Information Systems	http://www.business.uc.edu/msis

Table for Titles and Web Addresses of Similar Programs

The following table lists admission and program requirements collected from these 17 similar programs' web sites. This side-by-side comparison shows that several schools have the same admission and graduation requirements as those of the proposed MS IS program. It also confirms that allowing students to complete the MS IS program in 12 months when necessary is consistent with the trend. Based on comparisons of program tracks or emphasis options not shown here, our data and security focus is a niche that some of the similar programs have started to expand on but don't necessary have the same depth in these tracks as that in the proposed program.

	University	Admission	Program Hours	Project	Program Length
1	Carnegie Mellon University (Tepper)	GRE/GMAT/ 3-year work experience	45	Yes	1 year
2	University of Arizona (Eller)	GRE/GMAT	31	Yes	1 year
3	Georgia State University	GMAT	36	opt.	1 year
4	Indiana University–Bloomington (Kelley)	GRE/GMAT	30	Yes	3 semesters
5	Arizona State University–Main Campus (Carey)	2-year work experience	30	Yes	1 year
6	University of Illinois–Urbana-Champaign	2-year work experience/GMAT	30	No	1 year
7	University of Georgia (Terry)	GRE/GMAT	32	Yes	5 semesters
8	Bentley College (McCallum)	GRE/GMAT	30	No	2 years
9	University of Rochester (Simon)	GRE/GMAT	39	No	1 year
10	University of Texas - Dallas	GMAT	36	No	2 year
11	George Washington University	GRE/GMAT	42-45	Capstone	1 ~2 years
12	University of Florida	GRE/GMAT	36	opt.	1.5 years
13	University of South Florida	GRE/GMAT	33	Capstone	1 year
14	SUNY-Buffalo	GRE/GMAT	31	Yes	1 year
15	Utah State University	GMAT	33	No	2 years
16	BYU	GMAT	40	UG	2 years
17	University of Cincinnati	GRE/GMAT	72	Capstone	2 years

Capstone: capstone class required.

Table for Admission and Program Requirements of Similar Programs

In the following table, we can see that the curriculum design of University of Utah's MS IS program is based on both the common required or pre-requisite courses of similar programs and the emerging trend and key expertise of our faculty.

	University	DB	Networking	S.A.D	Security	Strategy	E-biz	Proj Mgt	Programming	Intro
1	Carnegie Mellon University (Tepper)	Yes	Yes	Yes	Yes	Yes	Yes		Yes	
2	University of Arizona (Eller)	Yes	Yes	Yes	Yes	Yes				Yes
3	Georgia State University	Yes	Yes	Yes				Yes	Yes	
4	Indiana University–Bloomington (Kelley)	Yes		Yes	Yes	Yes		Yes	Yes	
5	Arizona State University–Main Campus (Carey)	Yes		Yes	Yes	Yes		Yes		
6	University of Illinois–Urbana-Champaign					Yes		Yes		
7	University of Georgia (Terry)	Yes		Yes			Yes	Yes	Pre-req	Yes
8	Bentley College (McCallum)		Yes	Yes				Yes	Yes	
9	University of Rochester (Simon)			Yes						Yes
10	University of Texas - Dallas		Yes	opt		Yes			Yes	
11	George Washington University	Yes	Yes	Yes						
12	University of Florida	Yes	Yes	Yes					Yes	
13	University of South Florida	Yes	Yes	Yes					Yes	
14	SUNY-Buffalo	Yes	Yes	Yes	Yes		Yes			
15	Utah State University	Yes	Yes	Yes	Yes				Pre-req	Yes
16	BYU	Yes	UG	UG	UG			Yes	UG	Yes

SAD: System Analysis and Design; opt: optional; UG: undergraduate course

Table for Required Courses and Pre-requisites of Similar Programs

One of the main objectives of the benchmarking efforts is to learn about the program size and facts about the applicants and students. IS faculty have obtained such information through direct contact with the faculty members at the schools offering the programs. The following table provides the information collected. The table repeats admission and program requirements to allow for assessment of their impact, if any, on program size. IS faculty are still waiting for additional program facts from other similar programs not shown in this table and will present updated comparison table at the Graduate Council meeting. From our benchmarking efforts, we conclude that a quality MS IS program has the potential to grow substantially in size by good recruiting efforts targeting feeder programs as well as local, national and international student populations. We will emphasize on study, planning, and career advising to help students succeed in accomplishing their study and career goals. The tuition at the University of Utah is slightly higher than that at other schools in Utah. However, graduate teaching assistantship and tuition benefits from DESB along with collaborative projects with industry partners is expected to help reduce the tuition impact for a large percentage of students in the program. By targeting at the large service and technology oriented professional community in Utah and the large pool of international students with interests in studying MS IS in the US, IS faculty is confident that the size of the MS IS program will reach 35 to 50 in five years.

University	Program	Program Facts	Admission Criteria	Curriculum
University of Arizona	Master's degree in Management Information Systems	Established: >30 years ago Current size: 100 Applicant pool: 400 per year Student body: Mostly international	- GRE or GMAT accepted - No experience	- 30 credits - Masters project required

			required	
University of South Florida	Master of Science in Management Information Systems	Established: > 10 years ago Current size:90 Applicant pool: ~140 per year Student body: 50-60% international, 20% Tampa-based execs, 10-15% after Bachelors in IS from USF	- GRE or GMAT accepted - Experience needed if low GRE/GMAT or GPA.	- 33 credits - Masters project optional
George Washington University	Master of Science - Information systems Technology (MIS, ISD, ISPM)	Established: > 20 years ago Current size: 590 Applicant pool: 400 per year Student body: Mostly domestic, 10% international, very few after Bachelors in IS (major) from GWU	- GRE or GMAT not required - No experience required	- 30 to 33 credits - project required (groups)
Utah State University	Master of Science in MIS	Established: > 5 years ago Current size: 20-30 Applicant pool: about 20 per year Student body: Mostly from outside/international, 20% after Bachelors in MIS major from USU	- GMAT accepted - No experience required	- 33 credits - project optional
University of Florida	Master of Science degree in Decision and Information Sciences	Established: about 20 years ago Current size: 141 Applicant pool: 190 per year Applicant profile: 80% international	- GRE or GMAT accepted - No experience required	- 32 o 34 credits - no thesis
Arizona State University	Master of Science in Information Management	Established: 2-3 years ago Current Size: 70 Applicant pool: 100-110 per year Applicant profile: 85-90% in-state, rest international, very few out-of-state	- GRE or GMAT not required - Minimum experience of 2 years, average 5-10 years	- 30 credits - applied project required

Program Facts of Similar Programs

Collaboration with and Impact on Other USHE Institutions

The IS faculty has had close collaboration with IS programs and faculty at other USHE institutions including Utah Valley State College, Salt Lake Community College and Utah State University. Utah State University has a similar MS IS program, however, without the same track foci. Their MS IS program is a two-year study. The shorter study length, the different study foci and the metro location will be the reasons why the proposed MS IS program at the University of Utah will target at a different population of prospective

students than that of Utah State University's MS IS program. We will collaborate closely with other USHE institutions to advise their students on benefits of an MS IS study and how to prepare and apply for our MS IS program. This will be done via open houses, communication material and one-on-one Q/A by phone or emails. Students at other USHE institutions will benefit from the opportunities the MS IS program offers.

Benefits

Many states house one or more MS IS programs. The benefit of establishing an MS IS program in Utah's flagship university is evidently positive on expanding students' study and career options and on economic development.

Consistency with Institutional Mission

Configuration of the Utah System of Higher Education and Institutional Missions and Roles (R312) states that the institution's mission is to discover, create, and transmit knowledge through education and training programs at the undergraduate, graduate, and professional levels; through research and development; and through service and extension programs associated with a major teaching and research university. Emphasis is placed on teaching, research, and service. The institution contributes to the quality of life and economic development at the local, state, and national levels.

The proposed MS IS is designed to support our institution's mission via:

- Discovery and dissemination of a synergetic combination of technical and business knowledge through real-world-oriented learning opportunities, integrated within required, core, and elective course work.
- Preparing students to meet the growing need for IS or business professionals and leaders to understand, implement, use, and manage data-driven and security strategies as well as technologies.
- Motivating and preparing students for IS Ph.D. studies
- Supporting local and state economies with high-quality data and security professionals and managers who help create value for their employers and establish solid financial foundations with above-average income jobs.

Section IV: Program and Student Assessment

Program Assessment

- Recruiting, admission and retention goals and measures
    - o Goals – to recruit high-caliber applicants and retain students in quantity that meet or exceed the five-year program size projections.
    - o Measures – applicant pool size and program size, # of applicants recruited per recruiting channel/event, average GRE or GMAT and GPA of applicants and of students, # of applicants, and students by most recent location and degree/institution.
- Student learning and graduation goals and measures
    - Goals – to graduate 95% of the students admitted who meet the learning goals of MS IS.
    - Measures – the learning measures include

- o The student demonstrates IT knowledge, technical skills and business understanding in the classes with 2.75 or higher GPA.
  - o The student is effective in integrating business knowledge and IT concepts in a real world project by achieving a B or higher grade from the student's Master Project advisor and committee.
  - o The student is effective with analytical and critical thinking as measured using assignments or projects in program course work.
  - o The student is effective with team work and management as measured using group projects in the program study.
  - o The student is effective with written and oral communication measured using assignment, case analysis, and project writing and presentation in classes.
- Placements goals and measures
  - o Goals – to help MS IS graduates obtain career opportunities that leverage the knowledge they have learned in the program.
  - o Measures – # of positions by title, skills used, companies and industry as well as average salaries, sign-in bonus, and stock options received in students' offers.
- Student evaluation goals and measures
  - o Goals – to assure positive student and graduate perceptions of program design, study benefits and qaulity of co-hort for improvement of the MS IS Program.
  - o Measures – summaries of students' mid study, exit, and alumni interviews/surveys
- External evaluation goals and measures
  - o Goals – to assume positive perceptions of students and graduates by recruiters, guest speakers, project sponsors and coordinators for MS IS students for improvement of MS IS program.
  - o Measures – summaries of external surveys
- Financial goals and measures
  - o Goals – to meet or exceed the budget projection
  - o Measures – Student credit hours, revenues from MS IS, and sholarships and program fund raised.

Expected Standards of Performance
The MS IS students are expected to meet the performance standards in the following competencies
- o IT knowledge, technical skills and business understanding
- o Integrating business knowledge and IT concepts in a real world project by achieving a B or higher grade from the student's Master Project advisor and committee.
- o Analytical and critical thinking as measured by assignments or projects in program course work.
- o Team work and management as measured by group projects in the program study.
- o The student is effective with written and oral communication required of assignments, case analysis, and project writing and presentation in classes.

The performance will be measured using peer, instructor, or project coordinator evaluation using 7-point licker scale on multiple questions related to each competency. The MS IS committee and the Board of Advisors to be formed by spring 2009 will jointly design these evaluation questions.

Section V: Finance

Financial Analysis Form					
	Year 1	Year 2	Year 3	Year 4	Year 5
Students					
Projected FTE Enrollment	7	14	21	28	35
Cost Per FTE	$0	$0	$0	$0	$0
Student/Faculty Ratio	7/10	1 4/10	2 1/10	2 9/10	3 6/10
Projected Headcount	10	20	30	40	50
Projected Tuition					
Gross Tuition	$86,037	$180,678	$284,567	$379,423	$522,893
Tuition to Program	$63,000	$132,300	$208,373	$291,722	$382,884
5 Year Budget Projection					
	Year 1	Year 2	Year 3	Year 4	Year 5
Expense					
Salaries & Wages	$10,000	$10,000	$140,000	$140,000	$290,000
Benefits	$3,600	$3,600	$50,400	$50,400	$104,400
Total Personnel	$13,600	$13,600	$190,400	$190,400	$394,400
Current Expense	$5,000	$6,000	$7,000	$8,000	$9,000
Travel	$2,000	$3,000	$4,000	$5,000	$6,000
Capital					
Library Expense					
Total Expense	$20,600	$22,600	$201,400	$203,400	$409,400
Revenue					
Legislative Appropriation					

Grants & Contracts					
Donations					$30,000
Reallocation					
Tuition to Program	$63,000	$132,300	$208,373	$291,722	$382,884
Fees					
Total Revenue	$63,000	$132,300	$208,373	$291,722	$412,884
Difference					
Revenue-Expense	$42,400	$109,700	$6,973	$88,322	$3,484

Budget Comments

An FTE is a student taking 15 credits per semester. It is estimated that an MS IS student takes 21 credits in fall and spring semesters. Hence, 10 MS IS headcount is equivalent to 7 FTE students. The tution is estimated based on 50% out-of-state and 50% instate students with a 5 % annual tuition increase for other years. The tuition to program income for year 1 assumes $300 per graduate credit and a 5% annual increase in this allocation for other years. Since the courses in MS IS are already scheduled for the MBA and other graduate students in 2008-2010. The additional wages and salaries in years 1 and 2 only show additional cost for program advising. In years three and five respectively, we expect the increased tuition-program size fund one regular, tenure-track hire in each year three and five respectively. As can be see in the budget, the program expenses are fully funded by tuition-to-program allocations in year one to four. We expect that tuition-to-program and donations to program will fully fund the fifth-year expense. As such, the cost per FTE in the first five years of MS IS is zero.

Funding Sources

The funding source is parimiarly from tuition-to-program. The IS faculty also expect to solicit donations from technology and major recruiting companies that can be directed to this program.

Reallocation

No internal reallocation is requested at this point.

Impact on Existing Budgets

Because the program will be self sufficient, the program does not impact the existing budgets of other units.

<div align="center">Appendix A: Program Curriculum</div>

All Program Courses

List all courses, including new courses, to be offered in the proposed program by prefix, number, title, and credit hours (or credit equivalences).

Course Prefix & Number	Title	Credit Hours

Course Prefix & Number	Title	Credit Hours
Core Courses		
IS 6010	MIS Fundamentals	1.5
IS 6420	Database Theory and Design	3
IS 6430	Systems Analysis and Design	3
IS 6470	eBusiness	1.5
IS 6481	Data Driven Strategies and Products	1.5
IS 6482	Data Mining	1.5
IS 6595	Master's Project	3
	Sub-Total	15
Track Courses		
	Data Strategies Track	
IS 6480	Building Business Intelligence Systems	3
IS 6483	Advanced Data Mining	3
IS 6484	Advanced Data Management	3
MGT 6040	Data Analysis and Decision Making I	1.5
MGT 6041	Data Analysis and Decision Making II	1.5
	Sub-Total	12
	Information Security Track	
IS 6570	IT Security & Audit	3
IS 6571	IT Forensics	3
IS 6572	Network Defense and Countermeasures	3
	Sub-Total	9
Elective Courses		
IS 6471	Emerging Web Strategies and Technology	3
IS 6540	ERP	3
MGT 6060/1	Product and Operations Management I & II	1.5/1.5
MGT 6420/1	Quality Management I & II	1.5/1.5
MGT 6450	Simulation of Business Processes	3
MGT 6620	Supply Chain Management	3
MGT 6630	Service Strategies	3
MGT 6660	Project Management	3
	Sub-Total	24
	Total Number of Credits	60

New Courses to be Added in the Next Five Years

The following courses have been added for MBA electives in 2009-2010. The MS IS program will not need new courses in the next five years.

Course Number	Course Title	Credit Hours	Course Description
IS 6483	Advanced Data Mining	3	Theory and applications of recommendation, profiling, fraud

Course ID	Title		Cr.	Description
				detection, time series analysis, social network analysis and web mining algorithms
IS 6484	Advanced Data Management		3	Distributed data mgmt, web data mgmt, query, ETL and storage optimization
IS 6540	ERP		3	Technological and management issues and best practices of ERP systems
IS 6571	IT Forensics		3	Exam computer forensics and investigations

The following provide descriptions of IS courses. The remaining course descriptions are available in online catalog of the Management courses.

Course ID	Cr.	Title	Description
IS 4415	3	Data Structures & Java	This course covers the design, implementation, and analysis of basic data structures and algorithms. The data structures covered include stacks, queues, list, trees, and graphs. Algorithms for searching, sorting, and traversing the data structures will be introduced. Students are required to implement the data structures and algorithms as library components of computer programs using Java.
IS 4440	3	Networking & Servers	An introduction to the design, operation, and management of telecommunication systems including Server 2003, IIS, Linux, TCP/IP, management support for networking. This course provides instruction in data communications and computer network definitions, concepts and principles, including (but not limited to): the conversion of voice, data, video and image to digital form; topologies; protocols; standards; and fundamental concepts related to data communication networks, such as routers, gateways, cabling, etc. It prepares students to make intelligent and informed decisions about data network design/management, by analyzing the benefits, drawbacks, effects, tradeoffs, and the compromises related to various data communication technologies. You will learn how to make policy, design, and installation decisions related to planning and implementing data communication and computer network applications.
6010	3	Fundamentals of Management Information Systems	This course is to provide MBA students with (1) a comprehensive survey of important information systems and their business applications (2) a good understanding of essential issues or challenges surrounding management of information systems, and (3) a detailed analysis of prevailing information systems management practices and strategies in different organizations. This course strikes for a balance between technical issues and managerial considerations. Lectures and in-class discussions are the primary teaching methods, supplemented by case analysis, computer labs, and individual assignments.
6420	3	Database II	This course is designed to provide MBA and graduate students with (1) an overall understanding of fundamental database design theories and concepts, (2) detailed knowledge of essential techniques for designing database systems, (3) hands-on experiences in implementing (prototype) database systems using Oracle and ACCESS, (4) a firm grip of key management issues surrounding database technology, and (5) insights into emerging business applications enabled by database technology. This

			course emphasizes on database fundamentals that include data modeling, database design and implementation, structured query language (SQL), core DBMS functionality (such as transaction management, concurrency control and error recovery management), and advanced topics related to database technology.
6430	3	Systems Analysis and Design II	This course introduces you to the field of information system analysis, analysis tools, and the procedures for managing information system analysis projects. Topics covered include the role of the systems analyst in organization; concepts, philosophies, and trends in systems analysis and design; and tools and techniques for such analysis activities. A strong emphasis will be on case analysis and practicing the techniques for real world systems.
6470	1.5	E-Business	This course provides MBA students with an overall understanding of electronic commerce. It is designed to provide (1) an overview of essential technological infrastructure underpinning e-commerce, (2) a comparative analysis of important business activities that take place in the conventional marketplace versus in the virtual market-space, and (3) a survey of interesting e-commerce technologies, business models/practices, and strategies.
6480	3	Building Data Warehouses	This course introduces dimensional modeling, data extraction, loading and transformation (ETL) and online analytic processing (OLAP) reporting concepts and practices for building scalable data warehouse systems. Students will practice core methods and explore real world applications and issues in hands-on assignments and group projects.
6481	1.5	Data Driven Strategies and Products	This course covers the management of quality, systems, process, people, organization and investment in order to create value from data driven products. Students will analyze cases, data and explore data driven product management strategies for real world applications.
6482	1.5	Data Mining	This course introduces data mining technologies that assist in discovery of reliable, understandable and useful patterns in structured, semi-structured and unstructured data. Students will practice core data mining technologies, analyze cases, and explore real world applications and issues.
6483	3	Advanced Data Mining	This course covers advanced data mining methods, software tools and applications for text and web data mining as well as sequence and time series, social network analysis, segment and prediction analysis and modeling. Students will collect and analyze real world data using available data mining software or programming tools. Pre-requite: IS 6482
6484	3	Advanced Data Management	This course covers issues, methods and applications of distributed data management, multimedia data management, web data management and optimization of query processing, ETL and storage management.
6540	3	ERP	This course covers technological and management issues related to ERP.

6570	3	IT Security & Audit	Examines management issues associated with the control and audit of information systems. Specific emphasis is on IT controls and their evaluation, computer-based auditing techniques, encryption, and security policies. Recent developments in IT, such as client-server systems and the Internet, and their impact on auditing, control, and security, are also considered. Prerequisite: IS4440 or the telecommunication equivalent.
6571	3	IT Forensics	Examines computer forensics and investigations. It looks at the problems and concerns related to computer investigations. It blends traditional investigation methods with classic systems-analysis problem-solving techniques and applies them to computing investigations. It implements common computer forensic tools in real-life scenarios.
6572	3	Network Defense & Countermeasures	Provides a solid foundation in network security fundamentals. The primary emphasis is on intrusion detection. Examines developing a security policy and then implementing that policy by performing Network Address Translation, implementing packet filtering, installing proxy servers and firewalls, and setting up Virtual Private Networks. This course assumes familiarity with the Internet and basic networking concepts such as TCP/IP, gateways, routers, and Ethernet.
6595	3	Master's Project	The student completes a complex information system development, strategic planning or research project under the supervision of a full-time IS faculty member. The student is required to generate a written report for approval of the credit by the advisor and the MS IS committee. The project is expected to allow the student to integrate knowledge from individual courses and further expose students to new topics or techniques.

Courses Recommended For Elective Breadth or Business Pre-Requisite Requirement

ACCTG 6000   Financial Accounting (3) Prerequisite: Masters status in the School of Business.
   Designed to provide students with an understanding of the financial-reporting process followed by all public and many private companies. Students gain the ability to read and understand published financial statements and perform formal financial analysis.

ACCTG 6001   Managerial Accounting (1.5) Prerequisite: ACCTG 6000.
   Focuses on the way managements determine the information they need for effective decision-making and how those needs are met. Includes consideration of a variety of management-planning, control, and decision-making tools. Considers the communication and behavioral aspects of their use.

FINAN 6020   Financial Management (1.5 to 3) Prerequisite: Master's status in the School of Business and either ACCTG 6001 or equivalent.
   Topics include financial analysis, planning, working-capital management, financial math, valuation, and capital budgeting.

FINAN 6022 Financial Management (3) Prerequisite: MS status in Business School and either ACCTG 6001 or equivalent.
   For PMBA students. Topics include financial analysis, planning, working-capital management, financial math, valuation, and capital budgeting.

FINAN 6025   Managerial Economics (1.5) Prerequisite: Master's status in the School of Business and either MATH 1100 or equivalent.
   Addresses fundamental principles of economics from the managerial perspective. Topics include supply

and demand in markets, analysis of production and cost, consumer theory, analysis of market structure, the banking system, and macroeconomics.

FINAN 6120   Economics (3) Prerequisite: Masters status in the School of Business.
   Teaches the basic principles of microeconomics and macroeconomics and their usefulness in making business decisions. The course covers supply and demand, individual?s consumption, savings, and labor behavior. In addition, the course analyzes both short-run fluctuations and long-run growth of the aggregate economy. Topics include profit maximization, utility maximization, demand, supply, uncertainty, game theory, agency theory, booms and recessions, inflation and unemployment, monetary and fiscal policy, budget and trade deficits, and interest and exchange rates.

FINAN 6121   Corporate Finance (2.8) Prerequisite: Masters status in the School of Business.
   Uses modern financial theory and analytical methods as the framework for decision-making by corporate financial officers. Topics include financial mathematics, valuation of financial and real assets, capital budgeting, capital structure, cost of capital, management of working capital, issuing bonds and stocks, mergers and acquisitions, and international finance. The overall framework is maximizing shareholder value.

MGT 6040   Data Analysis and Decision Making I (1.5) Prerequisite: Master's status in the School of Business, MATH 1090, MGT 2350.
   This course will develop decision making abilities with data-analysis and decision models. Applications will be in the business functional areas. Students will use computers to solve business problems. Course topics will include advanced statistical analysis, regression models, linear programming, decision analysis, and project management.

MGT 6041   Data Analysis and Decision Making II (1.5) Prerequisite: MGT 6040.
   This course is a continuation of Data Analysis and Decision Making I. Course topics will include simulation, linear programming, and Bayes theorem.

MGT 6060   Production and Operations Management I (1.5) Prerequisite: Masters status in the School of Business.
   Operations Management involves designing, operating, and improving the processes wherby any firm (such as a hospital) transforms raw materials (e.g., sick patients) into finished goods (e.g., cured patients). A key role of Operations is to manage the flow of work through these process steps, with the goal of closely matching supply with demand while enhancing quality and minimizing cost. Thus we develop a framework for analyzing business process flows within a firm and across firms, applying the principles not only to service industries but also to manufacturing.

MGT 6061   Production and Operations Management II (1.5) Prerequisite: Master's status in the School of Business, MGT 6060.
   This course builds on MGT 6060 by looking more closely at how the management of supply chains, capacity, inventory, quality, and product design can have a positive impact on the match between supply and demand, and on profitability. The course further examines how firms in both service industries and manufacturing have used the Operations function to help create a competitive advantage, and how firms have achieved a strategic fit between the Operations function and other business disciplines.

MGT 6140   Statistics (2.8) Prerequisite: Masters status in the School of Business.

   Statistics provides an overview of basic statistical concepts and methods for managers. The emphasis is on understanding the concepts and their application to the real world business data. The conceptual material focuses on the importance of statistical thinking to make sound business decisions. The statistical methods are implemented using a computer to analyze business and economic data sets, with emphasis on interpreting the output. Topics covered include descriptive statistics (how to organize data and display it graphically), probability theory, distributions (empirical, mathematical and sampling), statistical inference (hypothesis testing), and the study of relationships (regression and correlation).

MGT 6160   Operations Management (2.8) Prerequisite: Master's Status in the School of Business.

   Operations management studies traditional operations management theories and methodologies as well as many new and developing models and associated technologies that are reshaping the way that firms manage procurement, production, and distribution of goods and services in an increasingly competitive international marketplace. This course develops a systems thinking approach that is critical for successful design and strategic management of world-class manufacturing and service operations. Topics covered include integrated product/process analysis and design, materials management, supply chain management, industry structure and virtual organizations, use of information technologies in the extended enterprise, service operations management, total quality management, experience curve concepts, technology management, project management, and current developments in operations strategy. Superior management of operations can result in considerable competitive advantages.

MGT 6420   Quality Management I (1.5 to 3) Prerequisite: MGT 6050.

   Introduction to the principles of quality management, with an emphasis on cross-functional problem solving. Topics include system design to control the quality of products and services, customer driven quality, leadership, employee participation and training, and strategic quality planning.

MGT 6421   Quality Management II (1.5 to 3) Prerequisite: MGT 6050.

   An introduction to the tools of process control and improvement. Topics include design quality and error prevention, management by fact, statistical thinking and statistical process control. Emphasis will be given to the design and interpretation of process control charts.

MGT 6425   Six Sigma for Managers (3) Prerequisite: MGT 6040.

   six Sigma is a philosophy and set of concrete tools designed to reduce variation in all critical processes to achieve continuous and breakthrough improvements that impact the bottom line of organization and increase customer satisfaction. In this course, we will study the five phase DMAIC (Design-Measure-Analyze-Improve-Control) approach in detail with a combination of lecture, small group breakout sessions, and hands-on practice. Course topics will include a review of statistics, process improvement tools, statistical process control, measurement system evaluation, capability analysis and design of experiments. Statistical software such as Minitab will be required and used throughout the class.

MGT 6430   Regression Analysis (1.5 to 3) Prerequisite: MGT 6040.

   Regression theory and applications to managerial and social-science problems. Two- and three-variable regression in summation notation, matrix algebra, general linear model, and advanced topics.

MGT 6440   Multivariate Statistics for Management (1.5 to 3)

   A practical introduction to multivariate statistical methods as applied in business. Topics to include

multiple regression, multivariate analysis of variance (MANOVA), principle components analysis, cluster analysis (hierarchical clustering, k-means), canonical correlation, factor analysis, discriminant analysis, and structural equations modeling -if time permits! Also a review of matrix algebra up through eigenvalues and eigenvectors. Emphasis will be given on the use of SPSS statistical software to implement statistical tools for approaching data problems in business; interpreting and analyzing the software's output.

MGT 6450   Simulation of Businsess Processes (1.5 to 3) Prerequisite: MGT 6040.
   This class will concentrate on building simulation models of business practices, and on using the models to improve processes. Simulation software will be used to allow for modeling of complex situations in may areas of business, including production management, finance, and marketing.

MGT 6460   Stochastic Models in Management Science (1.5 to 3) Prerequisite: MGT 6040.
   Chance-constrained programming and other stochastic programming models, inventory and queueing models, computer simulation of management systems, probabilistic dynamic programming, replacement models, Markov-chain models, dynamic programming in Markov chains.

MGT 6610   Practical Management Science I (1.5 to 3) Prerequisite: MGT 6040.
   This course takes a practical approach to management science by using popular business software (e.g., Microsoft Excel) to solve analytical models. Management-decision problems covered in the course may include marginal analysis, linear and integer programming, goal programming, transportation models, specialized network models, inventory models, critical-path method/project management networks, queuing theory, and simulation. Where applicable, the course will build on topics at a more advanced level than models covered in required MBA courses such as MBA 6430 -- Data Analysis and Decision Making -- and MBA 6300 -- Production/Operations Management.

MGT 6611   Practical Management Science II (1.5 to 3) Prerequisite: MGT 6040.
   This course continues the practical approach to management science by using popular business software (e.g., Microsoft Excel) to solve analytical models. Management-decision problems covered in the course may include marginal analysis, linear and integer programming, goal programming, transportation models, specialized network models, inventory models, critical-path method/project management networks, queuing theory, and simulation. Where applicable, the course will build on topics at a more advanced level than models covered in required MBA courses such as MBA 6430 -- Data Analysis and Decision Making -- and MBA 6300 -- Production/Operations Management. Although it is recommended to take both MGT 6710 and MGT 6711 in succession, MGT 6710 is not a prerequisite for this course.

MGT 6620   Supply Chain Management (1.5)
   Production of services and goods typically involves many process steps that are spread across multiple firms or departments. In supply chain management (SCM) we examine how to improve performance by considering the actions of multiple members within this chain of activities. SCM addresses not only the flow of materials from upstream to downstream members in the supply chain, but also the flow of information and funds. Advancements in information technology allow the supply chain to achieve performance improvements previously beyond reach, and may change the optimal structure of the supply chain. Class discussion is motivated by case studies that examine successful emerging supply chain strategies.

MGT 6621   Operations Strategy (1.5)
   We Explore various operational strategies that can lead to competitive advantage. Within each topic, we

develop a framework or theory that the firm can use to aid in decision-making, and typically also tackle a real-life problem using a case study. Possible topics include product and process innovation, strategic implications of the learning curve, strategies from diffusion of new products, rapid product and process development, capacity management, strategic supplier management, strategic quality management, and mass customization.

MGT 6630 Operations Planning and Control (1.5 to 3) Prerequisite: MGT 6060 or 6061.
   Design of information and decision systems for allocating resources and scheduling activities. Development of conceptual structures for guiding the design of integrated planning and control systems. Topics include forecasting, materials resource planning, just-in-time manufacturing, and capacity management.

MGT 6660 Project Management (1.5 to 3) Prerequisite: Masters status in the School of Business.
   Project management has become the way of life in many industries. Whether it is development of a new product, organizational-wide implementation of a new IT tool, or execution of a merger, project management skills are required to manage cross-functional teams subject to strict deadlines and tight budget constraints. In this course we discuss all three phases of project management: project conception, execution, and closure. Issues related to project leadership, budgeting, and scheduling will be addressed in the course, and case discussions will highlight state of the art project management practices. Project management software will be introduced (possibly including group project using MS Project Software).

MGT 6670 Service Operations (1.5 to 3) Prerequisite: MGT 6060 or 6061.
   This course aims to develop a better understanding of best practices in the service sector through analysis of leading-edge firms and the strategies they have employed to create and maintain competitive advantage. The course emphasizes the close coordination of marketing and operations in the design and implementation of service delivery processes. Topics include the importance of developing both human and technical skills among employees who represent the most critical point of contact between the service organization and its customers, and the role of technology, in particular information technology, in changing the nature of the service delivered and/or the way in which the service is delivered. The course relies heavily on the analysis of a number of case studies, and includes a group project where the principles developed in the course are applied to a real service organization.

MGT 6680 Product Innovation Consultation (1 to 4.5) Prerequisite: MGT 6040 & 6060.
   The objective of this course is to provide real-world, hands-on, technology-based product development consulting experience to advanced level MBA students. This year-long course will involve lectures from several experienced guest speakers with expertise on various aspects of innovative product developments such as business plan development, valuation & financial analysis, marketing research, project management, intellectual property and legal issues, and negotiation, teamwork and leadership. MBA students will be assigned as "business consultants" to engineering student-teams working on new product development projects. While the technical nature of product development will be the focus of work performed by engineering students, the MBA student will collaborate with the engineering students to provide a rigorous analysis for the commercial viability of the project, and will advise the project teams on business and management aspects of their projects. Student teams will be jointly supervised by both engineering and business school professors.

MGT 6690   International Operations Management (1.5 to 3)
   Approaches operations problems for global companies. Includes issues in facility location, productivity management, cultural production considerations, and global operations strategy.

MGT 6710   Strategy & Technology (1.5 to 3)
   An introduction to the management of technology as a business activity. The focus is on the processes by which technological enterprises evolve, and on the technological innovation process in established technology-based firms. Special emphasis is placed on intellectual property issues and the management of knowledge. Heavy emphasis is placed on classroom analysis of published case studies of technological enterprises, together with readings which outline basic concepts applicable to the subject.

MGT 6810   Entrepreneurship and Emerging Business (1.5 to 3)
   This course introduces the concept of the entrepreneur and of the role of the entrepreneur and innovator in the modern economy. It introduces the processes involved in identifying and defining opportunities in emerging industries and of developing and refining the business concept. At the end of this course, the student should understand the potential of Entrepreneurship as a career option and should have completed the preliminary analysis for an entrepreneurial business idea. The course will involve extensive exposure to entrepreneurs and entrepreneurial ventures and will require a formal business concept paper. Students are encouraged to develop new venture teams with both classmates and outside business partners.

MGT 6969   Special Topics in Statistics (1 to 6) Cross listed as STAT 6969, ED PS 6969, ECON 6969.
   Current topics in statistical methods. Prerequisites vary depending on the topic. Course format may be lecture, lab, or group projects.

MKTG 6090   Marketing Management (3) Prerequisite: Masters status in the School of Business.
   Focuses on developing analytical skills to make basic marketing decisions: target market, positioning, and marketing mix. Instructional approaches include lectures, case analyses, and a competitive situation. Written and oral communication are stressed.

MKTG 6300   Marketing in the Information Age (1.5 to 3)
   In the information age many products and services become more information intensive, making it possible to digitize part of their value chains and access them with a network. This course uses reading, cases, guest speaker, and a project to examine the impact of the Internet and related digital technologies on marketing and business. Specifically, it covers the marketing implication of information intensive products and services, business models for the information economy, and use of the Internet to perform marketing functions.

MKTG 6315   Consumer Relationship Management-Maximizing Profitability in Consumer Touch Points (1.5)
   Course examines the realities of CRM-the strategies, products, processes, and people that are making it work and the lessons from those who aren't. Students analyze the role that technology, corporate culture, market segmentation, and metrics play in determining success. It will focus on how to equip and convert front-line, customer-facing employees into a more critical component of the profit model.

MKTG 6600   Marketing Analysis and Decision Making in an Information Age (3) Prerequisite: MKTG 6090 or 6091.

This course deals with concepts, methods, and applications of decision modeling to address marketing issues such as segmentation, targeting and positioning; new product design and development; advertising salesforce, and promotion budgeting; and pricing. It will attempt to translate conceptual understanding into specific operational models that can be implemented on PC-based computer software.

MKTG 6860   Marketing Research (3) Cross listed as MKTG 7760. Prerequisite: MGT 6040.
   Meets with MKTG 4450. Develops ability to design research. Stresses design of research strategy, data collection, use of multivariate statistics and computer analysis. Stresses elements of research common not just to marketing but all business research areas.

Section III Courses To Be Considered For The Business Pre-Requisite Requirement Only

ACCTG 2010   Financial Accounting (3) Prerequisite: IS 2010.
   The first of a two-course sequence that provides a broad view of accounting information's role in supporting an organization's functions. Primary focus is financial use of accounting information.

ACCTG 2020   Managerial Accounting (3) Prerequisite: ACCTG 2010.
   Second of a two-course sequence that provides a broad view of accounting information's role in supporting an organization's functions. Primary focus is management's use of accounting information.

ACCTG 3000   Survey of Accounting Fundamentals (3)
   A broad survey of important topics in both financial and managerial accounting intended for business minors and other non-business majors.

ACCTG 5210   Management Accounting I (3) Prerequisite: ACCTG 2020.
   Identification and development of relevant cost information for both manufacturing and non-manufacturing situations. Emphasis given to the regulatory, analytical, and behavorial use of accounting information.

FINAN 3000   Fundamentals of Investing and Business Finance (3) Prerequisite: College Algebra Fulfills Quantitative Intensive BS.
   Introduction to investing and business finance: stocks, bonds, financial analysis and valuation, market access, risk and rate of return. For non-Business majors and minors.

MGT 2340 Business Statistics (3) Prerequisite: MATH 1100 and IS 2010. Fulfills Quantitative Reasoning (Statistics/Logic).
   This fast paced class covers the fundamental statistical concepts of collection, analysis, and interpretation of business and economic data; measures of central tendency and dispersion; probability theory and probability distributions; sampling distributions and statistical inference, including estimation and hypothesis testing. Functional area cases from Finance, Marketing, Accounting and Operations are analyzed. Microsoft Excel is used for computation and descriptive purposes.

MGT 3440   Applications of Business Statistics (3) Prerequisite: Upper division status or MGT 2340. Fulfills Quantitative Reasoning (Statistics/Logic).
   This practical and example-based course uses the essential tools and concepts of Six Sigma as a unifying framework. Discussion topics include design of experiments, goodness of fit, contingency tables, correlation analysis, nonparametric statistics, and an introduction to statistical process control. Moreover,

hands-on skill is acquired for the development and interpretation of regression models from functional areas of accounting, finance, marketing and operations with a focus on depth rather than breadth of the subject material. Microsoft Excel is used to create graphical and numerical outputs with emphasis on interpretation of output. A comprehensive case write-up and presentation, integrating the essentials of course tools is prescribed as the end-of -term project. Business cases are used throughout the term for reinforcement purposes.

MGT 3660   Production/Operations Management (3)

Analyzes conversion function of a business, i.e, how inputs are transformed into useful products and services. Location, design of facilities, layout, equipment selection, work methods and measurement, production scheduling and control, inventory management, quality control, and operations strategy. Relevant to operations of both manufacturing and service systems.

MGT 3700   Fundamentals of Entrepreneurship (3)

This course is designed as an introduction to entrepreneurship and the processes of new ventures. This course may be taken as a stand-alone elective, or as the first in the core series for Entrepreneurship. Students will become familiar with entrepreneurship and ascertain the degree to which entrepreneurship represents a relevant personal career. The course will expose the student to a wide range of entrepreneurial ventures and provide the opportunity to work in a team to develop a Business Conceptualization -- the first step in the enterpreneurial process.

MGT 4650   Principles of Quality Management (3) Prerequisite: MGT 3440.

Introduction to the principles of quality management, with an emphasis on cross- functional problem solving. Topics include customer driven quality, leadership, employee participation and training, continuous process improvement, design quality and error prevention, management by fact, and strategic quality planning.

MGT 5660   Operations Strategy (3)

What makes some operations succeed while others die a quick or miserable death? Why do some of the best product or service ideas in the world fizzle instead of sizzle? What separates effective and inspiring operations managers from the mass of has-beens and also-rans, especially in times of trial? These are just some of the intriguing questions we will explore in this course on applying strategy development and execution to operations management. This is not a class on quantitative theory, mathematical models, software simulations, or financial analyses of annual reports. It is an honest, non-vanilla look at operations today in our global economy, and what works and what does not from the manager's desks to the front-line trenches. We will examine real companies, real decisions, real constraints and politics, and how people, technology, culture, market segmentation, competition, and metrics combine strategically to drive the success of manufacturing and service operations. Topics of discussion include operational measures of success, product selection, capacity and production planning, technology integration, customer service outsourcing, best practices implementation, CRM, fraud prevention and other contemporary issues. All management majors will be required to complete MGT 5510 or 5660.

MGT 5969   Special Topics in Statistics (1 to 6) Cross listed as ED PS 5969, FP MD 5969, MATH 5969, ECON 5969, FCS 5969, PSY 5969, SOC 5969, STAT 5969.

Topics vary. Taught by members of the University Statistics Committee. Check current class schedule for cross-listings.

MKTG 3010   Principles of Marketing (3)

Marketing primarily deals with customer-focused business issues that can determine the success of failure of a firm. In this course, we teach the "language of marketing," introduce the core concepts of effective marketing, and discuss the various factors that influence marketing decision making. We will concentrate on key business decisions concerning product attributes, promotional campaigns, pricing strategies, distribution efforts, market segmentation, and strategy formulation. We also present a framework for understanding the factors that affect a marketer's decisions and the role of marketing in a small businesses, corporations, and society. You will better understand these topics through some combination of lecture, textbook material, case discussions, videos, guest speakers from industry, and discussion of current marketing issues. This course is for Business Majors, Non-business majors are encouraged to take MKTG 3000.

MKTG 4020   Marketing Management (3) Prerequisite: MKTG 3000, 3010 or 3011. Fulfills Upper Division Communication/Writing.

Roll up your sleeves and see the results of your decision-making. This course is a hands-on analysis and actual decision-making journey in marketing strategy. Experience the power of strategy tools such as differentiation and positioning. We additionally study actual case histories and decisions made by real managers and executives--and see how they did. The conclusion of the course provides an opportunity to apply your knowledge of marketing strategy maneuvers and marketing management via computer simulation. Major marketing concepts, principles, and strategy are directly applied.

MKTG 4300   Internet Marketing (3) Prerequisite: MKTG 3000, 3010 or 3011.

Each era's dominant new technology brings about new marketing capabilities. In the information age, the internet has forced business to consider new ways of carrying out commercial strategies and tactics, and to use new business models in order to compete, both locally and globally. This course looks at this new business environment from theoretical, strategic, and tactical perspectives. The focus is on internet marketing for Business-to-Consumers, and Business-to-Business markets.

MKTG 4450   Marketing Research (3) Prerequisite: MKTG 3000, 3010 or 3011 and MGT 2340 and 3440.

What to customers want from the marketplace? Who will buy our product? Where should we locate our store? Good business decisions require the answers to hundreds of questions like these. Marketing research is the science of studying the marketplace to get solid answers to support good decision making. In this class you will learn about different sources of business data (some that exists already and some that you will have to gather yourself), and spend the majority of the course focusing on the skills you need to design and perform good business research yourself. Among other techniques, you will learn about experiments and observation, surverys and interviews, focus groups and data analysis. This dynamic class brings together a whole array of tools that every good business person needs for effective decision making. You will use fieldwork, in-class exercises, discussion and lectures to cover basic principles first hand experiences, cases, and projects, as you study these important ideas.

MKTG 4500   Introduction to Advertising (3) Prerequisite: MKTG 3000, 3010 or 3011.

Advertising as an activity and strategic tool of marketing. Social and economic roles of advertising.

MKTG 4510   Advertising Management (3) Prerequisite: MKTG 3000, 3010 or 3011 and 4500.

Applying advertising theory and strategy; establishing good client-agency relationships; dealing with production suppliers and media organizations.

MKTG 4600   Marketing Analysis Decision Making in an Information Age (3) Prerequisite: MKTG 3000, 3010 or 3011.
    This course uses Excel and other relatively user-friendly software to build models and decision aids to address marketing issues such as segmentation, targeting, and positioning; new product design and development; advertising salesforce, and promotion budgeting; and pricing.

MKTG 5600   Marketing Analysis (3) Prerequisite: MKTG 3000, 3010 or 3011.
    Meets with MKTG 6600. This course deals with concepts, methods, and applications of decision modeling to address marketing issues such as segmentation, targeting and positioning; new product design and development; advertising sales force, and promotion budgeting; and pricing. It will attempt to translate conceptual understanding into specific operational models that can be implemented on PC-based computer software.

Appendix B: Program Schedule

The following shows a sample schedule for students studying in MS IS starting in the fall semester. Students who study in MS IS part-time, starting in a different semester or required to take pre-requisite courses will have different schedules.

Course Prefix & Number	Title	Credit Hours
Fall Semester		
IS 6430	Systems Analysis and Design	3
IS 6481	Data Driven Strategies and Products	1.5
IS 6482	Data Mining	1.5
	Track or Elective Courses	3
	Sub-Total	9
Spring Semester		
IS 6010	MIS Fundamentals	1.5
IS 6420	Database Theory and Design	3
IS 6470	eBusiness	1.5
	Track or Elective Courses	6
	Sub-Total	12
Summer Semester		
IS 6595	Master's Project	3
	Track or Elective Courses	6
	Sub-Total	12
	Total Number of Credits	30

Appendix C: Faculty

Rohit Aggarwal will join the David Eccels School of Business at the University of Utah as an Assistant Professor of Information Systems. His research interests include studying the avenues and challenges posed by electronic word of mouth (weblogs, online discussion forums, online posted reviews and twitter) on businesses. Specifically, he investigates the underlying process that leads to the successful generation of eWOM and its implications. His research will help firms and institutional investors in understanding the value of eWOM and the ways to better utilize eWOM. He is also interested in investigating reputation mechanism design for online services exchange, and online agent design that facilitates bidding in an online products exchange. His research has been mentioned in popular press outlets such as Conde Nast-Portfolio, and has won research funding.

Randall J. Boyle received his Ph.D. in Management Information Systems from Florida State University in 2003. He also has a master's degree in Public Administration and a B.S. in Finance. His research areas include deception detection in computer-mediated environments, information assurance, the effects of IT on cognitive biases, the effects of IT on knowledge workers, and e-commerce. He has published in several academic journals such as *Journal of Management Information Systems* and *Journal of International Technology and Information Management*. He has received the college teaching award at the University of Alabama in Huntsville and has taught a wide variety of classes including Information Security, Telecommunications, System Analysis and Design, Decision Support Systems, and Web Servers.

David S. Glod, CPA, CISA, CISSP, CFE is a regular IS adjunct faculty to teach two IS courses in the security and audit area each year starting in 2008-2009. He has ten years of technology audit and security experience and has designed and developed numerous courses to share knowledge of IT auditing and security. David has a Master of Accountancy in Information Systems and a B.S. in Accountancy from the Marriott School of Management of the Brigham Young University.

Jeff Hassett has been a member of the IT industry for over 15 years. He has experience in database design and implementation, large project implementation and also security. He has completed large technology implementations for industry leader such as Walt Disney World, United Airlines and Square D Electronics.

Paul J. Hu is an Associate Professor and David Eccles Faculty Fellow at the David Eccles School of Business, the University of Utah. He received his Ph.D. in Management Information Systems from the University of Arizona. His current research interests include information technology applications and management in health care, organizational management of systems implementation, electronic commerce, digital government, human-computer interaction, and knowledge management. Hu has published papers in *Journal of Management Information Systems*; *Communications of the ACM*; *IEEE Transactions on Systems, Man and Cybernetics*; *IEEE Transactions on Information Technology in Biomedicine*; *IEEE Transactions on Engineering Management*; *IEEE Intelligent Systems; IEEE Software; Journal of the American Society for Information Science and Technology*; *Decision Sciences; Decision Support Systems*; *Social Science Computer Review*; *European Journal of Information Systems; Information and Management; Electronic Commerce Research*; *Journal of Telemedicine and Telecare*; and *Topics in Health Information Management*. He received a Best Paper Award at the *33rd Hawaii International Conference on System Sciences*. Hu has received research funding from *the National Science Foundation*, *the Hong Kong Research Grants Council*, *University of Utah*, and *Center for International Business Education and Research*.

Daniel McDonald received his Ph.D. in Management (Information Systems) from the University of Arizona in 2006. He also has a Master's of Science degree in Management Information Systems and a B.S. in Accounting. Prior to his Master's and Ph.D., Daniel worked in industry accounting and inventory management. His research interests include Decision Support, Intelligent Systems, and Text and Data Mining. He is interested in processing e-mail communication, business news, and medical research texts to find relevant relationships, including social and event information. He has published in a variety of journals including *ACM Transactions on Information Systems*, *Bioinformatics*, *IEEE Transactions on Information Technology in Biomedicine*, *Decision Support Systems*, and the *Journal of the American Society for Information Science and Technology*.

Tariq Mughal comes to DESB with fifteen years of experience in the aerospace industry. His experience constitutes in the areas of engineering analysis, project management, business development, finance and program management. While he was at United Airlines in San Francisco he developed a budget of $2.2 Billion dollars for the acquisition and assimilation of U.S. Airways maintenance operations. He has masters in Mechanical Engineering and an MBA from University of Utah. His bachelors are in mathematics with emphasis in statistics. His primary responsibility at DESB is to teach undergraduate statistics classes and manage that program.

Gautam Pant is as an Assistant Professor at the David Eccles School of Business. He received his Ph.D. in Business Administration (Information Systems) from the University of Iowa. He also holds a Masters degree in Computer Science from Baylor University and a Bachelors degree in Computer Engineering from the University of Mumbai, India. His research focuses on searching, gathering, and analyzing Web-based information to gain actionable intelligence. He has worked as a software engineer for Computer Associates-TCG (India), as a research assistant for NEC Labs (Princeton), and GlaxoSmithKline R&D (King of Prussia). His research appears in *ACM Transactions on Information Systems*, *IEEE Transactions on Knowledge and Data Engineering*, *ACM Transactions on Internet Technology*, and *Information Retrieval*. His work also appears in the proceedings of highly selective international conferences such as *ACM SIGIR* and *ACM/IEEE JCDL*.

Joseph S. Pettit, Ph.D. is a regular Adjunct Faculty to teach two IS courses per year starting from 2008-2009. He is also a Program Delivery Manager for SAP Consulting, Palo Alto, CA and has over thirty years of system integration, business process re-engineering, organization development and general management experience as Client Delivery Director, Program Director, Program Delivery Manager, Senior Engagement Manager, Program Manager, Project Manager, Small Business Owner and General Manager in a wide-range of industries - Manufacturing, Automotive, Communications, Financial Services, Pharmaceutical, and High Tech. Dr. Pettit received his Ph.D. in Organizational Development from the Carlson School of Business at the University of Minnesota and his M.S. in Industrial Relations from DESB and his B.A. from Psychology at the University of Utah.

Vandana Ramachandran is a Ph.D. Candidate in Information Systems at the Robert H. Smith School of Business, University of Maryland. She will join the Information Systems group in the David Eccles School of Business at the University of Utah in Fall 2008. Her research interests include economics of information systems, e-business strategies, new business models in electronic markets such as online infomediaries and sponsored search/advertising, and strategic impacts of IT in firms. Her dissertation focuses on examining how the explosion of decentralized information in online channels transforms the dynamics among buyers and sellers in both online retail markets and offline channels for durable goods, using econometric and clickstream modeling techniques. Her work is forthcoming in *Information Systems*

Research, and is under review at *MIS Quarterly* and *Journal of Marketing*. She has also presented her research at several conferences including *ICIS, WISE, CIST-INFORMS, AOM, ACM* and others. She is also the recipient of research grants from the Net Institute (2005, 2007), the Stempler Award for Research on family owned/controlled businesses (2007), and the Dean's Fellowship for Summer Research (2003-2008).

Glen Schmidt's research interests include product innovation, new product development, and supply chain management. He has worked inside and/or studied firms in various industries including high-tech, heavy-duty equipment, automotive, and oil. Both his research and teaching materials have been recognized for their excellence by the Institute for Operations Research and the Management Sciences (INFORMS).

Olivia R. Liu Sheng is Presidential Professor and Emma Eccles Jones Presidential Chair of Information Systems at the David Eccles School of Business, University of Utah. She also directs the Global Knowledge Management Center (http://gkmc.utah.edu) to seek research and education extension of data driven business optimization. Her research focuses on data mining and optimization techniques for ebusiness management, customer analysis, customer profiling, personalization, recommendation, fraud/intrusion detection, bio-medical, digital government, telemedicine, telework and distributed learning applications. Her research has received funding from various Utah State agencies, Wasatch Advisors, Overstock, Optatio, U.S. Army, NSF, IBM, Tivoli, Toshiba Corp., Sun Microsystems, Hong Kong Research Grants Council, Asia Productivity Organization, SAP University Alliance, and Bureau of Land Management.

Dr. Sheng received the B.S. degree from the National Chiao Tung University in Taiwan, R.O.C. and the Master's and Ph.D. Degrees in Computers and Information Systems from the University of Rochester. She joined the faculty of Management Information Systems at the University of Arizona in 1985 and was the Department Head from 1997 to 2002. Dr. Sheng was visiting faculty at Hong Kong University of Science and Technology, Tokyo Institute of Technology, and Shanghai JaioTung University. She has published over 50 papers in such journals as *Management Science, ACM Trans. On Information Systems, ACM Trans. On Internet Technology, Information Systems Research, INFORMS Journal on Computing, Communications of ACM, IEEE Trans. on Man, Machine and Cybernetics, IEEE Trans. on Biomedical Computing,* and *IEEE Trans. on Engineering Management.* She is on the editorial board for various journals including *Information Systems Research*.

Jeff Stratman is an Assistant Professor in the Management Department at the David Eccles School of Business, University of Utah. He received his Ph.D. in Business Administration with a concentration in Operations Management from the University of North Carolina at Chapel Hill in 2001. He holds a B.S.E. in Mechanical and Aerospace Engineering from Princeton University.

His research interests include operations strategy, the strategic use of information systems for supply chain management, enterprise resource planning (ERP) systems, and management of technology. He has published in Production and Operations Management, the Journal of Operations Management, Decision Sciences, R&D Management and Supply Chain & Logistics Journal, and has presented papers at national meetings of the Institute for Operations Research and the Management Sciences (INFORMS), the Decision Sciences Institute (DSI), and the Production and Operations Management Society (POMS). He is a senior editor for Production and Operations Management, and a member of the editorial review board for Manufacturing & Service Operations Management, and Decisions Sciences.

He was a member of the faculty of the College of Management at the Georgia Institute of Technology from

2000-2006. Prior to joining Georgia Tech, he had six years of experience as a manufacturing systems consultant with Andersen Consulting (now Accenture). He is certified in Production and Inventory Management through the American Production and Inventory Control Society (APICS).

Sriram Thirumalai is an Assistant Professor in the Management Department at the David Eccles School of Business, University of Utah. Sriram holds a Bachelors in Metallurgical Engineering from the Indian Institute of Technology (IIT) Madras, a Master of Science in Statistics from the University of Minnesota, and a Ph.D. in Operations Management from the University of Minnesota. Sriram's research interests are in the areas of Management of Technology, Supply Chain Management, Operations Strategy, and Health Care Operations. Sriram's research has appeared in the Journal of Operations Management and Electronic Markets. He serves a reviewer for various journals including Journal of Operations Management, Production Operations Management Journal, and IEEE Transactions.

Weiyu Tsai's research interests are in the areas of new product-service development and project management. Specifically, he studies the topics of design of new product-service bundle, new product preannouncement, design competition, and project scheduling and resource allocation. His teaching interests are in the areas of management science and operations management.

Don G. Wardell is Professor and Chair of the Department of Management at the University of Utah's David Eccles School of Business (DESB). He received BS and MS degrees in Metallurgical Engineering from the University of Utah, and a Ph.D. degree from Purdue University's Krannert Graduate School of Management. Dr. Wardell has taught at both the undergraduate and graduate levels, including teaching classes in Spanish at INCAE in Costa Rica. Dr. Wardell was honored with the University of Utah's Distinguished Teaching Award, the DESB's Masters Teaching Excellence Award, the Brady Superior Teaching Award, and the Marvin J. Ashton Award for Excellence in Undergraduate Teaching. His research interests are mainly in the areas of quality management and Six Sigma, and especially statistical process control. He has served as an associate editor for Technometrics, is a member of the editorial review boards of Production and Operations Management and IIE Transactions on Quality and Reliability and reviews articles for numerous journals.

Appendix D Sample Industry Job Postings

This appendix lists various job postings on information systems that industry partners have hired or are seeking BS IS, MS IS or MBA graduates from the University of Utah to fill. Most of the positions shown here were sent by company recruiters to IS faculty.

Implementation Consultant, Omniture, Orem

Interaction: Internal & Clients (All Levels)
Reports to: Director of Implementation
Levels: Junior, Mid-career, Senior

How would you like to work for one of the fastest growing Software companies in Utah? Since going public in June of 2006, Omniture has become one of the most prominent and competitive web analytic companies in the market today. Headquartered in Orem, Utah, Omniture is the pioneer of next-generation online analytics technology. It is the only company in its market to offer a comprehensive view of activity on a company's website, including historical (data warehouse) and real-time analysis and reporting. Omniture

has the highest level of retained and satisfied customers in the market, including eBay, AOL, Wal-Mart, Gannett, Microsoft, Oracle, Intel, GM and Hewlett-Packard.

The employees at Omniture are "the best of the best". They are smart, innovative, driven, and – most importantly – nice. At Omniture, we are looking for professionals in various areas of expertise. There are roles in Engineering, Marketing, Sales, Professional Services, and many others. A career at Omniture will not only provide extensive career advancement and experience, but also great benefits, competitive salaries and employee perks. If you are interested in joining our team, please apply online today!

Description

Implementation Consultants customize Omniture code to each client's exact business requirements and reporting needs, help each client implement code throughout their website, and perform quality checks to ensure that implementation has been completed thoroughly. Although not a programming position, it is certainly a very technical position with constant customer interaction. This position includes all of the following aspects:

In-depth knowledge of client website, business model, and online marketing strategy.

Heavy interaction and support on the phone and sometimes in person with client employees all the way up to the VP level of Fortune 500 companies

- Expert in
  - Internet and online marketing
  - Website analysis
  - JavaScript and other Internet technologies
- SiteCatalyst product expert
- Project management
- Technical writing

Responsibilities

- Gather client business objectives using internal methodologies and tools
- Client implementation training
- Perform technical pre-assessment with client's IT personnel and assist in development of the risk assessment.
- Write logic necessary within client software to generate required values for implementation of Omniture technology
- Coach clients throughout the implementation process
- Ensure that clients complete their implementations on schedule
- Document issues and best practices relating to specific platforms or configurations
- Debug implementation problems, JavaScript errors, and product functionality
- Maintain customer contact and daily status updates for all outstanding issues
- Manage customer relationship to ensure that expectations are realistic and that the client is happy
- Coordinate with engineering department to ensure timely closure of quality issues

- Fully understand and document customer requests, and assign appropriate resources to resolve any issues

Requirements

- Extensive knowledge of Microsoft Office, email, and how the Internet and websites work.
- Must be self-managed, responsive, and dedicated to customer support.
- Strong understanding of HTML and web protocols.
- Strong JavaScript skills
- Strong technical writing skills (writing samples helpful)
- Bachelor's degree

Special Consideration Given For

- Strong client service experience, preferably with Fortune 500 companies
- Degree in information systems or related field
- Master's degree or other advanced education
- Web development experience
- ERP or other software implementation experience
- Demonstrated exceptional customer skills from previous employment
- Project management experience
- Consulting experience
- Demonstrated programming skills (with samples) in languages such as Perl, C/C++, CGI, Java, ASP, VBScript, or PHP

Business Intelligence Analyst, Sharp Analytics, Salt Lake City

We are a rapidly growing services and technology division of iCrossing, the largest privately-held digital marketing company in the United States. Sharp Analytics is based in Salt Lake City, with analysts in Scottsdale, AZ, Chicago, and New York. We do consulting work, without the extensive travel and instability of normal consulting organizations. If you are looking for variety and fast-paced, interesting work, take a look at Sharp Analytics.

Job Description:

As a member of the Sharp Analytics Business Intelligence practice you will be responsible for systems analysis, design, and implementation of reporting and analytics systems. You will help provide technical support to the sales staff. You will meet with clients to identify project requirements, develop project plans and schedules, write, test and implement software according to the client's specifications. You will be required to interact with people at many levels within an organization, from the CEO to applications developers.

Job Functions:

- Interact with clients to establish applications and systems requirements for assigned projects.
- Create design specifications using current techniques and tools or techniques and tools required by the client.
- Establish timelines for project milestones.
- Develop SQL reports and reporting dashboards per customer specifications.
- Keep current with the latest versions of Business Intelligence software, techniques and practices. Research and develop new ideas in Business Intelligence and Enterprise Reporting strategies.
- Supervise projects and coordinate technical resources as needed within the scope of the project.
- Work within the development team to foster good communication throughout the project life cycle.

Skills needed:
Oracle is the foundation of all of our systems. The candidate should have some knowledge of SQL and relational database concepts. We also look for:

- Ability to deal with complex situations and collaborate effectively with local and remote personnel in order to provide fast and effective problem resolutions.
- Superior communication skills.
- Ability to work in a fast-paced environment.
- Must be team-oriented, possess excellent organizational and written skills, and demonstrate the ability to communicate with either a software developer or business audience.

Education and Experience Required:
The candidate should have (or be close to completing) a Bachelors or Masters degree in either Information Systems, Business Administration, Accounting or Statistics. He or she should also have 3+ years of proven success developing analysis or reports to answer strategic business questions.

Product Marketing Manager – Google Inc, Mountain View

Do you love Google? Interested in learning more about the marketing and business world at one of the most cutting-edge technology companies in Silicon Valley? Google is looking for flexible, hardworking, quick studies to analyze, measure, position, package and promote our product offerings.

Responsibilities include working with the Corporate Marketing, Sales, and Product Support groups to drive projects such as:

- Defining and implementing a customer communications strategy.
- Determining ROI on advertising expenditures.
- Defining market research studies to gain knowledge about user attitudes and behavior.
- Developing collateral that optimally positions the strengths of our products.

Requirements:

- BA/BS degree, MBA a plus.
- Ideal candidate will have four plus years experience in product marketing, direct marketing, marketing program management, or consulting.
- Passion for analyzing products, customers and market dynamics.

- Outstanding written and oral communication skills.
- Strong organizational and analytical skills.
- Demonstrated capacity for developing and understanding strategy.
- Strong aptitude for determining the optimal way to position products in the market.
- Understanding of the search and online advertising market.
- Understanding of Google's strategic and competitive position.
- Passion for working on a variety of product and search related challenges.

Senior Planning Analyst, Backcountry.com, Park City

Summary:

Backcountry.com has an outstanding opportunity for a Senior Planning Analyst. This position requires proven experience as a business or planning analyst with outstanding analytical and computer skills. Experience with planning and budgeting software required; outdoor retail, apparel, or ecommerce business experience is highly desired. The ability to develop new processes, lead and mentor others, and work well alone and within a team is a must.
This role is diverse and dynamic: the senior planning analyst is expected to make significant contributions to solving the challenges of forecasting and adjusting revenue, assortment, pricing, and inventory scenarios for our rapidly growing businesses.

Primary Responsibilities: Evaluate and improve complicated business logic, and implement into daily company practices;
Investigate and possibly implement third party planning and forecasting software for planning department;
Forecast & OTB: take a lead role in bottom up and top down forecasting and reconciliation across website storefronts and product departments;
Analyze: apply appropriate subjective business knowledge or department created algorithms to report data and existing forecasts to recommend short and long term action on product;
Product life cycles and seasonality: report, analyze, and understand across brands, departments, and product segments;
Communicate, Present, Educate, Monitor: frequent work with buying, marketing, and finance department staffs to successfully implement the planning departments strategy;
Other duties as assigned.

Position Requirements:
Experience as a business or planning analyst with a retailer or manufacturer of finished consumer products;
Experience as a Buyer, Planner, or Analyst, in a high volume outdoor, apparel, or e-commerce retailer preferred;
Proven ability to develop and implement new processes;
Proven leadership skills;
Outstanding analytical and/or statistical skill set;
Bachelor's degree or commensurate experience in business, science, engineering, or computer field preferred;
Excellent Microsoft Excel skills;

\# Ability to write complicated SQL queries or related database expertise;
\# Addition experience with Perl, Java, other programming languages, database design, and regular expressions a plus;
\# Excellent written and verbal communication skills;
\# Ability to perform under pressure, prioritize competing tasks, and schedule time wisely.

Junior CRM Analyst, Overstock.com, Cottonwood

Responsibilities:
- o   Retrieving, analyzing and interpreting data, identifying key business issues, and presenting recommendations in a concise, meaningful way, both orally and in a written format.
- o   Assist in developing models to score customers and predict behavior.
- o   Acting as the subject matter expert in regard to the company's customer data.

Interpersonal skills:
- o   Highly organized, self motivated, strong work ethic, detail orientated and thorough.
- o   Ability to manage expectations of others and proactively keep others apprised of results and progress.
- o   Ability to thrive and enjoy a fast paced, dynamic and entrepreneurial environment.
- o   Strong presentation and team working skills. Ability to learn quickly and adapt in a dynamic environment with little direction.

Minimum Technical skills: 1+ years of moderate SQL or programming. A solid understanding of statistics, including modeling techniques, correlation, and probabilities. Advanced Excel skills (pivot tables, regressions, vlookups etc.). MS Office proficiency.

Bonus skills: SAS experience a big plus. Experience with techniques such as clustering, neural networks and decision trees. Experience with relational databases and reporting tools. CRM experience and knowledge.

Education: Bachelor of Science in statistics, mathematics, econometrics or similar quantitative background/experience.

Senior CRM Analyst, Overstock.com, Cottonwood

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- o   Assist in developing models to score customers and predict behavior.
- o   Acting as the subject matter expert in regard to the company's customer data.
- o   Managing ongoing model improvement and implementation.
- o   Assisting with various other analysis and reporting as needed.

Interpersonal skills:
- o   Highly organized, self motivated, strong work ethic, detail orientated and thorough.
- o   Ability to manage expectations of others and proactively keep others apprised of results and progress.
- o   Ability to thrive and enjoy a fast paced, dynamic and entrepreneurial environment.

o Strong presentation and team working skills. Ability to learn quickly and adapt in a dynamic environment with little direction.

Minimum Technical skills: 2+ years of intermediate / advanced SQL or programming. 2+ years CRM analytics.   Advance ability in statistics, including modeling techniques, correlation, and probabilities. Advanced Excel skills (pivot tables, regressions, vlookups etc.). MS Office proficiency. 2+ SAS experience or equivalent tools. Experience with techniques such as clustering, neural networks and decision trees. Experience with relational databases and reporting tools.

Education: Bachelor of Science in statistics, mathematics, econometrics or similar quantitative background/experience. Masters degree preferred. Marketing experience preferred.