NEW GRADUATE DEGREE OR GRADUATE CERTIFICATE FORM D

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| **UNIT PREPARES IN QUADRUPLICATE** |
| Route as indicated below under approvals. Return to the |
| Registrar's Office once all signatures have been obtained. |
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Date: | March 22, 2013 |

*Allow up to one year for the process to be completed for a certificate, and 18 months for a degree.

| Stephen D. Burd |
(Name of individual initiating Graduate Degree or Graduate Certificate)

| Associate Professor - 505-277-6418 |
(Title, position, telephone number)

| burd@unm.edu |
(Email address)

| Anderson School of Management - Department of Marketing, Information, and Decision Sciences |
(Department/Division/Program)

Note: Proposals for new graduate degrees or graduate certificates need to follow an approved format. Please call the Office of Graduate Studies and ask for an outline. Revisions of graduate degrees and some new certificates also may need state approval, depending on the extent of changes proposed. Please consult the Office of the Provost for advice prior to initiating this form.

Attach the following required documents:

1. Executive Summary.
2. Program Proposal (in the approved format).
3. Catalog Description (to include program curriculum).
4. Graduate Program Projected Costs (only for new degrees).
5. Library Impact Statement.

Does this new degree affect any existing program? Yes ☒   No ☐   If yes, attach statement.

Proposed date to admit new students: Term | Spring | Year | 2014 |

Required Signatures:

	Date
Department Chair	3/23/13
College Curricula Committee	3/25/13
College or School Dean	4
Dean of Library Services	
Office of the Registrar—Catalog _Elizabeth A. Eaton_	08/16/13
FS Graduate Committee	9/6/2013
Dean of Graduate Studies _Julie Coonrod_	9/9/13
FS Curricula Committee _Kathryn Walkens_	
Office of the Provost	10/16/13
Faculty Senate _Vivian Valencia_	11/7/13
Board of Regents _Jack L Fortner_	12/10/13

Additional Approvals for Degrees:

	Date
Board of Regents See above	
Council of Graduate Deans	
Academic Council of Higher Education	
Higher Education Department	
State Board of Finance	

MS in Information Systems and Assurance Program Proposal (Form D Attachment)

Executive Summary

The Anderson School of Management (Anderson) proposes an MS program in Information Systems and Assurance (MS-ISA) to begin in the Spring or Fall 2014 semester. The MS-ISA program is targeted to students holding a BBA with an accounting or MIS specialization or a Bachelor's degree in computer science or computer-related engineering. The program will prepare such students for advanced career positions in information systems development, system administration, computer and network security, forensic investigations, risk assessment and mitigation, and IT auditing. The program will be 32 credit hours in length and include a mix of courses tailored to specific student backgrounds and needs. A thesis option is included for student s pursuing a research-oriented career.

The program represents a natural evolution of IS- and IA-related graduate programs at UNM. It follows in the footsteps of the MS in Accounting (MAACT) program by providing a more specialized graduate degree than the MBA to meet specialized student and employer needs. The MS-ISA program also enhances UNM degree offerings within the scope of its designation as a National Center of Academic Excellence (CAE) in Information Assurance Education and Research (CAE-R). The program will also serve students who participate in the recently funded UNM Scholarship for Service program in cyber-security. The MS-ISA program incorporates content from Anderson, computer science (CS), and electrical and computer engineering (ECE) thus enabling students to pursue multidisciplinary IA studies. The program's thesis option provides a pathway for greater IA-related research collaboration across UNM.

The program responds to feedback from employers and students about the strengths and weaknesses of Anderson's current MBA program with an MIS or IA concentration and to the anticipated knowledge and skill requirements for future employees. The MS-ISA program is better targeted to IS- and IA-related skill and knowledge requirements than is the MBA program with a concentration in MIS and/or IA. Compared to the MBA program, the MS program is shorter, requires fewer general management courses, and provides greater flexibility and technical depth.

The MS-ISA program can be offered with existing resources. Existing courses comprise the bulk of the program though a handful of new courses will be created over the next two years to support the MS-ISA and a revised MBA program. Current faculty resources are sufficient to offer all needed courses while maintaining current BBA courses. The program should attract most/all of the students who currently pursue the MBA with an MIS and/or IA concentration. MIS and IA courses will continue to be available to MBA students as electives though the formal MIS and IA concentrations will be discontinued.

Program Description and Purpose

Anderson has offered concentrations in management information systems (MIS) within the BBA and MBA degree programs since the early 1980s. These concentrations prepare students for careers in information systems development, system administration, and related positions. Anderson has offered a concentration in information assurance (IA) within the MBA program since 2009 and a related concentration within the Master of Accounting program since 2011. Information assurance is a broad field encompassing computer, network, and data security, related behavioral and organizational design issues, forensic investigations, risk assessment and mitigation, and accounting-related subareas including auditing and internal control.

The proposed MS in Information Systems and Assurance (MS-ISA) program is targeted to students holding a BBA with an accounting or MIS specialization or a BS in computer science or computer-related engineering. The program will be 32 credit hours in length and include management courses of no more than 12 credit hours, a common technical core of no more than 11 credit hours, and advanced technical courses in information systems (IS) and information assurance (IA) totaling 9-24 credit hours. The precise mix of courses will be tailored for specific students to complement and extend their undergraduates degree and to provide advanced preparation for IS- and IA-related careers. A thesis option is included though it is anticipated that the majority of students will not write a thesis.

The motivation to propose a new MS program is partly a reaction to forthcoming changes in Anderson's MBA program, partly a response to market forces, and part of the broader effort to modernize and streamline related curricula. The MBA MIS concentration was last updated in 2006. That update did not incorporate IA and was limited in scope due to constrained faculty resources and weak student demand. Since that time, additional faculty have been hired and IS enrollment and hiring have rebounded both locally and nationally. The MBA IA concentration was started in 2009 and has enjoyed considerable success, reflecting both the program's strength and strong local and national demand for IA graduates.

The program also represents an evolutionary step in Anderson's efforts to redefine its MBA program and to broaden its graduate program offerings with more focused Masters programs. The first step in that evolution was the development of the Master of Accounting program in the mid-2000s. Creation of this program represents the second step. Subsequent steps will include revising the MBA program and developing additional specialized MS programs.

The goals of the MS-ISA are to:

- Modernize content to address existing coverage gaps and anticipated trends.

- Attract students with computer-related undergraduate degrees from management, computer science, and engineering.

- Provide sufficient technical depth to ensure that program graduates are competitive for a wide variety of jobs in the local and national job markets.

- Enable faculty and students to tailor programs of study to individual student backgrounds and interests.

- Respond to anticipated changes in the MBA program by developing a strong stand-alone program that will attract students "lost" due to anticipated MBA program revisions.

Underserved Market Segments

Though the current MBA concentrations appear well-suited to students holding a bachelor's degree in computer science (CS) or engineering, few such students enroll in the program. The primary reason appears to be the length of the MBA program – 48 credit hours, and the balance of managerial and technical content. Potential students are unwilling to devote 2 years of full-time study and generally prefer a degree program with a balance of technology and managerial emphases. Also, employers of IS and IA graduates tend to view an MS program more positively because it has more technical depth than an MBA program. Attracting CS and engineering students to Anderson for an IS- or IA-related graduate MS degree will require a smaller management core, shorter overall program, greater technical depth, and content that evolves more readily as the fields of IS and IA continue to change at accelerating rates.

Pending MBA Program Revisions

Changes to the MBA program scheduled for Fall 2014 include:

- Eliminating general management courses waivers based on similar undergraduate course-work
- De-emphasizing concentrations by reducing non-core credit hours

Revised MBA Impact on IS/IA Students and Enrollment

The potential impact of the forthcoming MBA program changes on IS and IA enrollment is substantial. Students completing a BBA and returning for an MBA will no longer have a large number of "free" courses into which they can fit a dual concentration. Thus, students will either be forced to scale back their specialized studies or to pursue a specialized degree at another institution. Avoiding the anticipated reduction in MBA enrollment while meeting the needs of BBA alumni is a significant impetus for the proposed program.

How does the program fit within the UNM mission and strategic plan?

The MS-ISA fits within several themes of the 2008 UNM Strategic Framework, including:

- *Excellence through relevance* and *Research for a better world* – In the post-9/11 world, information assurance has become a national priority. UNM was already a leader in CS and engineering-oriented security-related research prior to 9/11. Development of an IA concentration within the Anderson MBA and related faculty hires increased UNM's capabilities

in this area in the late 2000s. The MS-ISA program is an evolutionary step that further strengthens UNM 's IA-related research and teaching capabilities

- *Synergistic partnerships* – The MS-ISA program will continue a long tradition of partnerships between UNM, the national labs, and other employers within New Mexico. The national labs currently higher many graduates from UNM programs in IS, IA, CS, and ECE. The MS-ISA program was developed with significant input from labs to better serve their current and emerging need for a technology-related workforce. Those same characteristics will benefit other employers within the state – large and small. The MS-ISA program will also enhance the partnership between UNM and the federal government. UNM is designated as a Center of Academic Excellence in Information Assurance Education and Research. The MS-ISA program better fits the CAE designation requirements than the existing MBA program, while maintaining unique characteristics that provide competitive advantage.
- *Infrastructure for student success* – A key element of existing IS and IA programs in Anderson has been the development of virtual computer laboratory facilities and related course content in both IS and IA. The MS-ISA program will provide additional opportunities for building and testing this type of educational infrastructure.
- *Community engagement* – IA students within the current MBA develop and deliver educational modules for a larger audience outside of UNM including K-12 students and the business community. The MS-ISA program will increase the intensity of those efforts and add a student-centered research component to them.

How does the program fit with related offerings at UNM?

UNM has strong related programs in computer science and electrical & computer engineering. The MS-ISA fits with these programs in the following ways:

- It provides a natural graduate pathway for students who receive a BS in CS or ECE while avoiding duplication with existing MS programs in those areas.
- It will increase the number of students pursuing cross-disciplinary studies between Anderson and the School of Engineering by incorporating some CS and ECE courses in an Anderson degree and by providing additional graduate course options to students pursuing an MS in CS or ECE.
- It will increase interaction between Anderson, CS, and ECE with similar and overlapping teaching and research interests. Anticipated benefits include a stronger curriculum in all departments and increased success in obtaining interdisciplinary research funding.

Assuming timely approval, what is the program development and implementation timeline?

Since the program requires few new resources, the implementation timeline is short:

- 2013 – Obtain all UNM-related approvals including the Board of Regents. Concurrently, develop a marketing and recruitment plan for the program
- Spring and Summer – Obtain all state-related approvals. Concurrently implement the marketing and recruitment plan and accept applications starting in mid-Fall

- Spring 2015 – First group of students begin their studies

Draft Catalog Copy

Master of Science in Information Systems and Assurance (section title)

The Master of Science in Information Systems and Assurance (MS-ISA) program is targeted to students holding a BBA or similar degree with an accounting specialization, a BBA or similar degree with a specialization in information systems or technology, or a BS in computer science or computer-related engineering. The program prepares students for advanced positions in information system management, information system development, and information assurance.

Admission Requirements

- Completed bachelor's degree with at least 30 credit hours of courses in management, computer science, or computer-related engineering.
- A grade point average of 3.0 for the last 60 hours of college coursework including any post baccalaureate work.
- A score equal to or greater than 500 on the Graduate Management Admission Test (GMAT) or a Graduate Record Examination (GRE) score that is equal to or greater than 500 on the quantitative section and a score equal to or greater than 500 on the verbal section.

Advisement and Plan of Study

Advisement prior to first-semester enrollment and a formal plan of study is mandatory. Individual students will be required to enroll in specific classes that match their intended career path and complement their bachelor's degree and work experience. Courses included in the plan may not repeat already-completed undergraduate courses. Plan of study approvals will be granted by a designated faculty advisor or committee.

Program Requirements

Students must complete a minimum of 32 credit hours of courses within the following groups:

- **Core Group** — 11 credit hours —MGMT 533 (Professional communications), MGMT 631 (Project management), MGMT 636 (IS security), and MGMT 637 (Database management) —Courses may be waived based on similar undergraduate/graduate courses or experience. Students who granted waivers will complete additional courses in the technology group.
- **Management Group** — 12 credit hours minimum selected from MGMT 502 (Financial accounting), MGMT 503 (Managerial accounting), MGMT 506 (Organizational behavior), MGMT 508 (Law/ethics), MGMT 520 (Operations management), MGMT 522 (Marketing), MGMT 526 (Finance), and MGMT 633 (Vendor contract management)) — Up to 12 credit hours may be waived based on similar undergraduate/graduate courses or experience. Students who granted waivers will complete additional courses in the technology group.

- **Technology Group** – 9 credit hour minimum selected from MGMT 594 (Internal auditing), MGMT 630 (Management of information systems), MGMT 632 (Web application development), MGMT 634 (Systems analysis and design), MGMT 635 (Business intelligence and decision support), MGMT 638 (Advanced database management), MGMT 639 (Advanced IS/IA topics)[1], MGMT 641 (Forensic accounting), MGMT 642 (Fraud examination), MGMT 646 (Digital forensics), MGMT 647 (System and network administration), MGMT 648 (Advanced IS security), MGMT 649 (IA projects), MGMT 599 (thesis), computer science and engineering courses (CS/ECE 515, CS 544, CS 565, CS 581, ECE 595, and other graduate-level CS and ECE courses with advance approval), and problems/special topics, or internship courses (MGMT 551, 552,594, and 697).

Sample student study plans (not included in catalog copy)

BBA/MIS specializing in IS
- Core Group – 5 credit hours (636/637 waived based on UG courses):
  - MGMT 533 (Professional communications)
  - MGMT 631 (Project management)
- Management Group – 3 credit hours (others waived based on BBA core):
  - MGMT 633 (Vendor contract management)
- Technology Group – 24 credit hours
  - MGMT 630 (Management of information systems)
  - MGMT 632 (Web application development)
  - MGMT 635 (Business intelligence and decision support)
  - MGMT 638 (Advanced database management)
  - MGMT 646 (Digital forensics)
  - MGMT 647 (System and network administration)
  - MGMT 648 (Advanced IS security)
  - MGMT 649 (IA projects)

BBA/MIS specializing in IA
- Core Group – 5 credit hours (636/637 waived based on UG courses):
  - MGMT 533 (Professional communications)
  - MGMT 631 (Project management)
- Management Group – 3 credit hours (others waived based on BBA core):
  - MGMT 633 (Vendor contract management)
- Technology Group – 24 credit hours
  - MGMT 635 (Business intelligence and decision support)
  - MGMT 638 (Advanced database management)
  - MGMT 641 (Forensic accounting)
  - MGMT 642 (Fraud examination)
  - MGMT 646 (Digital forensics)
  - MGMT 647 (System and network administration)
  - MGMT 648 (Advanced IS security)
  - MGMT 649 (IA projects)

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[1] New IS/IA courses providing additional technical depth will be initially offered as MGMT 639 sections and later converted to stand-alone courses if needed. High priority offerings anticipated in the next two years include advanced database management, healthcare IT, and forensic data analysis.

BBA/Accounting specializing in IA

- Prerequisite programming – no graduate credit - MGMT 330 or CS 152L
- Core Group – 11 credit hours:
  - MGMT 533 (Professional communications)
  - MGMT 631 (Project management)
  - MGMT 636 (IS security)
  - MGMT 637 (Database management)
- Management Group – 3 credit hours (others waived based on BBA core):
  - MGMT 633 (Vendor contract management)
- Technology Group – 24 credit hours
  - MGMT 594 (Internal auditing)
  - MGMT 641 (Forensic accounting)
  - MGMT 642 (Fraud examination)
  - MGMT 646 (Digital forensics)
  - MGMT 648 (Advanced IS security)
  - MGMT 649 (IA projects)

BS CS or Engineering specializing in IS

- Core Group – 11 credit hours:
  - MGMT 533 (Professional communications)
  - MGMT 631 (Project management)
  - MGMT 636 (IS security)
  - MGMT 637 (Database management)
- Management Group – 12 credit hours:
  - MGMT 502 (Financial accounting)
  - MGMT 503 (Managerial accounting)
  - MGMT 506 (Organizational behavior)
  - MGMT 522 (Marketing)
- Technology Group – 9 credit hours:
  - MGMT 630 (Management of information systems)
  - MGMT 635 (Business intelligence and decision support)
  - MGMT 647 (System and network administration)

BS CS or Engineering specializing in IA

- Core Group – 11 credit hours:
  - MGMT 533 (Professional communications)
  - MGMT 631 (Project management)
  - MGMT 636 (IS security)
  - MGMT 637 (Database management)
- Management Group – 12 credit hours:
  - MGMT 502 (Financial accounting)
  - MGMT 503 (Managerial accounting)
  - MGMT 506 (Organizational behavior)
  - MGMT 522 (Marketing)
- Technology Group – 9 credit hours
  - MGMT 642 (Fraud examination)

- o MGMT 646 (Digital forensics)
- o MGMT 648 (Advanced IS security)

<mark>[Prior to submission to the NMHED and NMGDC, include a brief statement regarding institution's priority and refer to documentation provided by Provost's Office (see section 9).]</mark>

Justification for the Program

Evidence of Need

Strong evidence of need for the program can be garnered from the placement success of existing IS and IA programs. At the graduate level, Anderson has placed all recent graduates in both MBA concentrations, despite a weak overall economy. Despite recent placement success, Anderson faculty sought employer and student feedback to identify strengths and weaknesses of current programs and opportunities for improvement via the MS-ISA program.

Employer and Student Focus Groups

MIS and IA faculty members hosted focus groups sessions for students and employers in December, 2011. Two sessions were held for students and two more for employers with 7-10 participants per session. Employers were selected from a variety of local organizations including the City of Albuquerque, Sandia and Los Alamos Labs, the FBI, US Department of Homeland Security, Intel, PNM, UNM, APS, Albuquerque Heath Partners, and New Mexico Technet. Three employer participants are Anderson graduates. Students were selected from both undergraduate and graduate MIS/IA students at all stages of program completion.

Employer Feedback

Employers were asked about their experiences with Anderson and non-Anderson graduates in IS and IA positions, their current and anticipated knowledge and skill requirements for those positions, and the desirability of an MBA vs. an MS in IS and/or IA. No specific MS proposal was provided, though the outlines of typical MS programs at UNM and elsewhere were discussed.

There was a consensus regarding knowledge and skills desired in an employee holding or pursuing a Master's degree. Beyond depth of knowledge in technical subjects, employers expressed a strong desire for skills in communication, project management, budgeting, and interacting with clients, vendors, co-workers, and non-technical managers. There wasn't a strong consensus for within which degree program (undergraduate or graduate) those skills should be placed. An employee who acquires technical skills as an undergraduate and then acquires managerial skills as a graduate student was considered equally desirable as an employee who reversed the order in which the skills and knowledge were acquired. What was important to the employers was that a Master's graduate must have the entire portfolio of technical and managerial skills. Employers also expressed a preference for students who had applied those skills through complex academic assignments, projects with real world scope, and on-the-job experience.

Student Feedback

Students were asked to evaluate their experience at Anderson in terms of instructional quality, preparation for the job market, and the match of existing and proposed programs to their needs and desires. As with employers, only the outline of a generic MS program was discussed without specific content or requirements.

Students were nearly unanimous in their support for an MS program and several MBA students stated that they would have enrolled in such a program at Anderson (if it were available) instead of the MBA due its presumed better match to their needs. Students were generally satisfied with the technical education they were receiving though several expressed a desire for more technical depth in graduate courses and a greater choice of courses and topics.

Reaction to recent and ongoing movement of MIS and IA courses to an online format was mixed. Most students liked the flexibility of online courses and felt that content and depth had not suffered. A few disagreed and expressed either a strong preference for face-to-face instruction or a more consistent and interactive format for online courses.

Provide evidence of student demand.

The MS-ISA is intended to replace the existing MIS and IA concentrations within the MBA program. As such, we will use recent enrollment in those concentrations to estimate student demand for the MS-ISA. Since the current MBA MIS and IA concentrations recruit the majority of current students from the BBA program, graduation statistics for the BBA with MIS concentration are also relevant.

 Anderson currently offers IS and IA programs in seven forms:

- BBA with a concentration in MIS
- MBA with a concentration in MIS
- MBA with a concentration in IA
- MBA with a dual concentration in MIS and IA
- Masters in Accounting with a concentration in IA
- Post-Masters Certificate in MIS
- Post-Masters Certificate in IA

The BBA and MBA programs require general management course work (approximately 10 courses in each program) and the concentrations require at least 5 additional courses in specialized IS/IA topics. The Master in Accounting (MACCT) with an IA concentration requires 11 courses of which 5 are part of the IA concentration. The Post-Masters Certificate programs are essentially 5-course MBA concentrations decoupled from the MBA degree. They're intended for students who already hold an MBA or similar degree and want to expand their specialized knowledge. Approximate current graduation rates are as follows:

Program	Estimated graduates	
	Academic year 2011-2012	Academic year 2012-2013

Program	Estimated graduates	
	Academic year 2011-2012	Academic year 2012-2013
BBA with a concentration in MIS	23	49
MBA with dual concentrations in MIS and IA	24	19
MBA with an MIS concentration (excludes dual MIS/IA concentrations)	6	7
MBA with an IA concentration (excludes dual MIS/IA concentrations)	16	6
MACCT with an IA concentration	concentration added Fall 2011	1
Post-Masters Certificate in MIS	0	0
Post-Masters Certificate in IA	2	0

Table 1. Current enrollments in MIS and IA programs and program concentrations.

Current (but soon-to-expire) MBA program rules enable many students who hold a BBA to waive most MBA course requirements in general management and complete their degree with 11 courses. Due to the waivers and due to some overlap among courses in the MBA MIS and IA concentrations, it is possible for many current students to pursue a dual concentration. Since 2009, the majority of students pursuing/completing MIS and IA concentrations have actually pursued/completed both concentrations at the same time. A much smaller group of students are pursuing or have completed dual concentrations in Accounting and IA. The majority of all students pursuing dual concentrations are UNM BBA graduates.

UNM has recently been funded by the National Science Foundation to implement the UNM Scholarship for Service (SFS) program starting in 2014. This program provides full scholarships for 6 students per year to pursue a Master's degree at ASM specializing in IA. In exchange, students participate in a mandatory summer internship with a Federal agency and agree to work for a Federal agency for at least 2 years after graduation. Eligible graduate programs for SFS students include the MBA with an IA concentration and the proposed MS-ISA program. Availability of SFS scholarships will further stimulate student demand for the MS-ISA program.

Provide evidence of demand for program graduates.

We anticipate that an MS program will absorb most or all students who would otherwise enroll in the MBA program with the intention of pursing an MIS and/or IA concentration. We also expect the program to attract recent BS graduates in computer science and computer-related engineering. There are approximately 80 such graduates per year at UNM with many accepting jobs in New Mexico. We expect to attract at least 10 of those students per year. Thus, we anticipate enrollment in the MS-ISA program that equals or exceeds current MBA enrollment and a graduation rate of 30-40 students per year.

US Department of Labor Estimates

Data and estimates in this section are derived from the US Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook for 2012-2022. Careers for program graduates are described in two handbook sections: *Management Occupations* and *Computer and Information Technology Occupations*. The subsections below summarize data and estimates for the most applicable occupations for program graduates. Note that although each career lists a Bachelor's degree as the entry-level educational requirement, graduate degrees are typically held by persons in more advanced positions.

Computer and Information System Managers

Computer and information systems managers, often called information technology managers (IT managers or IT project managers), plan, coordinate, and direct computer-related activities in an organization. They help determine the information technology goals of an organization and are responsible for implementing the appropriate computer systems to meet those goals.

Quick Facts: Computer and Information Systems Managers	
2012 Median Pay	$120,950 per year $58.15 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	5 years or more
On-the-job Training	None
Number of Jobs, 2012	332,700
Job Outlook, 2012-22	15% (Faster than average)
Employment Change, 2012-22	50,900

Database Administrators

Database administrators use software to store and organize data, such as financial information and customer shipping records. They make sure that data are available to users and are secure from unauthorized access.

Quick Facts: Database Administrators	
2012 Median Pay	$77,080 per year $37.06 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	Less than 5 years
On-the-job Training	None
Number of Jobs, 2012	118,700
Job Outlook, 2012-22	15% (Faster than average)
Employment Change, 2012-22	17,900

Information Security Analysts

Information security analysts, web developers, and computer network architects all use information technology (IT) to advance their organization's goals. Security analysts ensure a firm's information stays safe from cyberattacks. Web developers create websites to help firms have a public face. Computer network architects create the internal networks all workers within organizations use.

Quick Facts: Information Security Analysts	
2012 Median Pay	$86,170 per year $41.43 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	Less than 5 years
On-the-job Training	None
Number of Jobs, 2012	75,100
Job Outlook, 2012-22	37% (Much faster than average)
Employment Change, 2012-22	27,400

Network and Computer Systems Administrators

Network and computer systems administrators are responsible for the day-to-day operation of an organization's computer networks. They organize, install, and support an organization's computer systems, including local area networks (LANs), wide area networks (WANs), network segments, intranets, and other data communication systems.

Quick Facts: Network and Computer Systems Administrators	
2012 Median Pay	$72,560 per year $34.88 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2012	366,400
Job Outlook, 2012-22	12% (As fast as average)
Employment Change, 2012-22	42,900

Software Developers

Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or other device. Others develop the underlying systems that run the devices or control networks.

Quick Facts: Software Developers	
2012 Median Pay	$93,350 per year $44.88 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None

Quick Facts: Software Developers	
Number of Jobs, 2012	1,018,000
Job Outlook, 2012-22	22% (Much faster than average)
Employment Change, 2012-22	222,600

(For full proposal, a discussion of the program's relationship to workforce development is also required.)

Although a Bachelor's degree is the entry-level education for each occupation, higher-level degrees are typical for holders of advanced positions. Thus, the program provides workforce development for employees in many computer-related positions in New Mexico. Large employers in New Mexico who typically require graduate degrees for advanced positions include Sandia and Los Alamos Laboratories, the University of New Mexico, state and local governmental agencies, Hewlett-Packard, and Intel.

Include any other information as appropriate that will support evidence of need for the university, state, or region.

ABQ Ranks 6th for Secure Data Center Sites (http://www.unm.edu/news/2012/march/26data.html). Secure data centers typically employ persons with advanced degrees in information assurance. Albuquerque is also home to an FBI regional computer forensics lab. Technology and white collar crime forensic skills are a key focus of the program and are in demand at the forensics lab and in law enforcement agencies, prosecutor's offices, and private law firms.

Duplication

Identify, if any, similar programs offered at New Mexico public or private institutions of higher learning. Also identify comparable programs in other states through which New Mexico students have access via the WICHE professional student exchange or WICHE regional graduate program.

If similar programs are offered within the state, describe how the proposed program will meet needs that are currently not met by existing programs already being offered (e.g., programmatic considerations, geographic needs, economic development factors, student demand, etc.).

New Mexico

Three programs related to IS and IA exist in New Mexico **though all are quite different** from the proposed program. Details are provided below for completeness but the programs are not considered similar or duplicative for other purposes within this proposal.

- **New Mexico Highlands University School of Business, Media & Technology** (http://www.nmhu.edu/academics/undergraduate/business/index.aspx) has an MS program in Software-driven Systems Design building on their undergraduate program in that area. The program includes courses in software development, data representation and visualization, and systems science and theory. Key differences from the program include having no courses in general management, project management, professional communications, and information

assurance. As such, it is targeted to a much narrower audience of students and employers – those focused on internal development of complex software and related systems.

- **New Mexico Tech** (https://cs.nmt.edu/~IA/index.html) offers information assurance courses and BS/MS/PhD degrees in its Computer Science department which primarily focus on technical aspects of information assurance. Key differences from the proposed program include the technical focus and a lack of courses in information systems, project management, professional communications, and general management topics. The NMTech program also lacks an integrated focus on white collar crime that includes both technical and accounting-oriented topics.
- **UNM** also offers an MS degree in computer science, which can include some IA-related courses. Key differences from the program include a lack of courses in management, project management, professional communications, and information systems. IA-related courses offered by the UNM CS and ECE departments are included within the program proposed herein.

Other in-state higher education institutions do not offer MS programs in information systems and assurance. As such, **the proposed program will be unique within the state** in fulfilling employer and student demand for a program that integrates managerial and technological aspects of both information systems and assurance.

WICHE and Southwest Region

In the southwest region including Arizona, California, Colorado, Texas, Oklahoma, Utah, and Nevada, MS degree programs in information management or management information systems are offered by 14 schools including Arizona State University, BYU, Baylor University, San Diego State University, Texas A&M University, Texas Tech University, University of Arizona, University of Colorado-Denver, University of Nevada-Reno, University of Nevada-Las Vegas, University of Oklahoma, University of Texas-Arlington, University of Utah, and University of Dallas. All of their MS degrees are in general information systems and have a number of optional courses about information assurance, rather than a particular emphasis on information systems and assurance, as we propose.

Only a limited number of peer institutions, such as University of Texas in San Antonio, University of Louisville, and Temple University offer MS degree in information systems & assurance in the college/school of business or management, while most of MS degrees are offered by colleges engineering. An information systems & assurance *business* degree is fundamentally different from and prepares students for different careers than an *engineering* degree.

The only WICHE-member institution offering a degree with any significant overlapping content in the University of Nevada at Las Vegas. As with most other programs in the region, their program is a general MIS degree with limited IA content. In addition, the program is not available online nor via other distance education methods. Thus, it is unavailable to working students in New Mexico who would complete the MS-ISA program part-time.

N/A – no similar programs exist in the state.

Inter-institutional Collaboration and Cooperation

N/A – needed faculty and other resources are unique to the University of New Mexico

Clientele and Projected Enrollments

Clientele

The student populations that will be recruited for the program include:

- Students who hold a BBA or similar degree with an emphasis in information systems or accounting
- Students who hold a Bachelor's degree in computer science, computer engineering, or a closely-related field

Initially, students will be recruited primarily from within New Mexico. Since the majority of New Mexico students with appropriate undergraduate degrees earn them from UNM, UNM students will be the primary target group. However, we will also actively recruit from other in-state institutions including ENMU, NMSU, NM Tech, NM Highlands, and WNMU, all of which have at least one undergraduate program matching the target student background.

If sufficient resources exist, we will recruit nationally and internationally for the program. Though the program content in MIS is not unique within the nation, the program content in IA is unique within the

nation and internationally. Only a handful of management schools in the world offer a Master's degree with significant IA-related content and only UNM enables to students to combine accounting- and computing-related content. In addition, the MS-ISA program will be one of a small number of IA-related programs that can be completed online. As such, we anticipate that the program could attract significant numbers of national and international students if sufficient resources were available to meet the demand.

<mark>Describe the admission requirements for the program.</mark>

Admission Requirements

- Completed bachelor's degree with at least 30 credit hours of courses in management, computer science, or computer-related engineering.
- A grade point average of 3.0 for the last 60 hours of college coursework including any post baccalaureate work.
- A score equal to or greater than 500 on the Graduate Management Admission Test (GMAT) or a Graduate Record Examination (GRE) score that is equal to or greater than 500 on the quantitative section and a score equal to or greater than 500 on the verbal section.

Projected Enrollment

<mark>Provide a five-year projection of enrollments. (For full proposal, detailed tables of enrollment projections are required and should include new student headcount, returning student headcount, the number of students expected to enroll full-time and part-time, and the total number of student credit hours expected to be generated for the first five years. A description of the methodology used to arrive at these projections should also be provided.)</mark>

We anticipate admitting 35 FTE students to the program annually. **That level will be achieved immediately** since the program will replace the existing MBA program with concentrations in MIS and IA. There will be no gradual ramp up of capacity since the existing MBA concentrations are already at capacity and since we anticipate that all of current students pursuing those concentrations will transition into the MS-ISA program in its first year.

Anticipated admission and enrollment levels are based on existing MBA enrollments and graduations over the last 4 years. Approximately 40% of each admitted class will be full-time students who will normally graduate in three semesters. Part-time students are assumed to graduate in four years, thus completing an average of eight credit hours each year. A 6-year enrollment projection incorporating these assumptions appears in the table below.

Year	Headcount					Credit Hours				
	New Full-Time	New Part-Time	Return Full-Time	Return Part-Time	FTE	New Full-Time	New Part-Time	Return Full-Time	Return Part-Time	Total
1	20	45	20	135	88	480	360	160	1080	2080
2	20	45	20	135	88	480	360	160	1080	2080
3	20	45	20	135	88	480	360	160	1080	2080

4	20	45	20	135	88	480	360	160	1080	2080
5	20	45	20	135	88	480	360	160	1080	2080
6	20	45	20	135	88	480	360	160	1080	2080

Table 2. Six-year head count and credit estimates assuming no enrollment growth.

Institutional Readiness for the Program

How many faculty are necessary for program delivery?

How will this program affect the workload of current faculty and support staff?

Will additional faculty or staff be required? What is the cost?

There are currently eight full-time faculty within Anderson that cover MIS and IA courses and a handful of adjunct and emeritus faculty teaching specialized MIS/IA courses. Full-time faculty members teach between 4 and 6 course sections per year, depending on their rank and research activities.

Additional adjunct faculty members teach MGMT 450 (BBA MIS core course), which frees other faculty members to cover specialized MIS/IA courses. No new full-time faculty resources are anticipated in the near future, though it is possible to add additional adjunct faculty to cover specialized courses. Existing faculty also staff undergraduate MIS courses (approximately 19 sections/ year).

Name	Status	Graduate Courses	Specialization Areas
Bose	Full-time, tenured	634, 635	Systems analysis/design, object-oriented methods, business intelligence
Brody	Full-time, tenured	594, 641, 642	Fraud and forensic accounting, internal and external auditing
Burd	Full-time, tenured	637, 647	Database management, computer hardware/software, accounting information systems, systems analysis/design, application development
Flor	Full-time, tenured	632	Application development, marketing applications, digital media, social networking
French	Full-time, tenure-track	None at present	Database management, application development, IS strategy and policy, project management, systems analysis/design
Jurkat	Adjunct, 2-3 courses/semester	634, 635	Systems analysis/design, database management, data mining
Luo	Full-time, tenured	630, 636, 646	Security, digital forensics, application development, multinational and behavioral IA issues, IS management
Pickard	Full-time tenure-track	549, 635, 637, 639	Database management and mining, advanced application development
Rooney	Staff, max 2 courses per year	632	Application development

Name	Status	Graduate Courses	Specialization Areas
Saiz	Staff, max 2 courses per year	647, 637	System/network administration, database management, application development
Schatzberg	Emeritus	630, 631	IS strategy and policy, project management, systems analysis/design
Seazzu	Full-time, lecturer	636, 646, 648, 649	Security, IS resource management

Table 3. Current faculty pool for MIS and IA courses.

Based on existing teaching loads – full-time and emeritus faculty can cover 30 course sections per year. Adjuncts currently cover approximately 15 sections per year. Total capacity is approximately 45 sections per year which is a few sections less than the current number of sections offered. One possible scheduling scenario is shown in Figure 1.

	Fall Semester			Spring Semester	
	Course	**Instructor**		**Course**	**Instructor**
UG Core	MGMT 450-1	Bose		MGMT 450-1	Adjunct
	MGMT 450-2	Adjunct		MGMT 450-2	Flor
	MGMT 450-3	Adjunct		MGMT 450-3	Saiz
	MGMT 450-4	Luo		MGMT 450-4	Adjunct
	MGMT 450-5	French		MGMT 450-5	French
UG Tech	MGMT 329	French		MGMT 329	French
	MGMT 330	Flor		MGMT 330	Flor
	MGMT 331	Flor		MGMT 336	Luo
	MGMT 336	Luo		MGMT 337	Burd
	MGMT 459	Bose		MGMT 459	Bose
				MGMT 461	Rooney
Grad Core/Tech	MGMT 533 (Prof Comm)	Burd		MGMT 633 (V/Ctr Mgmt)	Burd
	MGMT 630	Schatzberg		MGMT 594	Adjunct
	MGMT 635	Jurkat		MGMT 631	Adjunct
	MGMT 636	Seazzu		MGMT 632	Flor
	MGMT 637	Burd		MGMT 634	Bose
	MGMT 639 (Adv DB)	Burd		MGMT 636	Seazzu
	MGMT 642-1	Brody		MGMT 639 (IA Data Anal)	Pickard
	MGMT 642-2	Brody		MGMT 639 (Scripting)	Luo
	MGMT 647	Saiz		MGMT 641	Brody
	MGMT 648	Seazzu		MGMT 646	Seazzu
	MGMT 649	Seazzu		MGMT 648	Seazzu
Total Sections/semester		21			22

	Fall Semester			Spring Semester	
	Course	Instructor		Course	Instructor
Faculty Sections	Adjunct	6			
	Bose	4			
	Brody	3			
	Burd	5			
	Flor	5			
	French	4			
	Jurkat	1			
	Luo	4			
	Pickard	1			
	Rooney	1			
	Saiz	2			
	Schatzberg	1			
	Seazzu	6			
	Total Sections/AY	**43**			

Table 4. One possible scheduling scenario for undergraduate and graduate MIS and IA courses (assuming no enrollment growth)

There are a few issues that could make faculty course coverage tighter than is shown in Figure 1. The first is sabbatical and other leaves. With seven full-time tenured or tenure-track faculty members, one sabbatical leave per year is expected. If the sabbatical is for one semester then coverage for 2 sections is lost. If sabbatical is for a year, 4-5 sections are lost. Full-year sabbaticals normally free up one third of the faculty member's salary which is sufficient to pay adjuncts but not sufficient to hire a visitor.

Another issue that significantly impacts faculty course coverage is enrollment growth. Only a handful of courses in the existing undergraduate and graduate programs are offered multiple times per year. Current enrollment fills the majority of IA class and MIS core class (MGMT 450) sections to capacity. Most MIS concentration class sections are filled to at least 75% of capacity.

If enrollment in the MS-ISA doesn't exceed current MBA enrollment and if BBA enrollment doesn't increase then sufficient faculty capacity exists. However, any significant increase in enrollment in the BBA program as a whole (thus increasing required MGMT 450 sections), the BBA MIS concentration, or graduate MIS and IA enrollments will requiring adding additional sections, thus stretching full-time faculty beyond capacity. Such an outcome would require either additional full-time faculty or more part-time faculty coverage. Given the difficulty in securing new permanent faculty lines and the riskiness of building a program on part-time faculty, **admissions may have to be capped to prevent over-extending current faculty**.

A third issue that impacts faculty course coverage is the number of preparations per faculty member. Preparation load is uniformly high with many faculty covering 3 or 4 different courses per year. Some content overlap between graduate and undergraduate courses partly alleviates the challenge, although

pending course content changes will reduce content overlap. Maintaining content currency is difficult for many full-time faculty given service and research demands, rapidly changing technology, and the large number of preparations. While larger enrollments would make it feasible to offer more courses multiple times per year, they would also exacerbate the overall faculty shortage unless additional faculty members were added.

In sum, the existing programs fully utilize existing full-time faculty resources. We expect the new MS program to absorb all current graduate enrollments in MBA-related concentrations. Thus, there is minimal room for enrollment growth over current levels without additional faculty resources. This fact constrains our ability to attract new cadres of local, national, or international students.

Will any GA/TA positions be used to assist graduate faculty in the program?

Existing GA lines will be used to support existing faculty teaching in the program, one for each full-time tenured or tenure-track faculty member.

What faculty and staff development services will be needed?

No development services beyond those already in place at Anderson are required for the program.

What technology, media, equipment and instructional supplies are needed to support the program's intended outcomes? Are these resources available? What is the estimated cost?

Existing and proposed courses in the program extensively use computer labs and related software resources. These resources are already in place to support existing programs and they are funded by technology fees for Anderson courses. Since the current funding mechanism scales with enrollment, any increase in program enrollment above the existing enrollment levels will generate new revenue to pay for additional computing resources.

The specific computing resources that support the program include:

- Anderson physical computing lab (ASM #1002)
- Anderson virtual computing lab
- Anderson IA computing lab
- Software licenses primarily covered under Anderson's Microsoft Academic Alliance membership

Are there any needs for additional or renovated space?

Additional or renovated space will not be required unless enrollment is significantly larger than current enrollment.

What, if any, existing external facilities will be used? (For full proposal, discuss any agreements that have been or will be entered into for use of the facility.)

Current programs use facilities at the FBI Regional Computer Forensics Lab, which is located on the UNM south campus. UNM already has an agreement for use of this facility and that agreement extends to all UNM IA-related programs.

Projected Cost of the Program

Provide a five-year projection of program costs including the new costs for program start up and recurring costs to sustain the program including any new costs identified in Sections 5 or 7.

Incremental costs are zero as long as enrollment does not exceed current enrollment or is capped at present levels.

If applicable, describe anticipated sources of new revenue required for the program.

N/A

Provide a rationale for any course fees or other expenses (in addition to tuition) that students will be expected to cover.

Current Anderson students pay technology fees of $10 per credit hour and an online class fee of $100 per course. These fees will apply to all courses within the MS-ISA program. Technology fees provide funding for computing hardware, software, and related services which are intensively used across Anderson courses but especially within MIS and IA courses. Online fees cover incremental costs of online course delivery including some related technology, faculty training, and support staff dedicated to online course support.

(For full proposal, a detailed five-year program budget is required outlining programs costs and anticipated state support based on the state funding formula and other areas of support.)

Two budget scenarios are provided in the table below:

A. Same enrollment as existing MBA concentration in MIS and IA
B. Double enrollment of existing MBA concentrations in MIS and IA

Program Costs	Same enrollment (A)		Double enrollment (B)	
	1 Year	6 Year	1 Year	6 Year
Full-time faculty lines	$ 660,000	$ 3,960,000	$ 1,320,000	$ 7,920,000
Adjunct faculty	$ 40,000	$ 240,000	$ 80,000	$ 480,000
Graduate assistants	$ 50,536	$ 303,216	$ 101,072	$ 606,432
Administrative support	$ 26,250	$ 157,500	$ 52,500	$ 315,000
Technology costs	$ 20,880	$ 125,280	$ 41,760	$ 250,560
Marketing costs	$ 1,000	$ 6,000	$ 5,000	$ 30,000
Total Program Costs	$ 798,666	$ 4,791,996	$ 1,600,332	$ 9,601,992

Program Funding								
Tuition	$	1,036,901	$	6,221,405	$	2,845,526	$	17,073,158
State formula funding	$	1,367,640	$	8,205,840	$	2,735,280	$	16,411,680
Technology fees	$	20,880	$	125,280	$	41,760	$	250,560
Online course fees	$	70,400	$	422,400	$	140,800	$	844,800
Total Program Funding	$	**2,495,821**	$	**14,974,925**	$	**5,763,366**	$	**34,580,198**
Excess or (Deficit)	$	**1,697,155**	$	**10,182,929**	$	**4,163,034**	$	**24,978,206**

Table 5. Program costs and funding assuming current enrollment and doubled enrollment.

Estimated program costs include salary and benefits for full-time faculty, adjunct faculty, graduate assistants, and administrative support. Technology costs for support provided by Anderson are included and are assumed equal to funding generated by the technology fee. Costs not considered include buildings/space and administrative support outside of Anderson (e.g., OGS and NMEL). Marketing costs are small if program capacity matches current MBA levels. Marketing costs increase disproportionately in scenario B because the marketing effort would be national in scope.

Key assumptions underlying the budget scenarios include:

- Sections taught and average enrollments are based on MIS and IA concentration courses in the MBA program with additional sections for 2 new courses and an average of one general management course per student
- Full-time faculty teach an average of 4 sections per year
- The proportion of sections taught by full-time and adjunct faculty is the same as current proportions for MIS and IA courses in the MBA program
- All salary cost projections include indirect costs (benefits)
- Each full-time faculty member has one graduate assistant
- 10% of students pay out-of-state tuition in scenario A, 40% in scenario B
- State formula funding is $653 per credit hour
- Enrollment level per year is constant for the 5-year budget
- No inflation assumptions are incorporated into costs or funds

Quality of the Program

Describe the qualifications of the faculty and how the expertise and experience will contribute to the quality of the program.

Faculty Member	Teaching Areas	Research Areas
Rich Brody, PhD, CPA, CFE	Fraud examination, forensic accounting, internal and external auditing	Corporate and financial fraud, identify theft, cross-cultural issues in fraud and Internet banking

Faculty Member	Teaching Areas	Research Areas
Ranjit Bose, PhD	Systems analysis/design, object-oriented methods, business intelligence	Object-oriented software development, IS strategy & policy
Stephen Burd, PhD, CPA	Systems architecture, databases, system and network administration, accounting information systems	Virtualization, systems architecture, auditing, health information technology
Nick Flor, PhD	Application development, user-interface design	User-interface design, mobile applications, social media, digital marketing
Aaron French, PhD	Application development, databases, IS strategy, project management	Information security, social networks, web development
Xin Luo, PhD	Information system security, computer forensics, application development	Information security, E-commerce/M-commerce, Internet banking, global IT adoption and management
Matthew Pickard, PhD	Forensic accounting, accounting information systems, data mining, database management	Forensic accounting, cyber-infrastructure, machine learning, computational linguistics
Laurie Schatzberg, PhD	IS policy, project management, systems analysis & design	Subset of teaching areas
Alex Seazzu, MBA	Computer and network security, information assurance	Computer and network security, internal auditing, virtualization, cloud computing

Table 6. Full-time faculty qualifications.

Show how the proposed admission standards (identified in Section 1) compare with those of other institutions offering a similar program.

Institution and program	Admission standards
UNM – MS in ISA	- Completed bachelor's degree with at least 30 credit hours of courses in management, computer science, or computer-related engineering. - A grade point average of 3.0 for the last 60 hours of college coursework including any post baccalaureate work. - A score equal to or greater than 500 on the Graduate Management Admission Test (GMAT) or a Graduate Record Examination (GRE) score that is equal to or greater than 500 on the quantitative section and a score equal to or greater than 500 on the verbal section. - International students from a country where English is not the native language and who did not receive a degree from a university where English is the language of the institution need to submit a TOEFL score (minimum score of 550 for the paper-based test, 213 for the computerized test, or 80 for the interned-based test) or IELTS score (minimum score of 6.0)

Institution and program	Admission standards
University of Nevada Las Vegas – MS in MIS	- Undergraduate degree completed at time of enrollment in the Master of Science program (successful applicants typically have at least a GPA 3.0 on a four-point scale or equivalent) - GMAT or GRE score (successful applicants typically have a score of 550 or higher on the GMAT or a score of 1050 or higher on the GRE). The combined portfolio of test score, undergraduate GPA, and other materials will be considered to make an admission recommendation. - Two letters of recommendation uploaded to the application system or submitted in sealed envelopes (letters may be from professional and academic references) - International students from a country where English is not the native language and who did not receive a degree from a university where English is the language of the institution need to submit a TOEFL score (minimum score of 550 for the paper-based test, 213 for the computerized test, or 80 for the interned-based test).
University of Texas at San Antonio – MS in Information Technology – Information Assurance	For admission to the M.S.I.T. program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in information technology as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional). The M.S.I.T. Graduate Program Committee evaluates each applicant individually based on the complete package of submitted materials.

Institution and program	Admission standards

University of Colorado at Denver – MS in MIS	• Your complete academic records, including GPAs and previous coursework are considered. Undergraduate degrees do not have to be in business, but they must be from regionally accredited colleges or universities.
	• The Business School uses the test as one predictor of academic performance in the graduate business programs. The average GMAT for admitted students is 560.
	• If you are an International applicant and your first language is not English you must meet this requirement in one of the following ways:
	    o Submit TOEFL score that meets the minimum requirements: MBA: 83 (IBT) or 560 (PBT), 11-Month MBA: 90 (IBT) or 575 (PBT), all other programs: 71 (IBT) or 525 (PBT).
	    o Submit IELTS score that meets the minimum requirements: MBA and 11-Month MBA: 6.5, all other programs: 6.0.
	    o The TOEFL/IELTS will not be required, if the applicant has completed a baccalaureate or graduate-level degree program at an English speaking college or university or have completed at least 2 semesters at a college or university in the Unites States as a full-time student and obtained a "B" average (3.0 GPA) or higher.
	    o The TOEFL/ IELTS can also be waived if the applicant successfully completes CU Denver's English as a Second
	    o Language (ESL) Program (http://esl.ucdenver.edu) and submits a recommendation letter from the program.
	• Relevant background and a history of increasing responsibility are viewed positively, but are not required for admission.

Table 7. Summary of admission standards for similar degree programs at peer instiutions.

What instructional model(s) will be used in presenting the program? What types of technology will be used for delivery of instruction?

Content will be delivered via a combination of face-to-face lecture, experiential, and online learning.

What types of opportunities for experiences outside of the classroom will be available to students and utilized in the program (e.g., internships, service learning projects, research-based service learning).

The MS-ISA program includes strong experiential and research elements that are interwoven through multiple IA courses. These elements enable the program to achieve synergistic goals including enhancing student knowledge and skills, projecting IA knowledge and capabilities into the larger community, and enhancing IA-related research. These activities support current IA students and will form a significant part of the learning and professional development experience for students.

The RCFL at UNM is a partnership among the university, national labs, and national, state, and local law enforcement agencies. While there are 15 other RCFL sites, UNM is only the second participating university and the facility is located on campus. Unlike most RCFLs, the RCFL at UNM also has a unique

research and training mission that combines academic, national lab, and law enforcement expertise and resources. An MOU between UNM and the FBI provides three specific experiential opportunities for IA students: regular internships, the FBI's Honors summer internships and year-round volunteer internships. The primary focus areas of RCFL-related activities for IA students are digital forensics and live detection and analysis of network intrusions.

Center for Cyber Defenders. Sandia National Laboratories extended its *Center for Cyber Defenders (CCD)* program onto the UNM campus in 2008 through an onsite satellite office housed at CIARE. SNL provides training materials, guidance through regular interaction, and internship opportunities for students in the MS-ISA program. Having a CCD program dedicated to management students allows SNL to help UNM build the program specifically around the management aspects of IA. These include hands-on project experience and research and managerial areas on IA. Current research by students and faculty include the adoption of and resistance to information security policies and the management of the discovery process in litigation.

Tracer FIRE (Forensic and Incident Response). Sandia and Los Alamos National Labs conduct two day training sessions with leading experts in the field of computer forensics and incident response in the spring and fall semesters. Through these hands-on exercises IA students are immersed in the cognitive skills needed to perform forensic analysis and reverse engineering of malicious code in a hostile networked environment. The first day is designated to provide training sessions while the second day hands on application and competition.

Collegiate Cyber Defense Competition. A team of students from the IA program participates in a controlled, competitive environment to assess their depth of understanding and operational competency in managing the challenges inherent in protecting a corporate network infrastructure and business information systems.

Computer and Network Vulnerability Assessment Simulation (CANVAS). Developed through the Air Force Academy, IA students from the program participate in CANVAS which shares some elements with a typical "Capture the Flag" exercise, but differs from other security competitions in the overall approach to the exercise, in the exercise objectives, in team makeup, and in the evaluation criteria. Teams are formed at the exercise and combine students from different backgrounds.

Fraud Prevention Audits. Students enrolled in Fraud Examination (MGMT 642) form teams to conduct fraud prevention audits for non-profit organizations in New Mexico. The audits analyze existing internal control systems, identify weaknesses, and recommend improvements to prevent fraud. The audits encompass both accounting and information security topics including asset custody, maintenance of accounting records, segregation of duties, authorization and authentication for automated systems, and the security of workstations, servers, databases, and networks. When the audit is completed, students produce a final report distributed to appropriate parties in the organization.

White Collar Crime Internship. Students who have completed MGMT 641 and 642, including SFS recipients, have an opportunity to work with the white collar crime units of the Secret Service, the Albuquerque Police Department (APD), the Bernalillo County Sheriff's Department (BSC), or the NM

State District Attorney's (DA) office. Students work up to nine hours a week at their respective agency during each semester and assist detectives investigating crimes of embezzlement, fraud, and forgeries that occur in organizations of all sizes.

K-12 Outreach. Every semester, students enrolled in the introductory IA course (MGMT 636) are required to complete an outreach project for a local or state K-12 school. The presentations educate our younger population about the properties of digital information, the risks of not properly caring for what belongs to the individual or the group, and the importance of securing the transmission, processing and storage of information. Projects have reached over 1000 students in 30 schools with topics that range from "Protecting Your Information in Social Networks" to "Digital Rights Management".

Courseware Development. Students in MGMT 646 and 648 develop hands on modules for different student populations, from K-12 to graduate, that demonstrate different technical risks present in protecting information systems and digital forensics. The VLAB serves as the virtual sandbox where diverse environments and scenarios are presented to demonstrate systems and network vulnerabilities. Additional information about the labs developed by our students is available at http://ia.unm.edu/labs.asp.

What student support services are likely to be needed and to what extent (CAPS, library, ITS, advising, etc.)? What is the estimated cost?

No additional student support services are anticipated beyond those already provided for Anderson graduate students

What student support will be needed (GA & TA positions, scholarships, internships, etc.)?

No additional GA/TA positions, scholarships, or internships are required unless enrollment exceeds current MBA enrollment. A grant proposal has been submitted to the NSF under the CyberDefenders Scholarship for Service program. If the proposal is funded, it will provide full scholarship and limited administrative support for 33 MS-ISA students over a 5 year period.

What are the expected student learning outcomes for the program? What will the students know and what will they be able to do when they complete this program?

Graduates will combine knowledge and skills in computer and network security, individual and organizational behavior, accounting and finance, information technology, and a wide range of supporting disciplines to address the requirements of careers in criminal investigation, intelligence, national security, auditing, information system design, and management of critical information technology infrastructure.

How will the program's learning outcomes be measured? (For full proposal, also describe any final integrating experiences in the program that will be used to assure graduates have acquired the knowledge and skills expected for the degree/certificate awarded.)

Building upon successful implementation of Assurance of Learning for Anderson's international accrediting body (AACSB), the faculty will use a portfolio review process to assess mastery of program learning goals. A sampling of student projects or papers from the program core MS-ISA classes (MGMT 533, 631, 636, and 637 will be collected during the academic year. MS-ISA faculty will conduct portfolio reviews to determine the effectiveness of teaching, gaps in learning and/or course content, and to develop suggestions for revising curricula and syllabi to close noted gaps.

Based on experiences in other Anderson graduate programs and input from employers, we will pay particular attention to critical thinking, problem analysis and solution, and written and verbal communications in addition to specific technical content skills.

The MS-ISA faculty will maintain documentation of the review process, findings, and subsequent remedial actions.

[Prior to submission to the NMHED and NMGDC, the proposal should UNM is institutionally accredited by the Higher Learning Commission of the North Central Association and has approval to offer any degree program appropriate to UNM's mission.]

If applicable, describe any accreditation issues, including the following:

Will accreditation be sought for the program? If so, describe the process and expenses involved.

How does the program affect any existing accreditation and licensure requirements?

Anderson is accredited by the AACSB and all programs offered by the school must be accredited. Accreditation requirements for the MS-ISA program will be similar to those for the extant MS in Accounting program. Accreditation expenses for all Anderson programs are covered by its annual AACSB membership fee.

Assessment of Operations and Impact

In addition to student learning outcomes, what other measures to evaluate program effectiveness are contemplated?

As for all Anderson programs, program effectiveness will be measured by admissions rates, graduation rates, placement rates, and satisfaction surveys of students, alumni, and external constituents. Measurement, evaluation, and follow-up programs are well-established within Anderson as required by UNM and AACSB accreditation standards

(For full proposal, a long-range plan (at least 5 years) for program assessment and evaluation must be included.)

Anderson has formal ongoing assessment programs for all academic programs which will be extended to the MS-ISA program. Key assessment program elements performed on an annual basis include:

- Student surveys
- Employer surveys
- Review of enrollments and graduations
- Merit reviews of program faculty

In addition, Anderson is scheduled for an accreditation review by the AACSB in academic year 2015/2016 covering all degree programs including the MS-ISA.

Administrative Responsibility for the Program and Institutional Commitment

What is the proposed governance structure of the program? (For full proposal, a thorough discussion is especially important for interdepartmental and intercollegiate programs or when entering into collaborative agreements with other institutions.)

MS-ISA program governance will be the same as for other Anderson graduate programs. Primary responsibility for the program rests with the Dean and the faculty as a whole. Administrative governance will be implemented by the Dean, Associate Dean, department chairs, and Director of Advisement and Placement Services. Faculty will provide evaluation and oversight through the Anderson Graduate Curriculum & Programs Committee.

[Prior to submission to the NMHED and NMGCD, documentation outlining the institution's priority for the proposed program should be obtained from the Provost's Office to include with the proposal.]

Additional Information

Provide any additional information needed to make the case for development of a full proposal. (For full proposal, provide any additional information to support the request for the proposed degree program.)

Working Definitions of Information Systems and Information Assurance

The field of **Information systems (IS)**, also called **management information systems (MIS)**, is the study of how computer hardware, software, networks, and related technologies are best applied to the management and operation of organizations. Subtopics include:

- Applications development, implementation, deployment, operation, and maintenance

- Information and technical resource management

- System and network administration

- Applying technology to achieve greater efficiency, improved quality, and competitive advantage

- Management of projects charged with developing, integrating, and de-commissioning systems and applications, including user involvement and training

Information systems is distinct from the related fields of computer science and computer engineering. Differences include:

- IS has a bias toward applications in business, governmental, and non-profit organizations as compared to scientific and engineering applications

- IS emphasizes application of existing and emerging technologies rather than development of new technologies

Despite their differences, the fields share many common characteristics that arise from using computer and related technologies to solve real-world problems.

The field of **Information assurance (IA)** is the study of "measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. These measures include providing for restoration of information systems by incorporating protection, detection, and reaction capabilities." [source] Though broadly inclusive, this definition emphasizes traditional computer, network, and information security and obscures some significant subfields commonly included within information assurance including:

- Forensic investigations - particularly those that employ computer technology
- Risk assessment at all organizational levels
- Penetration testing and other methods of assessing vulnerability to external threats
- Auditing, internal control, and other behavioral subfields normally associated with accounting

As with information systems, the study of information assurance in a managerial context differs from similar study in computer science and engineering primarily in that the management context:

- Emphasizes application of existing and emerging technologies rather than development of new technologies
- Includes of subject such as law, policy, procedure, and human factors

Attachments full proposal only

Department of Labor documentation, if applicable.

Incorporated into proposal body

Formal Needs Assessment.

Incorporated into proposal body

List of similar programs (state and regional).

Incorporated into proposal body

List of potential employers.

Incorporated into proposal body

List of advisory committee or board members, if applicable. Minutes of advisory committee or board meetings, if applicable.

Mary Adams - Sandia National Labs
Mary Adkins - Federal Bureau of Investigation
Elisha Allen - UNM New Media Ext Learning NMEL
Terry Boulanger - New Mexico Technet
Matthew Deller - Sandia National Labs
Jenna Esparza - Los Alamos Labs
Lynn Harris - Albuquerque Public Schools
Stephen Howard - Los Alamos Labs
Clint Hubbard - Albuquerque Police Department
Justin Johnson - Sandia National Labs
Darrin E. Jones - Federal Bureau of Investigation
John Larson - Sandia National Labs
Stephen Lee - SL Consulting
Barbara Lopez - PNM Resources, Business Technology Services
Robert Mayer - Albuquerque Health Partners
Andrew Sloan - Department of Homeland Security
Kelcey Tietjen - Los Alamos National Labs
John C. Woods - Intel

Letters of support from external partners or stakeholders.

See attachments

Additional Attachments for submission to NMHED and NMGDC (supplied by Provost's Office)

Minutes from the Board of Regents meeting, noting approval.

Documentation of institution's priority for the proposed program.

College of Business
Office of the Dean
MSC 3AD
New Mexico State University
P.O. Box 30001
Las Cruces, NM 88003-8001
575-646-2821, fax: 575-646-6155
business.nmsu.edu

September 4, 2012

Re: UNM Anderson School of Management Proposal for MS in Information Systems and Assurance

Dear Program Review Committees:

I'm writing to support the UNM Anderson School of Management proposal for a MS degree in Information Systems and Assurance.

New Mexico State University's College of Business does not offer a similar program and we see the value to New Mexico of launching this program. As noted in the UNM proposal, students who earn the MS/ISA degree will be positioned to enter the New Mexico workforce in both the private and public sectors, taking on technical roles in IT security or information systems management.

Yours truly,

Garrey E. Carruthers
Dean

From:	Subhasish Mazumdar <mazumdar@cs.nmt.edu>
Sent:	Monday, September 17, 2012 11:55 AM
To:	Stephen Burd
Cc:	Subhasish Mazumdar; Peter Gerity
Subject:	Re: MS in Information Systems and Assurance program proposal

Dear Program Review Committee,

The Computer Science and Engineering Department of New Mexico Tech has read a proposal for an MS program in 'Information Systems and Assurance' prepared by the UNM Anderson School of Management.

We do not see any appreciable overlap with our programs in technical content.

I am therefore pleased to offer our support to the UNM Anderson School of Management for its proposed MS degree in Information Systems and Assurance.

The students entering the NM workforce with this degree should be able to fill important Information Technology roles in both the private and public sectors.

Yours sincerely,

Subhasish Mazumdar

Subhasish Mazumdar, Ph.D.
Associate Professor & Chair,
Dept of Computer Science and Engineering,
Adjunct Faculty, Dept of Management.
New Mexico Tech
801 Leroy Place, Socorro, NM 87801
Work: (575) 835-5288
Fax: (575) 835-5587
www.cs.nmt.edu/~mazumdar

10/8/2012

Subject: Re: MS in Information Systems and Assurance program proposal

Dear Program Review Committee,

Faculty from the graduate Software-driven Systems Design and the graduate Media Arts and Computer Science programs in the Department of Media and Technology, School of Business, Media, and Technology at New Mexico Highlands University have read a proposal for an MS program in 'Information Systems and Assurance' prepared by the UNM Anderson School of Management.

We do not see any appreciable overlap with our programs in technical content.

We are therefore pleased to offer our support to the UNM Anderson School of Management for its proposed MS degree in Information Systems and Assurance.

The students entering the NM workforce with this degree should be able to fill important Information Technology roles in both the private and public sectors.

Sincerely,

Prof. David M. West
Software-driven Systems Design, Media and Technology Dept.
New Mexico Highlands University

Dr. Stephen Burd
Anderson Schools of Management
MSC05 3090
University of New Mexico
Albuquerque, NM 87131-0001

September 26, 2012

Dear Dr. Burd;

I'd like to take this opportunity to express my enthusiastic support to establish a Master's degree program in Management of Information Systems and Assurance. Your Program targets a unique area of growing need to National security: information assurance to protect our financial and business interests. Over the last several years, the Nation has witnessed the emergence and rapid growth of sophisticated criminal organizations that have transformed computer compromise into a lucrative business. Technology alone cannot address these threats; our greatest opportunities to manage national cyber security risks require policy analysis, security metrics, identity management, and business processes. Without these skills, it's entirely possible to spend billions of dollars on technology and end up with a less secure system. Your proposed Program that couples fraud accounting and financial investigations with digital forensics and computer security will likely have a greater impact on these criminal organizations than will pure technical programs.

Our organization has recently recognized the importance of Master of Science programs that include all aspects of Information Management and security and has restructured our employment designations in order to enable a more aggressive hiring program for these critical skills. We will look to University of New Mexico to help meet these needs. In addition to helping satisfy our staffing needs, I look forward to continuing our strong partnership through our internship Programs. Your Program is unique and necessary to prepare a workforce capable of addressing evolving threats to National security.

Sincerely,

Bob Hutchinson
Senior Manager
Information Security Sciences
Sandia National Laboratories

Dr. Stephen Burd
Anderson Schools of Management
MSC05 3090
University of New Mexico
Albuquerque, NM 87131-0001

October 16, 2012

Dear Dr. Burd;

I'd like to take this opportunity to express my enthusiastic support to establish an MS degree program in Information Systems and Assurance. Having been a recent graduate of the Information Assurance MBA program, I can attest to the value and necessity of the program in an increasingly competitive and dynamic field.

Given the numerous facets in the IT/IA/IS world today, the proposal of different groupings will better equip program graduates in the field according to their strengths and interests. Additionally, making the program a Master of Science will position students more competitively in the challenging job market. Although the breadth of information I gained through my program has been an invaluable starting point for my career, the proposed program and study plans are more congruous with what I've encountered in the last few years. One of the many benefits of this program is combining the institutional and managerial level perspective with a broad technical understanding of the field. However, by having a MS program dedicated to ISA, students will have the opportunity to further broaden and refine their skills by focusing on courses more relevant to their specialization.

As organizations around the world grow more connected and the reliance on technology increases, so will the demand for qualified professionals. However, the most effective and best situated to solve the issues we face today (and will face in the future), are those that have a unique but tightly integrated combination of management and technical skills. This program targets a critical need in national, regional, and local security and for businesses and government of all sizes. As the sophistication of emerging threats grows, so do those who are protecting the assets whether it is for the financial, government, or healthcare sector. This program will help prepare graduates to make the fine distinctions between weighing business and mission impacts with costs- something that a purely technical degree typically does not offer. As budgets continue to tighten, the demand for qualified employees to make those tough decisions will be valuable.

In addition to helping satisfy our staffing needs, I look forward to continuing our strong partnership through our internship programs and educational outreach. The MS-ISA program is unique and necessary to prepare a workforce capable of addressing evolving threats to national security. Please do not hesitate to contact me with any questions.

Sincerely,

Jenna M. Esparza
Office of the Chief Information Officer
Information Security Group
Los Alamos National Laboratory
jesparza@lanl.gov

In Reply, Please Refer to
File No.

4200 Luecking Park Avenue NE
Albuquerque, New Mexico 87107

September 27, 2012

Mr. Stephen Burd
Anderson Schools Management
MSCo5 3090
University of New Mexico
Albuquerque, NM 87131

Dear Mr. Stephen Burd:

I am writing to offer my support for the formation of the MS graduate program, Information Systems and Assurance. Our organization is particularly interested in this masters program as it provides a forum for students from engineering and computer science backgrounds to work in partnership with one another, further advancing the technical depth of the work force that the Federal Bureau of Investigation (FBI) pulls from. The collaboration of our New Mexico Regional Computer Forensics Laboratory's Computer Forensic Examiners and the Anderson Schools of Management Interns has provided positive exchanges of real-world applications and theory. With MS-ISA graduate students, we can continue to build on that relationship, with goal being to provide employment opportunities.

The FBI and its partners are leading the national effort to investigate high-tech crimes, including cyber-based terrorism, computer intrusions, online sexual exploitation, and major crime-frauds. To stay in front of emerging trends, it is absolutely essential that we have employees with advanced technical capabilities and knowledge. The proposed MS graduate program will assist in modernizing content to address the world's progression into the cyber-world.

Currently there are key areas applicants can qualify under for an Agent or Support position within the FBI, with the MS-ISA degree satisfying the Computer Science/Information Technology qualifications. Because of the breadth and scope of the FBI's

mission and our ongoing development of cyber programs, the MS-ISA degree will remain a relevant and versatile area of expertise.

I strongly support UNM's already nationally recognized efforts to expand their recruitment and training of men and women into the field of MS in Information Systems and Assurance.

Sincerely,

Carol K. Lee
Special Agent in Charge

Los Alamos
NATIONAL LABORATORY
——— EST 1943 ———

Office of the Chief Information Officer
Information Security
Attention: Steven G. Howard
Mail Stop B289
Los Alamos, New Mexico 87545   *Date:*   October 30, 2012
505-667-2051

Stephen Burd
Anderson Schools of Management
MSC05 3090
University of New Mexico
Albuquerque, NM 87131-0001

Dear Dr. Burd:

I would like to thank UNM for providing the opportunity to participate in the development of the MS in Information Systems and Assurance program. Having worked in both the technical implementation and operations and oversight roles, I have seen a need for individuals that have both reasonably strong technical skills as well as strong management, leadership and communication skills.

As Los Alamos National Laboratory moves from a compliance based security model to one based on risk, the skill balance provided by your program will be beneficial. A risk based approach requires individuals that can analyze risk, understand the impact of security on mission, be able to balance the two and finally, communicate recommendations to management. Successful graduates of your program will very likely become the managers themselves, in which case a solid understanding of both the technical issues as well as business operations would be very valuable.

During my review of your program it is clear to me you have taken suggestions provided during your focus groups to heart and developed a program that will produce individuals suited for work in areas such as the LANL Office of the CIO. I support your establishment of an MS in Information Systems and Assurance program.

Sincerely,

Steve Howard

Steven G. Howard
Team Lead, OCIO Risk Management Team

SGH:sgh

Dr. Stephen Burd
Anderson Schools of Management
MSC05 3090
University of New Mexico
Albuquerque, NM 87131-0001

October 5, 2012

Dear Dr. Burd;

I would like to show my support for the creation a master's degree program in management of information systems and assurance. The Anderson Schools of Management (ASM) program addresses a unique area of growing needs to national and global security that is not currently met by demand for these trained individuals. For the past several years I have personally seen companies, our nation and many others being targeted by state sponsored intruders, organized crime and activists transforming computer intrusions into a actualized problem. Even though technology has emerged to attempt to tackle these problems, highly skilled analysts are still needed to engineer, maintain and analyze the data from these systems. I know your proposed program that combines fraud and financial investigations, digital forensics and computer security will likely have a greater impact on these types of attacks than any pure technical programs; producing true leaders in this space that will have the knowledge of business impact and technical expertise. We have and will continue to hire students and support interns from ASM information security programs.

Sincerely,

Kelcey Tietjen
Global Information Security Operations Manager
Bechtel Corporation

To: Dr. Stephen Burd
From: Elisha Allen
Date: September 24, 2012
Subject: MS-ISA

Thank you for the opportunity to sit on the focus group for Anderson's proposed MS program in Information Systems and Assurance (MS-ISA), and for the recent materials you sent relating to this proposal. In my professional opinion as an IT Manager at UNM, this program would be helpful in preparing students for the IT Workforce. In my own selection of applicants to fill technology positions, I look for candidates with the right balance of technical competence, functional problem solving, and communication skills. This combination is not always easy to find, as formal computer science curriculum does not always include the requisite managerial competence and communication skills for effective operation in an organization that needs employees with technical and functional competencies.

Similarly, traditional management degrees can lack sufficient depth in technical issues related to technology implementation, planning and management. The proposed curriculum offers critical skills in both the technical and functional areas, and would be an attractive credential when I am reviewing job applicants. Please feel free to contact me if you have any questions, and I look forward to reviewing applicants with degrees in this program in years to come.

Sincerely,

Elisha Allen
Associate Director, New Media & Extended Learning
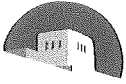
Department of Computer Science

Dr. Stephen Burd
Anderson Schools of Management
MSC05 3090
1 University of New Mexico
Albuquerque, NM 87131-0001

August 29, 2013

Dear Dr. Burd,

Faculty from the UNM Computer Science graduate program committee have reviewed the proposal for a MS degree in Information Systems and Assurance to be offered by Anderson School of Management. We enthusiastically offer our support to ASM for this proposed degree program.

We see many benefits of such a program to students who have obtained an undergraduate degree in Computer Science. A key benefit being the opportunity for these students to continue their educational pursuits so that they are better prepared for advanced career positions in information systems development, system administration, computer and network security, forensic investigations, risk assessment and mitigation, and IT auditing. We also support the incorporation of existing CS courses and the opportunity for students to utilize additional CS courses in this program since course requirements are customized on a per-student basis.

We look forward to educational collaborations through the Information Systems and Assurance MS program at Anderson School of Managment. Again, we offer our strongest support for this proposal.

Respectfully,

Michalis Faloutsos
Professor and Chair
Computer Science Department

Office of the Dean

September 3, 2013

Dr. Stephen Burd
Anderson School of Management
University of New Mexico
Albuquerque, NM 87131

Prof. Burd,

You have my strongest support for the establishment of an MS degree in Information Systems and Assurance (ISA). This program is an excellent next step for many students earning their BS from the School of Engineering in computer science or computer engineering who want their next venture in higher education to be a combination of business and technical skills. This also sets the stage for vital future collaboration between our schools, and will only enhance the pool of technically competent and business savvy students available in the New Mexico job market, thus enhancing our state's economic development.

Please don't hesitate to contact me for any additional support of this important initiative.

Regards,

Catalin Roman

Proposed MS Degree in Information Systems and Assurance Library Impact Statement

Overview

The impact of the proposed MS degree in Information Systems and Assurance (MSISA) will be minimal for the following reasons:

- Most of the program's courses are existing courses already supported by existing UNM library resources
- Program enrollments in the first several years will supplant existing program enrollment in the MBA program Management Information Systems (MIS) and Information Assurance (IA) concentrations

The primary impact on UNM library resources will be from students completing the optional thesis course MGMT 599. Students completing this course will require library resources to conduct research. However, the required resources are essentially the same as those that support MIS and IA faculty in their research activities.

Details

Salient details of the proposed MSISA program and their impact on UNM library resources are discussed in detail in the following sections.

Program Content

The MSISA program essentially repackages existing courses and adds three new courses. The repackaging produces a shorter, streamlined, and more focused program that will be more attractive to students than the existing MBA with MIS and/or IA concentrations. To the extent that existing courses rely on existing UNM library resources there is no net impact on those resources. It should be noted that most of the existing courses are not research or literature-oriented and make minimal use of UNM library resources at present. The courses are highly technical in nature and the majority of their reference materials beyond textbooks is from online sources not hosted by UNM.

The proposed program does include three new courses. Two of them are described here with their library impacts and the third (MGMT 599) is described in a separate section below.

- **MGMT 533 (Professional Communications):** This course is essentially a 2 credit version of the existing MGMT 712 course oriented to the needs of MS students rather than Executive MBA

students. As with MGMT 712, textbooks and online sources will support students in learning material and completing assignment. This course will not use UNM library resources.

- **MGMT 633 (Vendor & Contract Management):** This course is a continuation of MGMT 631 (Project Management) with specific emphasis on managing multiples types of IT projects, evaluating and controlling project risk, developing RFPs and contracts, and vendor selection and relationship management.

Number of Students

No new faculty resources are allocated to the proposed program. Since the proposed program is better attuned to the needs of students pursuing careers in MIS and IA, we anticipate a rapid migration of students from the MBA program and its MIS and IA concentrations to the new MS program. Once that migration is complete, the related MBA concentrations will be discontinued. As such, the number of students pursuing this area of study will not change significantly in the next 3 years. If additional enrollments are enabled by adding new faculty lines then enrollment may increase over current enrollments. However, this is not anticipated in the near future.

MS Theses (MGMT 599)

The MSISA program creates a research-oriented alternative to more traditional professional study by creating MGMT 599 (a variable credit thesis course) and incorporating it as an optional program component. We anticipate small enrollment in this course since it is primarily intended for students working closely with faculty members on publishable research projects. In the past, few students have pursued such studies through a problems course or independent study alternative to traditional courses. Based on past experience and anticipated student profiles, we anticipate no more than 5 students per year will enroll in MGMT 599.

Students enrolled in MGMT 599 are expected to heavily use library and other research-oriented resources to complete course requirements. Resources used by students will mirror those used by faculty members in their research activities. Examples are listed below. All except those listed in red are currently available through the UNM libraries.

- Databases
    - Computer Database
    - Computers & Applied Sciences Complete
    - Library, information Science, and Technology Abstracts
    - ScienceDirect
- Digital Library Collections
    - Association for Computing Machinery (ACM) Digital Library
    - Institute for Electrical and Electronics Engineers (IEEE) Digital Library
- Journals (not included in digital library collections)
    - Artificial Intelligence
    - AI Expert
    - AI Magazine
    - Communications of the AIS

- Computers and Operations Research
- Computers and Security
- Computer Supported Cooperative Work
- DATABASE for Advances in Information Systems
- Database
- Database Programming and Design
- Decision Sciences
- Decision Support Systems
- European Journal of Information Systems
- European Journal of Operations Research
- Expert Systems
- Expert Systems with Applications
- Harvard Business Review
- Human-Computer Interaction
- Information & Management
- International Journal of Electronic Commerce
- International Journal of Human-Computer Interaction
- International Journal of Human-Computer Studies
- International Journal of Information Management
- International Journal of Information Security
- Informing Science
- Interface: The Computer Education Quarterly
- Information Resources Management Journal
- Information Systems Frontiers
- Information Systems Research
- Information and Software Technology
- Information Technology and Management
- Journal of the AIS
- Journal of Database Administration
- Journal of Database Management
- Journal of Information Technology Education
- Journal of Management Information Systems
- Knowledge Based Systems
- MIS Quarterly
- Management Science
- Operations Research
- Sloan Management Review
- Telemedicine and eHealth

Institution: University of New Mexico
Proposed Program: MS in Information Systems and Assurance
    Projected Graduate Program Cost Estimates and Resources – Scenario 1 (No New Resources)

ESTIMATED REVENUES	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Existing	New	Existing	New	Existing	New	Existing	New	Existing	New	Existing	New
Projected University I&G or Tuition	$2404K		$2404K		$2404K		$2404K		$2404K		$2404K	
External Grants and Contracts												
Other	$91K		$91K		$91K		$91K		$91K		$91K	
TOTAL REVENUE	$2496K		$2496K		$2496K		$2496K		$2496K		$2496K	
ESTIMATED EXPENSES	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Existing	New	Existing	New	Existing	New	Existing	New	Existing	New	Existing	New
Salaries and/or benefits (Faculty & Staff)	$726K		$726K		$726K		$726K		$726K		$726K	
Learning Resources												
Equipment	$21K		$21K		$21K		$21K		$21K		$21K	
Facilities & modifications												
Other	$51K	$1K	$51K	$1K	$51K	$1K	$51K	$1K	$51K	$1K	$51K	$1K
TOTAL EXPENSES	$799K		$799K		$799K		$799K		$799K		$799K	
DIFFERENCE (Rev.-Exp.)	$1697K		$1697K		$1697K		$1697K		$1697K		$1697K	
ESTIMATED IMPACT OF NEW PROGRAM	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
FTE Enrollment	88		88		88		88		88		88	
Projected Annual Credits Generated	2080		2080		2080		2080		2080		2080	
Tuition Generated	$1037K		$1037K		$1037K		$1037K		$1037K		$1037K	