# ARIZONA STATE UNIVERSITY PROPOSAL TO ESTABLISH A NEW GRADUATE DEGREE

This template is to be used only by programs that have received specific written approval from the University Provost's Office to proceed with internal proposal development and review. A separate proposal must be submitted for each individual new degree program.

#### DEGREE PROGRAM

College/School(s) offering this degree: Technology and Innovation

Unit(s) within college/school responsible for program: Engineering

If this is for an official joint degree program, list all units and colleges/schools that will be involved in offering the degree program and providing the necessary resources:

Proposed Degree Name: Information Technology

Master's Degree Type: Master of Science

Proposed title of major: Information Technology (IT)

Is a program fee required? Yes 🗌 🛛 No 🖂

Requested effective term: Fall and year: 2013

(The first semester and year for which students may begin applying to the program)

# PROPOSAL CONTACT INFORMATION

(Person to contact regarding this proposal)

Name: Ann McKenna

Title: Chair, Department of Engineering

Phone: 727-5121

email: <u>Ann.McKenna@asu.edu</u>

#### DEAN APPROVAL

This proposal has been approved by all necessary unit and College/School levels of review, and the College/School(s) has the resources to offer this degree program. I recommend implementation of the proposed degree program. (*Note: An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.*)

College Dean name: Mitz			
	(Please see attached email)		
College Dean Signature		Date:	
College Dean name: (if more than one college invol	lved)		
College Dean Signature		Date:	

#### ARIZONA STATE UNIVERSITY PROPOSAL TO ESTABLISH A NEW GRADUATE DEGREE

This proposal template should be completed in full and submitted to the University Provost's Office [mail to: <u>curriculumplanning@asu.edu</u>]. It must undergo all internal university review and approval steps including those at the unit, college, and university levels. A program <u>may not</u> be implemented until the Provost's Office notifies the academic unit that the program may be offered.

#### DEGREE PROGRAM INFORMATION

Master's Type: M.S. (E.g. MS, MA, MAS, PSM, or other)

Proposed title of major: Information Technology

#### 1. PURPOSE AND NATURE OF PROGRAM: A. Brief program description –

Students who select the Master of Science in Information Technology obtain advanced technology skills that prepare them for careers in industry, education, or government. Through the curriculum, graduates design and implement information solutions, develop and implement enterprise databases, perform systems and network analysis, design and create graphic and geographic technology solutions, and serve as information and communications security experts. The program focuses on developing the ability to conceptualize, organize and realize information technology projects that meet the needs of users within an organizational or societal context. Program coursework encompasses core technologies and a specialization area with a culminating project experience.

# B. Will concentrations be established under this degree program? Yes No (Please provide additional concentration information in the operational appendix – number 5A.)

2. **PROGRAM NEED -** Explain why the university should offer this program (include data and discussion of the target audience and market).

ASU currently does not have an MS degree in Information Technology. The popularity of an MS in Information Technology degree has grown over the past decade with many outstanding peer institutions that now offer a similar degree. Such institutions with informative models include The McCormick School of Engineering at Northwestern, the University of Maryland, and Penn State's College of information science and Technology. The models for these programs are grounded in the science and technology of information, bringing together computer science, information technology, and systems users. Likewise, there is a significant potential growth from international markets to ASU who would matriculate either as traditional two-year MS students or who would matriculate into a planned 3+2 MS IT program. In India, several of the leading Indian Institutes of Technology (IIT) offer an MS in Information Technology. In China SJU offers and MS Information Technology and in a recent visit with many universities, there were repeated statements of interest in a partnership with ASU, providing we offered a similar degree for which computer science and technology students could matriculate. We envision an international partnership in 3+2 programs that would bring 100 MS Information Technology students to ASU. The Occupational Outlook from the Bureau of Labor Statistics projects Information Technology jobs in the technical areas addressed by this proposed degree to grow 22% over the next 10-years. This is a faster than average projected job growth for all other occupations.

The College of Technology and Innovation is also in the process of developing a BS in Information Technology for governance review and approval. Having both of these programs provides a good BS to MS path for our students.

3. IMPACT ON OTHER PROGRAMS - Attach any letters of collaboration/support from impacted programs. (see Checklist coversheet)

The W. P. Carey School of Business was consulted and their response is included in the letters of support file submitted with the proposal.

4. PROJECTED ENROLLMENT - How many new students do you anticipate enrolling in this program each year for the next five years? Please note, The Arizona Board of Regents (ABOR) requires nine masters and six doctoral degrees be awarded every three years. Thus, the projected enrollment numbers must account for this ABOR requirement.

5-YEAR PROJECTED ANNUAL ENROLLMENT					
Please utilize the following tabular format.	1 <sup>st</sup> Year	2 <sup>nd</sup> Year (Yr 1 continuing + new entering)	3 <sup>rd</sup> Year (Yr 1 & 2 continuing + new entering)	4 <sup>th</sup> Year (Yrs 1, 2, 3 continuing + new entering)	5 <sup>th</sup> Year (Yrs 1, 2, 3, 4 continuing + new entering)
Number of Students Majoring (Headcount)	30	60	90	120	150

#### 5. STUDENT LEARNING OUTCOMES AND ASSESMENT:

A. List the knowledge, competencies, and skills students should have attained by graduation from the proposed degree program. (You can find examples of program Learning Outcomes at (<u>http://www.asu.edu/oue/assessment.html</u>).

#### **Technical Competence**

- a. Apply and adapt knowledge of advanced computing and mathematics appropriate to computerized acquisition, modeling, representation and application of information technology.
- b. Analyze an information technology problem; identify and define the computing requirements appropriate to its solution.
- c. Effectively integrate advanced information technology based solutions into the user environment.
- d. Understand and apply information technology best practices and standards.

#### Design

e. Design, implement, evaluate, and adapt an advanced computer-based system, process, component or program to meet desired needs.

#### Communication and Team Skills

- f. Function effectively and apply and adapt teaming strategies to influence productivity in accomplishing an information technology solution.
- g. Communicate effectively with a range of audiences.

#### **Professionalism and Perspective**

- h. Identify and understand professional, ethical, legal, security, social issues and responsibilities relevant to information technology.
- i. Describe the local and global impact of information technology on individuals, organizations, and society.
- j. Recognize the need for and engage in continuing professional development.

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

The assessment plan has the dual purpose of determining student achievement of educational objectives and student outcomes. Assessment is accomplished by program faculty and unit administration. Assessment information data flows include: student and faculty course assessment, graduating student survey, graduating student interview, and direct measures of student outcome achievement in key courses.

Information from these sources is evaluated to determine student achievement of student outcomes and program objectives. Program faculty and administration are responsible for conducting regular evaluations, as well as initiating and documenting the student assessment and evaluation of the data. Each required course in the program identifies course level outcomes that are tied to program level student outcomes. The course outcomes and their mapping to program student outcomes validate each course's place in the program and student achievement of the program's educational objectives and student outcomes.

Student performance based outcome assessment is aimed at identifying student strengths and weaknesses relative to each student outcome in addition to determining whether the collective student body is adequately achieving outcomes. The assessments are used to continuously improve the MS in Information Technology program. Projects are assessed by faculty committees on a yearly basis.

6. ACCREDITATION OR LICENSING REQUIREMENTS (if applicable): Provide the names of the external agencies for accreditation, professional licensing, etc. that guide your curriculum for this program, if any. Describe any requirements for accreditation or licensing.

None

### 7. FACULTY, STAFF, AND RESOURCE REQUIREMENTS:

- A. Faculty
  - i. **Current Faculty -** List the name, rank, highest degree, area of specialization/expertise and estimate of the level of involvement of all current faculty members who will teach in the program.

Amiya Bhattacharya, Lecturer, Ph.D. Network Security, Wireless Sensor Networks
Srividya Kona Bansal, Ph.D. Service Oriented Architectures, Software Engineering
Arnaud Ehgner, Lecturer, Master of Computer Business Admin, Video Game Art
John Femiani, Assistant Professor, Ph.D. Computer Science, Visual Analytics
Ashraf Gaffar, Assistant Professor, Ph.D. Human-Computer Interface Design
Kevin Gary, Associate Professor, Ph.D. Software Engineering, Web Applications
Arbi Ghazarian, Assistant Professor, Ph.D. Software Requirements Engineering
Timothy Lindquist, Professor, Ph.D. Mobile Systems, Computer Science
Deborah Prewitt, Lecturer, MS of Technology, Web and Multimedia Design
Laurel Ralston, Lecturer, EdD, Online Learning, Human-Computer Interface Design
Anshuman Razdan, Professor, Ph.D. Graphic Information Technology
Richard Whitehouse, Lecturer Sr., MS Mobile Systems, Software Engineering

**ii. New Faculty -** Describe the new faculty hiring needed during the next three years to sustain the program. List the anticipated hiring schedule and financial sources for supporting the addition of these faculty members.

N/A

**iii.** Administration of the program - Explain how the program will be administered for the purposes of admissions, advising, course offerings, etc. Discuss the available staff support.

The program will be administered by the Department of Engineering at the Polytechnic campus. The Chair, Dr. Ann McKenna, and departmental support staff will provide administrative oversight. Advising will be provided by the College of Technology and Innovation using the same model currently in use for all other programs in the college. Admission, registration, course scheduling, and graduation (audit) support will be provided as is currently provided for the other programs in the Department of Engineering – through a combination of support at the departmental, college and university levels.

**B. Resource requirements needed to launch and sustain the program:** Describe any new resources required for this program's success such as new staff, new facilities, new library resources, new technology resources, etc

None; future hires will come from growth funding

#### 8. COURSES:

i.

- A. Course Prefix(es): Provide the following information for the proposed graduate program.
  - Will a new course prefix(es) be required for this degree program? Yes  $\Box$  No  $\boxtimes$
  - ii. If yes, complete the <u>Course Prefixes / Subjects Form</u> for each new prefix and submit it as part of this proposal submission.
- **B.** New Courses Required for Proposed Degree Program: Provide course prefix, number, title, and credit hours and description for any new courses required for this degree program.

#### IFT 510: Principles of Computer and Information Technology (3)

A comprehensive introduction to computer and information technology (IT). This course provides a detailed understanding of computer architecture, system software and important related issues in an Information Technology context. The course forms a technical foundation for understanding current technologies and how they work. Topics include principles of systems' physical architecture, operating systems and application software, storage and systems management as well as current developments in cloud computing, green IT, social networking systems, and Internet search. Prerequisite: Graduate Standing

#### IFT 520: Principles of Telecommunication Technology (3)

Basic communication technology concepts from an information technology perspective. Signals, spectra, and bandwidth; attenuation, distortion, and noise; filtering, equalizing, modulation and multiplexing; information measurement, source and channel coding, channel capacity, baseband data transmission, digital modulation and spread-spectrum systems; local area networks and architecture and performance; layered network architecture, protocols, switching techniques, TCP/IP, traffic engineering and basic capacity analysis are addressed. The focus is not on detailed component design but understanding the interrelationships of these concepts and telecommunication systems to support broad system design and management. Prerequisite: Graduate Standing

#### IFT 530 Information Analysis, Modeling, Representation, and Communication (3)

This course teaches proven techniques for modeling information requirements and organizational data resources, with a strong focus on gleaning information from data. Students will learn how to discover and document database requirements, functional system requirements, and user interface requirements at a level appropriate for advanced information technology practitioner. Techniques covered in this course include entity-relationship modeling for data analysis, functional dependency and normalization for the logical design of the database, Structured Query Language (SQL) for data management, and use cases for learning the process of requirement specification. Prerequisite: Graduate Standing

#### IFT 540 Software Development for Information Technology (3)

This course prepares students for systems analysis and development using applications software from an information technology perspective. The course provides grounding in software engineering so information technology students can better understand and relate to software engineers during information technology system development. Students learn theory and methods of the object-oriented modeling and the fundamentals of application development process models. Hands-on information technology focused projects give the students an opportunity to practice their modeling skills and illustrate an effective integration of various software development techniques throughout an iterative, software project life cycle. Prerequisite: IFT 530

#### APPENDIX OPERATIONAL INFORMATION FOR GRADUATE PROGRAMS

(This information is used to populate the Graduate Programs Search/catalog website.)

#### 1. **Provide a brief** (catalog type - no more than 150 words) **program description**.

Students who select the Master of Science in Information Technology obtain advanced technology skills that prepare them for careers in industry, education, or government. Through the curriculum, graduates design and implement information technology solutions, develop and implement enterprise databases, perform systems and network technical analysis, design and create technical graphic and geographic technology solutions, and serve as information technology and communications security experts. The program focuses on developing the ability to conceptualize, organize and realize information technology projects meeting the needs of users within an organizational or societal context. Program coursework encompasses core technologies and a specialization area with a culminating project experience.

#### 2. Campus(es) where program will be offered:

(Please note that Office of the Provost approval is needed for ASU Online campus options.)

ASU Online only (all courses online)

All other campus options (please select all that apply):

Downtown	$\boxtimes$	Polytechnic
Tempe		West

**Both** on-campus **and** ASU Online (\*) - (Check applicable campus from options listed.)

(\*) Please note: Once students elect a campus option, students will not be able to move back and forth between the on-campus (in-person) or hybrid options and the ASU Online campus option.

#### 3. Admission Requirements:

**Degree**: Minimum of a Bachelor's or master's degree in what fields, or a closely-related field from a regionally accredited College or University.

Information Technology, Computer Science, Applied Computing, Engineering,

**GPA:** Minimum of a 3.00 cumulative GPA (scale is 4.0=A) in the last 60 hours of a student's first bachelor's degree program. Minimum of 3.00 cumulative GPA (scale is 4.0 = A) in the applicable Master's degree. Modify or expand if applicable.

**English Proficiency Requirement for International Applicants:** The English proficiency requirements are the same as the Graduate College requirement. (see Graduate College requirement <u>http://graduate.asu.edu/admissions/international/english\_proficiency</u>): X Yes No

If applicable, list any English proficiency requirements that are supplementary to the Graduate College requirement.

#### Foreign Language Exam:

Foreign Language Examination(s) required? Yes No

**Required Admission Examinations:** GRE GMAT Millers Analogies None required (Select all that apply.)

#### Letters of Recommendation: XYes No

4. Application Review Terms (if applicable Session): Indicate all terms for which applications for Admissions are accepted and the corresponding application deadline dates, if any:

Fall (regular)	Deadline (month/year): Deadline (month/year):	Feb 1
Spring (regular)	Deadline (month/year): Deadline (month/year):	Oct 1

**Please note** that the above deadlines have been established for grad admissions. The academic unit has language that still allows apps to be submitted/reviewed after the deadline but these dates are the working deadlines

Summer I Deadline (month/year): Jan 1

Summer II Deadline (month/year):

#### 5. Curricular Requirements:

(Please expand tables as needed. Right click in white space of last cell. Select "Insert Rows Below")

#### 5A. Will concentrations be established under this degree program? Yes No

#### 5B. Curricular Structure:

Required Core Courses for the Degree			Credit Hours
(Prefix & Number)	(Course Title)	(New Course?) Yes or No?	(Insert Section Sub-total) 15
IFT 510	Principles of Computer and Information Technology	Y	3
IFT 520	Principles of Telecommunication Technology	Y	3
IFT 530	Information Analysis, Modeling, Representation, and Communication	Y	3
IFT 540	Software Development for Information Technology	Y	3
OMT 540	International Management	N	3
<u>Elect</u> (as deemed n Student must choose 12 cred the supervisory committee	<u>Credit Hours</u>		
(Prefix & Number)	(Course Title)	(New Course?) Yes or No?	(Insert Section Sub-total) 12
GIT 414	Website Design and Internet/Web Technologies	N	3
GIT 417	Advanced Internet Programming	Ν	3
GIT 435	Web Management and E-Commerce	Ν	3

			15
GIT 537	Current Issues in Quality Assurance	Ν	3
GIT 540 Cross-Media Design Solutions N		3	
GIT 541	GIT 541 Graphic Information Systems N		
GIT 542	Information Design and Usability	Ν	3
GPH 570	GPH 570 Fundamentals of Geographic Information N Science N		
CST 481	Information System Security	Ν	3
CST 482	Network Forensics	Ν	3
CST 533	Database-Centric Enterprise Application Development	N	3
<u>Culminating Experience</u> <b>E.g.</b> - Capstone course, applied project, <u>thesis</u> ( <u>masters only</u> – 6 credit hours) or <u>dissertation</u> ( <u>doctoral only</u> – 12 credit hours) as applicable			<u>Credit Hours</u> (Insert Section Sub-total) <u>3</u>
IFT 593 Applied Project			3
<u>Other Requirements</u> E.g Internships, clinical requirements, field studies as applicable			<u>Credit Hours</u> (Insert Section Sub-total)
For doctoral programs – when approved by the student's supervisory committee, will this program allow 30 credit hours from a previously awarded master's degree to be used for this program? If applicable, please indicate the 30 credit hour allowance that will be used for this degree program.			
Total	required credit hours		30
	and total gradit hours for the sore (required your		

• List all required core courses and total credit hours for the core (required courses other than internships, thesis, dissertation, capstone course, etc.).

• Omnibus numbered courses cannot be used as core courses.

• Permanent numbers must be requested by submitting a course proposal to Curriculum ChangeMaker for approval. Courses that are new, but do not yet have a new number can be designated with the prefix, level of the course and X's (e.g. ENG 5XX or ENG 6XX).

#### 6. Comprehensive Exams:

Master's Comprehensive Exam (when applicable), please select the appropriate box.

#### (Written comprehensive exam is required)

Oral comprehensive exam is required – in addition to written exam

No oral comprehensive exam required - only written exam is required

- 7. Allow 400-level courses: Xes No (No more that 6-credit hours of 400-level coursework can be included on a graduate student plan of study.)
- 8. Committee: Required Number of Thesis or Dissertation Committee Members (must be at least 3 including chair or co-chairs): Not applicable
- **9. Keywords** (List all keywords that could be used to search for this program. Keywords should be specific to the proposed program.)

Computing, Computer, Software, Graphic, Game Development, Game Design, Video Game, Web, Web Applications, World Wide Web, Network Administration, Network Security, Information Technology, Animation, Multimedia

# **Scott Danielson**

From: Sent: To: Subject: Mitzi Montoya Thursday, November 08, 2012 5:39 PM Scott Danielson Re: MS in Information Technology Proposal Approval

Approved

Mitzi Montoya Sent from my DROID

Scott Danielson <<u>Scott.Danielson@asu.edu</u>> wrote:

Dean Montoya,

I am asking for your approval on the attached proposal for a MS in Information Technology to be offered in the College of Technology and Innovation at the Polytechnic campus. Your approval is needed before I can send the proposal forward to the Provost's office.

Your approval indicates that the proposal has been approved by the Department and College levels of review, and the College has the resources to offer this degree program and that you recommend implementation of the proposed degree program.

Thank you.

Scott Danielson, Ph.D., P.E. Associate Dean for Academic Programs College of Technology and Innovation Arizona State University 480-727-1185



Date: November 14, 2012

To: Scott Danielson, Ph.D., Associate Dean for Academic Programs College of Technology and Innovation

ann Mickeuna

From: Ann F. McKenna, Chair, Department of Engineering College of Technology and Innovation

Re: Master of Science in Information Technology

Please accept this memo of support for the establishment of the proposed Master of Science in Information Technology. The attached proposal has been developed and reviewed by a group of Engineering faculty in the College of Technology and Innovation.

The Department of Engineering has sufficient resources to support the new MS in Information Technology without impacting the offering of core courses within the unit.

**Department of Engineering** 

7171 E. Sonoran Arroyo Mall Peralta Hall, Suite 330 Mesa, Arizona 85212 (480) 727-2727 Fax: (480) 727-1549 http://technology.asu.edu

## **Scott Danielson**

From:	Amy Hillman
Sent:	Thursday, November 08, 2012 3:29 PM
То:	Chell Roberts
Cc:	Mitzi Montoya; Scott Danielson
Subject:	RE: MS information Technology

We have no objections, thanks.

Amy Hillman Executive Dean W. P. Carey School of Business

From: Chell Roberts
Sent: Thursday, November 08, 2012 11:27 AM
To: Amy Hillman
Cc: Mitzi Montoya; Scott Danielson
Subject: MS information Technology

Amy

Attached is our propel for an MS in Information Technology, which we hope to fast track. The degree is aligned with the BS IT degree. I think we have written it with your previous concerns regarding the BS IT degree in mind. We look forward to your comments so we can finish the process.

Chell Roberts Executive Dean College of Technology and Innovation