ARIZONA STATE UNIVERSITY
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE

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

DEGREE PROGRAM

College/School(s) offering this degree: Ira A. Fulton School of Engineering

Unit(s) within college/school responsible for program: School of Computing, Informatics and Decision Systems 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: Bachelor of Science in Informatics

Masters Degree Type: BS-Bachelor of Science

If Degree Type is Other, provide proposed degree type:

and proposed abbreviation:

Proposed title of major: Informatics

Is a program fee required? Yes ☒ **No**☐

Requested effective term: Fall and year: 2010
(The first semester and year for which students may begin applying to the program.)

PROPOSAL CONTACT INFORMATION
(Person to contact regarding this proposal)

Name: Kurt VanLehn **Title:** Professor

Phone: 480-727-6348 **email:** kurt.vanlehn@asu.edu

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: Dierdre Meldrum, Dean (Ira A. Fulton Schools of Engineering)

College Dean signature _____ **Date:** 3/19/10
Paul C. Johnson, Executive Dean

College Dean name:
(if more than one college involved)

College Dean signature _____ **Date:** _____

ARIZONA STATE UNIVERSITY
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE

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

DEGREE PROGRAM INFORMATION

Undergraduate: BS-Bachelor of Science

If Degree Type is Other, provide proposed degree type:
and proposed abbreviation:

Proposed title of major: Informatics

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1. PURPOSE AND NATURE OF PROGRAM

A. **Brief program description** (This is a catalog type description of no more than 250 words. Include the distinctive features of the program that make it unique. Do not include program or admission requirements.)

The proposed Bachelor of Science (B.S.) program in Informatics will be an interdisciplinary degree that combines mastery of general techniques for processing information with specialization in an application area and its information processing problems. The design of the degree responds to the rapidly growing need for skilled workers who can take a problem-driven, system-level, user-oriented perspective toward information and computing, who can apply current Informatics methods to address society's needs, and who can contribute to the next generation of such systems.

The proposed program will revolve around the idea that Informatics involves the design, development, and application of computational tools that meet specific needs of human users. These include storing and retrieving of information to/from memory, creating models and using them for inference, simulation, problem solving and decision making, perceiving and analyzing information, and expediting communication with humans or between humans. Informatics tools and principles for these activities incorporate ideas from computer science, cognitive psychology, information science, and other disciplines throughout the university. These core ideas will be taught twice: first in a discipline-independent general form, and second in the context of a specific discipline. For instance, the introductory course in information storage and retrieval (a function) would use examples from business, medicine, geography and other disciplines to illustrate fundamental technologies for searching, indexing, organizing, etc. In the later years of study, the student will take discipline-specific courses in, for instance, geo-informatics, enterprise informatics or educational informatics, where they will learn about discipline-specific information storage and retrieval tools.

After learning about the fundamentals of informatics first in a general setting then again in the context of disciplinary applications, the student will select a focal area such as educational informatics, geo-informatics, etc. They will take prescribed courses and do a 2-course capstone project in the focal area. Thus, Informatics graduates will remain highly interdisciplinary and yet have a specialization that gives them a head start on one possible career in informatics.

2. STUDENT LEARNING OUTCOMES AND ASSESMENT

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

The program will prepare students for future careers as informaticians in science, government, industry and education, as well as prepare them for graduate study in the area.

Learning Outcome 1. Students must demonstrate a comprehensive understanding of the complex tasks that humans confront and that Informatics systems can automate, assist, and model based on the ways that Informatics systems represent, utilize, and create internal structures to handle these tasks. Students will master the principles for the design, construction, and evaluation of Informatics systems that demonstrate these behaviors.

Learning Outcome 2. Students must demonstrate an in-depth understanding of some of the problems that arise in one of the advanced domain areas, how to apply Informatics methods to address these problems in integrated and user-relevant ways, and ways to evaluate the success of these Informatics systems on such problems.

Learning Outcome 3. Students must demonstrate the ability to identify problems that are amenable to Informatics solutions, to design, construct, use, and evaluate Informatics systems that address such problems, and to present their results in written and spoken form.

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

Assessment 1. Students will complete, with a C grade or better, and with an average GPA of 2.5 or higher, the core courses that are required for the B.S. degree in Informatics. We will assess student mastery through small assignments, individual projects, group projects, and examinations. We will assess student projects in terms of whether they provide correct functionality on relevant problems in both usable and useful ways, which will be necessary in their future careers.

Assessment 2. Students will complete, with a C grade or better, the courses required for one of the Informatics focal areas, including course projects that give them experience with existing Informatics techniques. We will assess student ability in terms of whether the systems they develop address problems that are relevant to end users in the concentration area, incorporate domain knowledge that is appropriate to the application area, and take user needs and background into account. See also requirement for 2.5 GPA below.

Assessment 3. Students will complete, with a C grade or better, the technical electives required for the B.S. degree in Informatics, thus demonstrating knowledge and expertise in advanced techniques. We will assess student mastery through small assignments, individual projects, group projects, and examinations. We will assess student projects in terms of whether they provide correct functionality on relevant problems in both usable and useful ways, which will be necessary in their future careers. The students will also demonstrate mastery for Assessments 2 and 3 by having a GPA of 2.5 over the 42 units of Informatics focal area courses and technical elective courses.

Further Outcomes and Assessments. Students are encouraged but not required to demonstrate further professional competence in Informatics by:

- completing independent study courses with professors who are affiliated with the Informatics program;
- publishing papers on their results in the refereed literature;
- conferences and workshops on Informatics and related topics;
- taking courses and pursuing projects in areas that complement their work in Informatics.

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Taken together, the above activities will ensure that students who receive the B.S. have the knowledge and skills needed to use and develop Informatics systems, apply them to societal problems, and communicate their solutions to other researchers and to potential users.

3. CURRICULUM OF THE PROPOSED PROGRAM

Total credit hours must be 120 to include: first year composition, general studies, core/required courses, program specific electives, and any additional requirements.

The combined Informatics and general ASU BS requirements are:

Basic Sciences	8 units
ASU 101	1 unit
Humanities/Social Science (General Studies)	15 units
English Composition	6 units
Literacy and critical inquiry (L)	3 units
Informatics Core Courses	38 units
Informatics Focus Area courses	15 units
Informatics Capstone	7 units
Informatics Electives	27 units
Total	120 units

For each of the core, focal area and elective courses, a minimum grade of C is required of every required course. In addition, a 2.5 GPA is required for the 38 units of core courses, and for the 42 units of Focus Area and Elective courses.

A. Major Map. Please prepare and attach a Major Map. If there are concentrations in this degree program, prepare a separate Major Map for each one. (Examples of Major Maps can be found at http://provost.asu.edu/curriculum)

B. Total credit hours required for this program: 120

C. Core/Required Courses.

i. Total required and/or core course credit hours: 38

ii. List the name, prefix, and credit hours for each required/core class for this program

1. CPI 101: Introduction to Informatics (3)
2. CSE 110 Principles of Programming with Java (3)
3. MAT 210 Brief Introduction to Calculus (3)
   or MAT 251 Calculus for the Life Sciences (3)
   or MAT 265 Calculus for Engineers I (3)
   or MAT 270 Calculus with Analytic Geometry I (4)
4. CSE 205 Object-oriented Programming and Data Structures (3)
5. MAT 242 Linear Algebra (3)
6. MAT 243 Discrete Math (3)
7. CPI 200 Mathematical Foundations of Informatics (3)
8. CPI 310 Information and Data Management (3)
9. IEE 305 Information Systems Engineering (3)
10. STP 420 Introductory Applied Statistics(3)
    or STP 231 Statistics for the Life Sciences (3)
    or GCU 495 Quantitative Methods in Geography (3)
    or IEE 380 Probability and Statistics for Engineering Problem Solving (3)
11. CPI 350 (new course) Evaluation of Informatics Systems (3)
12. CPI 360 Decision Making and Problem Solving (3)
13. CSE 463 Human-Computer Interaction (3)

D. Program Specific Electives.

i. Total required program elective credit hours: 27

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

It is important that Informaticians learn about discipline-specific tools from a variety of disciplines. Thus, students are required to take 27 units of electives from *outside* the focal area that they choose in the third year. They may select electives from other focal areas (listed in the Table of section E, below) or from the list below:

- CPI 400 Scientific computing and visualization (3)
- CPI 412 Cognitive Systems and Intelligent Agents (3)
- CPI 420 Technology and Society (3)
- CSE 310 Data Structures and Algorithms (3)
- CSE 360 Introduction to Software Engineering (3)
- CSE 408 Multimedia Information Systems (3)
- CSE 412 Database Management (3)
- CSE 471 Introduction to Artificial Intelligence (3)
- CSE 476 Introduction to Natural Language Processing (3)
- CSE 477 Introduction to Computer-Aided Geometric Design (3)
- CSE 494 Special Topics (3) with the permission of Informatics Program Director.
- IEE 405 Developing Information Systems Applications (3)

Other electives possibilities will be added later.

E. Additional Program Requirements, if any. List and describe any capstone experiences, milestone, and/or additional requirements for this degree program:

In their third year, students must choose one of the following focal areas. Each area specifies 15 units of courses that need to be completed. The curriculum of each focal area is maintained by a Coordinator (see below) who is a specialist in that area, assisted by an Advisory Committee (to be formed later). More focal areas may be added later.

Name and coordinator	Required courses	Total required credit hours	Elective courses	Total elective credit hours
Digital Cultures Informatics (Hari Sundaram)	The digital culture initiative is an ASU wide initiative that focuses on competencies[1] and not on specific courses. The student in consultation with the digital culture advising staff will determine the set of digital culture competencies (required and elective) most appropriate to him/her[2].	0	AME/HIDA 194/140 – Topics in Digital Culture AME 194 Computational Thinking for Digital Culture and Media Arts AME/SOA 294 Introduction to Interactive Environments SDI 294 Media Editing SOA 294 Introduction to	15

[1] The set of competencies of interest to the informatics certificate include: Editing and Processing. Sensors and Signals, Visualization and Sonification, Publishing and Sharing, Form and Composition, Performance, Movement / Kinesthetic Awareness, Narrative Composition, Producing and Staging, Fabrication and System Building, Improvisation and Rapid Prototyping, Media in Physical Space, Social Mechanisms & Understanding, Reflective Practices, History and Theory, Cultural Studies, Cultural Practice, Content Analysis. The elective courses shown meet many of these competencies.

[2] The 15 credits will come from courses from the following sub-areas of digital culture curriculum – media arts (3), engineering (3), digital culture core (6), projects (3)

			Visualization and Prototyping AME 294 Programming for Media Arts DCE 294 Hybrid Action: Physical Intelligence in Digital Culture SALA/AME 394 How to Build a Digital-Physical System SDI 394 Digital Modeling HIDA 394 Collaborative Projects in Digital Culture ANP 394 Digital Fabrication AME 394 Compositional and Computation Principles for Media Arts ANP 494 Digital Ecologies: Parametric Systems Design AME 494 Animating Virtual Worlds ART/AME 494 Media Installations AME 494 Integrated System Development for Digital Culture	
Game Informatics (Ashish Amresh)	• CPI 111 Game Development I (3) • CPI 211 Game Development II (3) • CPI 311 Game Engine Development (3) • CPI 321 Fundamentals of Game Art (3)	12	Choose 1: • CPI 411 Graphics for Games • CPI 412 Cognitive Systems and Intelligent Agents (3) • CPI 421 3D Modeling and Texturing (3) • CPI 422 3D Animation and Rigging for Video Games (3)	3
Geo-informatics (Elizabeth Wentz)	• GPH 370 Geographic Information Technologies (3) • GPH 373 Geographic Information Science I (3) • GPH 473 Geographic Information Science II (3)	9	Choose 2: • ABS 485 GIS In Natural Resources (3) • GCU 361 Urban Geography (3) • GCU 441 Economic Geography (3) • GCU 442 Geographical Analysis of Transportation SB (3) • GPH 371 Introduction to Cartography and Georepresentation (3) • GPH 372 Air Photo Interpretation (3) • GPH 471 Geographics: Interactive and Animated Cartography and Geovisualization (3) • GPH 481 Environmental Geography (3) • GPH 483 Geographic Information Analysis (3) • PLB 434 Landscape Ecological Modeling(3) • GCU 494 Locational Analysis and Modeling (3)	6
Educational Informatics (Kurt	With instructor approval, students will take: • EDT 501 Foundations and Issues	15		0

VanLehn)	in Educational Technology (3) • EDT 501 Design and Development of Instruction (3) • EDT 503 Instructional Medial Design (3) • EDT504 Development of Computer-based Instruction (3) • EDT 323 Authoring Tools (3)			
Enterprise Informatics (John Fowler)	• MAT 266 Calculus for Engineers, II (3) • IEE 376 Operations Research Deterministic Techniques/Applications (3) • IEE 470 Stochastic Operations Research (3)	9	Choose 2 • IEE461 Production Control (3) • IEE494 Urban Operations Research. (3) • IEE494 Operations Research in Healthcare (3) • IEE 474 Quality Control (3) • IEE 475 Simulating Stochastic Systems (4)	6 or 7

Each student will take a two-course Capstone sequence (7 units, total) during his or her senior year which involves an extended group project that gives participants in-depth experience in developing and utilizing Informatics techniques in the context of concrete problems. The capstone projects will be in the focal areas of the students. The Coordinator and Advisory committee of each focal area will serve as capstone advisors for the projects in their focal area.

F. Are any concentrations to be established under this degree program? ☐ Yes ☒ No

i. If "Yes", please check one:
☐ Students must select a concentration as part of this degree program
☐ Concentrations are optional

ii. If "Yes", list the name of the concentrations and the minimum number of credit hours required for each concentration.

4. NEW COURSE DEVELOPMENT

A. Will a new course prefix(es) be required for this degree program? ☐ Yes ☒ No
If yes, complete the request for establishment of a new prefix for each prefix and submit with this proposal.

For simplicity, we will start by using existing course's identifiers and the new courses listed below will have a CPI prefix. However, it would be preferable to replace the CPI prefix with INF. Having the INF course prefix will help establish the academic identity and improve the visibility of the program. If a new course prefix were possible now or in the future, we would cross-list the core courses under it and use it for the 3 new courses below.

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

Although the degree program would be much improved with the addition of new courses, we understand that new resources are not available at this time so we should try to create a program using only existing courses. This proved to be impossible, so the course below selects content from a wide variety of methodology courses. Thus, we are proposing *only one new course at this time* (in addition to 2 capstone courses). When ASU resources return to normal levels, we will seek permission to add new courses, which we believe would greatly enhance the education of Informatics students.

CPI 350: Evaluation of Informatics Systems (3)
Experimental methods, computational theory (e.g., asymptotic complexity), ethnographic methods and Monte Carlo methods of evaluation. Pre-requisites: STP 420, STP 231, IEE 380, or GCU 495.

CPI 485: Informatics Capstone I (3) [proposed Literacy]
Industry-oriented course where students develop and evaluate of an informatics tool in partnership with a local industry or research group. Students increases their skills in development, evaluation, technology, teamwork and communication. This first semester capstone course focuses on background research, requirements development and planning. Prerequisite: Approval of focal area coordinator.

CPI 486: Informatics Capstone II (4) [proposed Literacy]
Continuation of Capstone I. Students will carry out the planned developments then present their work to several audiences via print, spoken and other media. Prerequisite: CPI 485.

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

The digital universe is expanding. A recent study from IDC estimates that the amount of stored digital information in 2007 was 281 Exabyte's (281 billion gigabytes), and will continue to grow exponentially for the foreseeable future (http://www.emc.com/leadership/digital-universe/expandingdigital-universe.htm). We also generate more information than we store. The results of this can be seen in surveys that describe knowledge workers who feel inundated with information--so much so that they are headed for a "breaking point" (http://www.lexisnexis.com/media/press-release.aspx?id=1041.asp). How do we decide what to collect and store? More importantly, how can we help people use information effectively?

Informatics makes connections between the work people do and technology that can support that work. The purpose of the B.S. Program in Informatics is to provide an interdisciplinary degree that combines a discipline-specific understanding of applications and methods with mastery of advanced information processing techniques that help people create, store, find, analyze and interpret knowledge.

There is a recognized disconnect between technologists and their ability to develop innovative technology and the ability of practitioners and researchers in other disciplines to apply technology in useful ways to problem solving. Individuals who possess skills in a domain and technology are highly valued by both industry and academia because of their ability to make connections between the work people do and technology that can usefully support that work. These people have obtained skills in what we describe as Informatics. They are called informaticians, and their specialty is often appended to the front, as in geo-informatician.

Informatics tools incorporate ideas from computer science, cognitive psychology, information science, and other disciplines throughout the university. The interdisciplinary approach ensures that students receiving a B.S. in Informatics understand discipline-specific research problems and methods as well as principles underlying technologies that can be used to support people in their work. Importantly, informaticians also know how to design, implement, and evaluate systems to make them most useful.

The B.S. in Informatics is an interdisciplinary program that combines mastery of advanced methods for processing information with domain expertise that will help humans understand phenomena and achieve goals. The program's design responds to a need for students that have domain knowledge and can take a problem-driven, system-level, user-oriented perspective in developing and applying Informatics systems that can address societal needs. These goals are closely aligned with the aims of the New American University.

The degree responds to a need for students who take a problem-driven, human-centered approach to supporting work through technology. While technology-focused disciplines like computer science seek

answers to problems of technology (e.g., algorithm development, optimization techniques, programming language development, protocols), informatics explores problems of interest to other disciplines (e.g., science, geography, education, entertainment) that technology can help address. Example informatics challenges include designing, developing, and applying computational tools that model, aid, or automate mental activities.

Outside academia, according to the Bureau of Labor Statistics (http://www.dol.gov/21cw/magazine/020314/parents.htm), many of the fastest-growing occupations are computer-related. While their categories are more traditionally computer-science-based, the reality of the workplace is that many of these positions require or benefit from additional domain expertise. Their report points out that "The increasing demand for computer-related occupations reflects the rapid advances in computer technology and the continuing development of new computer applications, including the Internet. Overall, the [national] demand for computer specialists is projected to grow 68.6 percent, and that for computer and information systems managers anticipates growth of 47.9 percent through 2010." Applicants with both domain and technology expertise have an edge in the workplace. Technology built with the benefit of domain expertise tends to be more useful and thus more successful.

Technology is also important to the state of Arizona. In the 2004 State Science and Technology index, Arizona ranked 17th nationally (http://www.milkeninstitute.org/pdf/state_tech_sci_index04.pdf). The index also notes that a technology workforce tends to gather intensity (more technology infrastructure and industry) in states that offer both the relevant job opportunities and a vibrant, growth-oriented business environment (p. 36). A recent report prepared by William Patton and Marshall Vest (http://ebr.eller.arizona.edu/benchmarks/Sector/HighTechPower.aspx) notes that: High technology companies represent 11% of the total number of companies in Arizona. High technology, which includes service and information sectors, is the fastest growing component of Arizona's economy. The proposed program will help meet the state's need for researchers with both domain and technology expertise.

Three key features of ASU's transformation into the New American University are the university's transdisciplinary character, its recognition of the value of people, and its acknowledgement that technology plays a central role in society. The proposed B.S. program in Informatics has similar thrusts, making it emblematic of the university's mission and strategic direction. Moreover, the program's emphasis on application-and project-oriented courses plus problem-driven science make it closely aligned with ASU's commitment to use-inspired research and applications.

Because this is a transdisciplinary program, Informatics B.S. students will target careers and roles that may use technology, but do not typically design or construct systems used for solving problems. The program will be attractive to students from other disciplines because it does not require previous expertise in Computer Science, but rather represents a value-added to their contextualized knowledge/experience.

The informatics program is needed to complement existing professional and research disciplines, support local and large-scale ventures in Arizona, and help the New American University realize its short and long-range vision.

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

The proposed program will not compete with other programs for students. We expect to attract students with a different focus than those that enroll in existing programs. In particular, the Computer Science and Computer Science Engineering curricula are so different from the proposed curriculum that we expect to see little competition for students.

We believe the proposed program will actually enhance other academic units in at least two ways. One, the proposed program lets students take courses in particular subjects from other academic units such that demand for those units' courses should see a small increase. Two, the proposed program's outwardly-focused, interdisciplinary, problem-driven perspective will create synergies with and enhance exposure of existing academic units. The existing academic units we foresee this program's students

engaging include Arts, Media and Engineering, the Mary Lou Fulton Institute and Graduate School of Education, and the School of Geographic Sciences. This list is not exhaustive and we may add more academic units' courses into our program of study in the future.

7. **PROJECTED ENROLLMENT** How many new students do you anticipate enrolling in this program each year for the next five years? Please utilize the following tabular format.

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	**2nd Year** (Yr 1 continuing + new entering)	**3rd Year** (Yr 1 & 2 continuing + new entering)	**4th Year** (Yrs 1, 2, 3 continuing + new entering)	**5th Year** (Yrs 1, 2, 3, 4 continuing + new entering)
Number of Students Majoring (Headcount)	25	60	100	150	200

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

   NA

9. **FACULTY and STAFF**
   a) **Current Faculty**. List the name, rank, highest degree, area of specialization/expertise and estimate of the level of involvement of all current faculty who will teach in the program.

The "% involvement" column values are in proportion to the time that faculty members allocate to undergraduate teaching and administration of such teaching. Thus, a faculty member who is listed as 100% Informatics may still spend a significant proportion of their time doing research. As another example, we use "10%" for the involvement of a faculty member who does most of their teaching in, say, SGeoS, but often teaches a course that is in an Informatics focal area.

Name	Rank	Degree	Area of Expertise / Academic Unit	% Involvement
Ashish Amresh	Lecturer	B.S.	Computer science/CIDSE	100%
Robert Atkinson	Assoc. Prof.	Ph.D.	Education/MLFCE	10%
Winslow Burleson	Assist. Prof.	Ph.D.	HCI/CIDSE	100%
Hasan Davulcu	Assoc. Prof.	Ph.D.	Computer science/CIDSE	50%
Gerald Farin	Professor	Ph.D.	Computer science/CIDSE	50%
Toni Farley	Lecturer	Ph.D.	Computer Science/CIDSE	100%
John Fowler	Professor	Ph.D.	Industrial engineering/CIDSE	20%
Pat Langley	Professor	Ph.D.	Computer Science/CIDSE	100%
Christopher Lukinbeal	Asst. Prof	Ph.D.	Geography/SGeoS	10%
Alan Murray	Professor	Ph.D.	Geography/SGeoS	10%

Gregory M. Nielson	Professor	Ph.D.	Computer Science/CIDSE	20%
Wilhelmina Savenye	Professor	Ph.D.	Education/MLFCE	10%
Hari Sundaram	Assist. Prof.	Ph.D.	HCI/AME & CIDSE	50%
Kurt VanLehn	Professor	Ph.D.	Computer Science/CIDSE	100%
Elizabeth Wentz	Assoc. Prof.	Ph.D.	Geography/SGeoS	20%
Peter Wonka	Asst. Prof.	Ph.D.	Computer Science/CIDSE	10%

b) **New Faculty.** Describe the new faculty hiring needed during the next three years to sustain the program and list the anticipated hiring schedule for addition of these faculty.

Although the proposed program can be implemented without any new faculty, it would be greatly enriched by the addition of 3 new faculty to cover topics that are central to informatics but are not yet reflected in the expertise of existing faculty.

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

The School of Computing, Informatics and Decision Systems Engineering (CIDSE) will administer this program. Two key agents will have responsibility for this administration:

- A Program Chair will oversee the structure of the "major map" plus the content and execution of the core Informatics courses, which are essential for educating students in the fundamentals of Informatics and introducing them to the breadth of application domains and methods. This person will be affiliated with CIDSE.
- An Undergraduate Program Committee (UPC) will determine and oversee the activities and requirements for this program. This will include faculty from CIDSE, representatives from other participating units (AME, MLFCE and SGeoS) and the Program Chair, who will serve as it chair. The UPC will oversee all aspects of administering the program, most importantly proposing and formulating changes that are presented to all participating faculty for vote. The interdisciplinary make-up of the UPC will ensure that a dialog among the participating disciplines continues to influence and improve the Informatics program.

Although we use "program" to refer to the proposed undergraduate degree and its administration, we are not proposing to create a new Program Faculty at this time. The proposed Informatics major will be part of the CSE Program Faculty of CIDSE, which currently includes two other majors, Computer Science and Computer Science Engineering. The Informatics UPC will collaborate closely with the Undergraduate Program Committee of the CSE Program Faculty and the Undergraduate Program Committees of all the other participating units (AME, IE, MLFCE and SGeos) on curriculum issues that affect them both.

This program will receive initial and ongoing support from shared staff resources within CIDSE and the Ira A. Fulton Schools of Engineering. Core support for business operations (personnel, procurement, etc.), Internships and Capstone activities, and advising will come from CIDSE, which collaborates with the Ira A. Fulton School of Engineering for outreach to Honors College, High School, Community Colleges, and other universities. Existing CIDSE advising staff will provide initial support for recruitment disseminating information to other advisors throughout the university, and in leading the advising efforts

for incoming students to this program. As the Informatics program grows, some dedicated staff should be added to this team.

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

a) Describe any new resources required for this program's success, such as new support staff, new facilities, new library resources, new technology resources, etc.

The Program Chair, who should be a tenured faculty member of CIDSE, will need to be relieved of one course in order to have the time necessary for administering the program. She or he will be assisted by the existing CIDSE staff who will expand their duties to include this program. It is anticipated that the BS Informatics program will consume approximately the following staff effort:

Planned staff positions (FY09)	FTE
Administrative Assistant	0.25
Academic Advisor	0.5
Recruiting and outreach	0.20
Technical Support	0.20
Total staff lines	**1.4**

The ASU Libraries have an adequate collection for a B.S. degree in Informatics. The Libraries have been collecting Informatics material primarily in support of Computer Science degrees, with additional collecting in specific areas where Informatics is applied, such as geographical information systems. As Informatics materials are frequently grouped within an area of study, it will be necessary to monitor the research of faculty and students as the program grows to determine if Informatics is being appropriately covered for those specific subjects. Consequently, funding for additional materials, particularly journals, may be needed in the future.

b) Explain where you will get the resources to support this program.

No external sources of funds have been identified.

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

1. Contact and Support Information

Office Location (Building & Room): BYENG 208

Campus Telephone Number: 480-965-3199

Program email address: cidse.advising@asu.edu

Program website address: http://informatics.asu.edu (this URL currently goes to Prof. Kim's computational systems biology lab website, he has agreed to give it to the Informatics program if the program is approved)

2. Additional Program Description Information

A. Additional program fee required for this program? ☐ Yes ☒ No

Students will be charged the differential tuition assessed for undergraduate engineering students ~ no additional program specific fee is anticipated.

B. Does this program have a second language requirement? ☐ Yes ☒ No

3. Career Opportunities & Concentrations Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration.

An ASU Informatics graduate will have the ability to develop future information technology solutions that place a strong emphasis on user needs, and provide the ability to adapt and change dynamically with society's needs. This makes informaticians strong candidates for jobs in technology start-ups, management consulting firms, technology research centers and graduate programs offering emphasis in emerging technologies.

4. Additional Admission Requirements If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)

All students will be admitted to the university using standard Ira A. Fulton Schools of Engineering standards, with one exception. The default Engineering standards require no deficit in math and no deficit in science. The Informatics admission standards will allow a deficit in either math or science, but not both.

5. Keywords (List all keywords that could be used to search for this program. Keywords should be specific to the proposed program.)

Informatics, computation, computing and Informatics, information science, information technology, information management, information systems, knowledge management, network management, library science, visualization systems, cross-disciplinary science, applied computing, systems analysis, software systems development, systems engineering, innovation management, project monitoring, process analysis, computer modeling, computer-aided design, computing and networking, communication

support, systems analysis, geoinformatics, policy informatics, educational informatics, educational technology

6. Area(s) of Interest

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

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

B.

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

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

ARIZONA STATE UNIVERSITY

March 9, 2010

To: Elizabeth D. Capaldi, University Provost and Executive Vice President

Thru: Deirdre A. Meldrum, Dean, Ira A. Fulton Schools of Engineering
Paul C. Johnson, Executive Dean, Ira A. Fulton Schools of Engineering

From: Ronald G. Askin, Director,
School of Computing, Informatics, and Decision Systems Engineering

RE: BS in Informatics

As Director of the School of Computing, Informatics, and Decision Systems Engineering, I fully support the proposal to create a Bachelor of Science in Informatics degree. This program complements our existing educational offerings while filling an emerging need across many areas of inquiry for individuals with strong skills in developing and using application-specific, data-driven information tools. The program has been carefully constructed to flexibly adapt to multiple disciplinary needs while utilize existing university courses. The faculty of Computer Science and Engineering (CSE) has agreed to serve as the home for the program and the CSE Undergraduate Program Committee has approved this proposal.

cc. Yann-Hang Lee
Kurt VanLehn

IRA A. FULTON SCHOOLS OF ENGINEERING
School of Computing, Informatics, and Decision Systems Engineering
P.O. Box 878809 Tempe, AZ 85287-8809
(480) 965-3190 http://engineering.asu.edu

From: Thanassis Rikakis
Sent: Friday, March 05, 2010 3:50 PM
To: Kurt VanLehn
Cc: Hari Sundaram; Grisha Coleman; Heather Landes
Subject: Letter of support for BS in Informatics

Kurt,

I am writing to express the strong support of the School of Arts, Media and Engineering for the proposed BS in Informatics. The proposed degree will integrate seamlessly with the recently announced digital culture undergraduate curriculum lead by HIDA. The way the BS in Informatics is set up, it will allow interested students to choose a focus area in digital culture in the 3rd and 4th year of their studies. This approach will avail the rich interdisciplinary digital culture community and related resources to the Informatics students. It will also infuse the digital culture community with the specialized, and highly relevant, knowledge of informatics students and faculty. Professor Sundaram who is heading the digital culture focus in the Informatics degree is also in the coordinating committee for digital culture and can help better integrate the two initiatives.

We are looking forward to working with you towards the successful realization of this degree

Sincerely

Thanassis Rikakis, Professor and Director
School of Arts, Media and Engineering
Arizona State University
t.rikakis@asu.edu
http://ame.asu.edu

From: Josephine Marsh
Sent: Wednesday, March 10, 2010 8:55 AM
To: Kurt VanLehn
Cc: Robert Atkinson
Subject: Re: Letter of support for Informatics BS (URGENT)

Bob Atkinson, the Technology faculty, and I endorsed this program and will help enable qualified undergraduate students enroll in the graduate level courses in the Educational Informatics focus.

Sincerely, Josephine

Josephine Peyton Marsh
Director and Associate Professor
Division of Advanced Studies in Learning, Technology and Psychology in Education
Mary Lou Fulton Institute and Graduate School of Education
Payne Hall 301, PO BOX 870611
Tempe, AZ 85287-0611

Office cell: 602.903.0585

From: Luc Anselin [Luc.Anselin@asu.edu]
Sent: Tuesday, March 09, 2010 11:55 AM
To: Kurt VanLehn
Cc: Elizabeth Wentz
Subject: Re: Letter of Support for Informatics BS

The School of Geographical Sciences and Urban Planning supports the proposal for a new Bachelor of Science degree in Informatics.
Sincerely,

Luc Anselin, PhD
Foundation Professor of Geographical Sciences Director, School of Geographical
Sciences and Urban Planning Director, GeoDa Center for Geospatial Analysis and
Computation Arizona State University

ARIZONA STATE UNIVERSITY

Major Map: Informatics – Bachelor of Science (B.S.)

Ira A. Fulton Schools of Engineering | Catalog Year: 2010-2011

Completed ATP: ☐ *Yes* ☐ *No* | *Completed AGEC:* ☐ *Yes* ☐ *No*

Course Subject and Title *(courses in bold/shading are critical)*	Hrs.	Upper Division	Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirement Notes
TERM ONE: 0-15 CREDIT HOURS					
ASU 101-FSE: The ASU Experience	1	☐			• ASU 101-FSE should be completed first semester. • An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses • ASU Math Placement Exam score determines placement in Mathematics course ** If ENG 105, a 3 hr applicable elective must also be taken prior to graduation. See Advisor. #Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses. (NOTE: An additional HU/SB can be move up to Term 1, or any deficiency courses can be added)
# CPI 101: Intro to Informatics (CS)	3	☐		Grade of C	
# CSE 110: Principles of Programming with Java (CS)	3	☐		Grade of C	
ENG 101 or 102: First-Year Composition OR ENG 105: Advanced First-Year Composition** OR ENG 107 or 108: English for Foreign Students	3	☐		Grade of C	
Social & Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	☐			
TERM TWO: 16-30 CREDIT HOURS					
# CSE 205: Object Oriented Programming and Data Structures	3	☐		Grade of C	#Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses.
# MAT 210: Brief Introduction to Calculus (MA) or # MAT 265: Calculus for Engineers I (MA)	3	☐		Grade of C	
# CPI 200: Mathematical Foundations of Informatics	3	☐		Grade of C	
ENG 101 or 102: First-Year Composition OR ENG 105: Advanced First-Year Composition** OR ENG 107 or 108: English for Foreign Students	3	☐		Grade of C	
Humanities, Fine Arts & Design (HU) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	☐			
TERM THREE: 31-45 CREDIT HOURS					
# IEE 305: Information Systems Engineering	3	☒		Grade of C	• **Complete all 6 critical courseseach with a minimum grade of C.** • Complete First-Year Composition requirement: ENG 101 & 102 or ENG 107 & 108 or ENG 105 • See advisor for approved list of Informatics Electives #Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses. ##Designates Focal Area & Informatics Elective: A minimum cumulative GPA of 2.50 required in focus area courses and informatics electives.
# MAT 242: Linear Algebra (MA)	2	☐		Grade of C	
## Informatics Elective	3	☐		Grade of C	
Literacy & Critical Inquiry (L)	3	☐			
Laboratory Science (SG)	4	☐			
TERM FOUR: 46-60 CREDIT HOURS					
# CPI 310: Information and Data Management	3	☒		Grade of C	• See advisor for approved list of Informatics Electives #Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses. ##Designates Focal Area & Informatics Elective: A minimum cumulative GPA of 2.50 required in focus area courses and informatics electives.
Laboratory Science (SQ)	4	☐			
# MAT 243: Discrete Mathematical Structures	3	☐		Grade of C	
## Informatics Elective	3	☐		Grade of C	
Social & Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	☐			
TERM FIVE: 61-75 CREDIT HOURS					
# CPI 360: Decision Making and Problem Solving	3	☒		Grade of C	• See advisor for approved list of Informatics Electives #Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses. ##Designates Focal Area & Informatics Elective: A minimum cumulative GPA of 2.50 required in focus area courses and informatics electives.
# STP 420: Introductory Applied Statistics OR # STP 231: Statistics for the Life Sciences OR # GCU 495: Quantitative Methods in Geography OR # IEE 380: Probability & Statistics for Engineering Problem Solving	3	☐		Grade of C	
## Informatics Elective	3	☐		Grade of C	
## Informatics Elective	3	☐		Grade of C	
Humanities, Fine Arts & Design (HU) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	☐			
TERM SIX: 76-90 CREDIT HOURS					
# CPI 350: Evaluation of Informatics Systems	3	☒		Grade of C	#Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses. ##Designates Focal Area & Informatics Elective: A minimum cumulative GPA of 2.50 required in focus area courses and informatics electives.
# CSE 463: Human-Computer Interaction	3	☒		Grade of C	
## Informatics Elective	3	☐		Grade of C	
## Informatics Elective	3	☐		Grade of C	
Upper Division Humanities, Fine Arts & Design (HU) OR Social & Behavioral Science (SB)	3	☒			
TERM SEVEN: 91-105 CREDIT HOURS					
# CPI 485: Informatics Capstone I (L)	3	☒		Grade of C	• See advisor for approved list of Informatics Electives #Designates Core Course: A minimum cumulative GPA of 2.50 required in core courses. ##Designates Focal Area & Informatics Elective: A minimum cumulative GPA of 2.50 required in focus area courses and informatics electives.
## Focus Area Required Course	3	☒		Grade of C	
## Focus Area Required Course	3	☒		Grade of C	
## Focus Area Required Course	3	☒		Grade of C	
## Informatics Elective	3	☐		Grade of C	
TERM EIGHT: 106-120 CREDIT HOURS					
## CPI 486: Informatics Capstone I (L)	4	☒		Grade of C	##Designates Focal Area & Informatics Elective: A minimum cumulative GPA of 2.50 required in focus area courses and informatics electives.
## Focus Area Required Course	3	☒		Grade of C	
## Focus Area Required Course	3	☒		Grade of C	

## Focus Area Required Course	3	☒		Grade of C
## Upper Division Informatics Elective	3	☒		Grade of C

Graduation Requirements Summary:

Total Hours Regular Curriculum (120)	Total UD Hrs (45 min)	Total Hrs at ASU (30 min)	Cumulative GPA (2.00 minimum)	Major GPA (2.00 minimum GPA)	Hrs Resident Credit for Academic Recognition (56 min)	Total Comm. College Hrs. (64 Max)

General University Requirements: Legend

- General Studies Core Requirements:
  - Literacy and Critical Inquiry (L)
  - Mathematical Studies (MA)
  - Computer/Statistics/Quantitative applications (CS)
  - Humanities, Fine Arts, and Design (HU)
  - Social and Behavioral Sciences (SB)
  - Natural Science-Quantitative (SQ)
  - Natural Science-General (SG)
- General Studies Awareness Requirements
  - Cultural Diversity in the US (C)
  - Global Awareness (G)
  - Historical Awareness (H)
- First-Year Composition

Additional Notes: