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 INFORMATION

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

Unit(s) within college/school responsible for program: Industrial Engineering program within the 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: BSE in Engineering Management

Undergraduate Degree Type: Bachelor of Science in Engineering

If Degree Type is Other, provide proposed degree type: N/A

and proposed abbreviation:

Proposed title of major: Engineering Management

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

Requested effective term: Select term and year: Fall 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: Ronald G. Askin

Title: Professor and Director

Phone: 480-965-2567

email: ron.askin@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: Deirdre R. Meldrum, Dean

College Dean signature _____ **Date: 3/19/20**

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: Bachelor of Science in Engineering

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

Proposed title of major: Engineering Management

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1. PURPOSE AND NATURE OF PROGRAM

A. Brief program description (This is a catalog type description. Include the distinctive features of the program that make it unique. Do not include program or admission requirements.)

This program is designed to provide the graduate with the skills for effective management and leadership of engineering-driven enterprises. The curriculum provides a breadth of engineering science and design with depth in one specific area suitable for practice. This knowledge is augmented with an understanding of business practices, organizational behavior and management skills to enable the graduate to succeed in the management of a scientific or engineering enterprise. Topics such as project and resource management, financial engineering, risk management, configuration management, service plans, product liability, entrepreneurship, and operations management are covered in addition to product design and process development. The graduate will be prepared to begin as a project management team member or lead, system specification and customer relationship management specialist, production supervisor, supply logistics engineering or similar role and then progress through successively higher levels of management responsibility.

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)

Prior to graduation, Engineering Management students shall acquire and demonstrate:
Generalized Engineering Learning Outcomes
(a) an ability to apply knowledge of mathematics, science, and engineering;
(b) an ability to design and conduct experiments, as well as to analyze and interpret data;
(c) an ability to design or manage a system, function, or individual process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability in an uncertain environment;
(d) an ability to function on and lead multidisciplinary teams;
(e) an ability to identify, formulate, and solve engineering problems;
(f) an understanding of professional and ethical responsibility;
(g) an ability to communicate effectively with individuals from diverse cultures, educational levels, and organizational/functional responsibilities;
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
(i) a recognition of the need for, and an ability to engage in life-long learning;
(j) a knowledge of contemporary issues;
(k) the ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Specific Engineering Management Additional Learning Outcomes
(1) an in-depth knowledge of at least one industry or technical discipline;
(2) an understanding of the role of engineering management and how the engineering function interacts with other functional areas in manufacturing, research, and service organizations,
(3) an understanding of how the financial analysis process is conducted
(4) an understanding of the impact of humans on organizations and the corresponding management/leadership/entrepreneurial techniques.
(5) an ability to use the techniques, skills, and modern engineering tools necessary for engineering management practice including project management and the ability to extend this knowledge to successfully manage at the systems/program/project level

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)

The intent will be to seek Accreditation Board for Engineering and Technology (ABET) accreditation once the program is established and students begin to graduate (ABET requires at least one student to have graduated before accreditation can be considered). Accordingly, ABET processes will be employed for defining and assessing the program objectives and learning outcomes. Two to three metrics will be defined from the curriculum for each learning outcome. Metrics will be specific exam questions, project components or student presentations that directly relate to the outcome. Each metric will state the minimum acceptable proportion of students that must achieve a minimally acceptable score on the metric as defined by an accompanying rubric. With input from the program stakeholders, the program chair will be responsible for formalizing the metrics. Course instructors will evaluate the metrics each semester and forward the results to the Program Chair. The curriculum committee will evaluate performance on the metrics each Spring and propose recommended curricular changes if necessary.

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.

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) Found in **Appendix B.**

B. Total credit hours required for this program: 120

English Composition	6	credits
Humanities (HU, H)	6	credits
Core Requirements	80	credits
Capstone Requirement	3	credits
Program Electives	25	credits
	120	credits

C. Core/Required Courses.

i. Total required and/or core course credit hours: 80

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

In order to meet the clearly defined learning outcomes for the Engineering Management program, specific clusters of core courses have been defined. These are:

- Math and Science Core:
  - BME 111 — 3 — Engineering Perspectives on Biological Systems
  - CHEM 114 — 4 — General Chemistry for Engineers (SQ)
  - MAT 265 — 3 — Calculus for Engineers I (MA)
  - MAT 266 — 3 — Calculus for Engineers II
  - MAT 267 — 3 — Calculus for Engineers III
  - MAT 242 — 2 — Elementary Linear Algebra
  - PHY 121 — 3 — University Physics I (SQ)
  - PHY 122 — 1 — University Physics I Laboratory (SQ)
- Supporting Core Foundations:
  - ASU 101 — 1 — The ASU Experience
  - CSE 110 — 3 — Principles of Programming with Java (CS)
  - CSE 205 — 3 — Object Oriented Programming & Data Structures
- General Studies
  - COM 263 — 3 — Elements of Intercultural Comm. (SB,G,C)
  - PGS 101 — 3 — Introduction to Psychology (SB)
- Engineering Management Major
  - IEE 100 — 2 — Introduction to Engineering Design
  - IEE 369 — 3 — Work Analysis and Design (L)
  - IEE 380 — 3 — Probability & Statistics for Engr Problem Solving
  - IEE 381 — 3 — Six Sigma Methodology*
  - IEE 475 — 4 — Simulating Stochastic Systems
  - IEE 461 — 3 — Production Control
- Financial Skills
  - ACC 231 — 3 — Uses of Accounting Information I
  - ACC 241 — 3 — Managerial Accounting
  - ECN 211 — 3 — Macro Economics (SB)
  - IEE 300 /FIN 300 — 3 — Economic Analysis for Engineers / Fundamentals of Finance
- Management / Leadership Skills
  - IEE 431 — 3 — Engineering Administration
  - MGT 300 — 3 — Organizational and Management Leadership
- Systems / Program / Project Management
  - IEE 454* — 3 — Risk Management
  - IEE 456* — 3 — Introduction to Systems Engineering
  - IEE 458* — 3 — Project Management

Please note that all of the above listed core classes are currently available except those with a (*)
The classes noted with a (*) will be easily added to the current curriculum.

D. Program Specific Electives.

i. Total required program elective credit hours: 25

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

Three categories of Program Electives have been designed.

- Global Engineering or Sustainability or Entrepreneurship 3
- Math / Science Electives 7
- Industry Focus Area Electives 15

The sustainability electives would be chosen from advisor approved SOS courses and the global engineering electives would be chosen from advisor approved special topics. The entrepreneurship electives include FSE 301 Entrepreneurship for Engineers and other advisor approved topics.

Specific industry-focus based science and specific electives are shown in **Appendix C**. The specific industry-focus areas developed to date are as follows:

- Software Industry / Computer Science foundation area
- Mechanical Products Industry / Mechanical Engineering foundation area
- Environmentally-benign Industry / School of Sustainability foundation area.
- Electronics and Semiconductor Industry / Electrical Engineering foundation
- Communication and Networks Industry / Electrical Engineering foundation
- Power Systems Industry / Electrical Engineering foundation.
- Distribution Industry / Supply Chain Management foundation area

E. Additional Program Requirements, if any.

i. Total required additional program requirements: 3

ii. List and describe any capstone experiences, milestone, and/or additional requirements for this degree program:

The student must complete a capstone experience in their final two semesters. The capstone will consist of an industry-based project. This may be a team project where the Engineering Management major fulfills the role of project manager for a multidisciplinary team project. The project may also be an individual project where the student participates on a team with industrial practitioners as part of an internship. The management related project responsibilities of the student must be approved by the ASU course instructor.

- Capstone Events
  - IEE 490 3 Project in Design/Development (L)

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. List courses & additional requirements for the proposed concentration (s):
Industry Focus Area electives have been designed as program planning templates. These are simply presented as acceptable plans ~ the student will have the flexibility to create their own Industry Focused electives series of courses. Detailed descriptions of these can be found in **Appendix C.**

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.

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

We believe the following new courses must be added to the course catalogue to complete the Engineering Management program Major Map planning:

IEE 381 Six Sigma Methods (3 credits)
An in-depth treatment of the Define, Measure, Analyze, Improve and Control (DMAIC) approach to business and quality improvement. The statistical tools useful at each step in DMAIC are reviewed and their integration into the problem-solving process is illustrated. Tollgates for each step in DMAIC are discussed. An overview of lean principles and design for six sigma is also given. Unique features of applying six sigma and DMAIC in transactional and service organizations are discussed.

IEE 454 Risk Management (3 credits)
Methods and tools for identifying, assessing, mitigating and controlling risk in business and engineering design activities. Decision tools include cost-benefit analysis, decision trees, value of information, Bayesian statistical decision making, fault trees, and failure modes and effects analysis (FMEA).

IEE 456 Introduction to Systems Engineering
This course addresses all of the concepts needed for a successful systems engineering process. Topics include successfully bringing large scale systems to completion on schedule and on budget, standards driving Systems Engineering such as ISO 15288 and ISO 12207 for software, EIA 632 and IEEE 1220, the Systems Engineering professional association certification topics from INCOSE, the modern new product development process, systems engineering modeling techniques, cost estimating techniques, and finally an introduction to risk and variability.

IEE 458 Project Management
Life-cycle processes for selecting and managing large scale projects to ensure successful completion. Topics include project phases, defining milestones, work breakdown structure, group decision making and teamwork, organizational structure, human resource management, technological and economic feasibility, configuration management, budget control, and resource allocation and scheduling. Use of modern tools for planning and controlling project performance.

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

Students who want a combination of Engineering and Business with aspirations of moving from technical to managerial positions as their careers mature will be attracted to this program. This will likely include some Engineering majors that will choose to double major.

Three target markets result from this analysis:

- We have identified a large number of on-campus engineering students seeking more management understanding that will pursue the EM as their major.
- We have also had many on-campus engineering students requesting to supplement their current engineering discipline by adding more management understanding as a Concurrent Degree.
- Industry support for the program and a significant proportion of the EM student population is anticipated to be off-campus working professionals, many of whom hold an Associate Degree and seek upward career mobility by earning an engineering degree. This audience will create the need for offering the Engineering Management suite of courses in non-traditional modes.

Delivery mode assumptions we are making are as follows:

- We anticipate that the Math, Science, English and General Studies courses can all be taken in the university-wide system ~ either at night or on-line.
- We anticipate that the Engineering Management Major, the Financial, the Leadership, the Systems, and all of the Industry-focus courses will be offered live in the classroom as well as on-line in an asynchronous manner. As the program grows a second section of some courses may be offered in the "off" semester and these will probably be only offered in an on-line mode.

6. **MPACT 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.

With the projected enrollment in the Engineering Management program, impact on other programs is foreseen, specifically the disciplines of Electrical Engineering, Mechanical Engineering, Computer Science, the School of Business, Supply Chain Management and the School of Sustainability may have more students in their undergraduate programs. The impact will be negligible until year 2 at the earliest. Letters of support from the following departments can be found in **Appendix E**. These include letters from:

- Dr. James Collofello and Dr. Ron Askin for Computer Science
- Dr. Stephen Phillips and Dr. Ravi Gorur for Electrical Engineering
- Dr. Valana Wells for Mechanical Engineering
- Dr. Kay Faris, W.P. Carey School of Business
- Dr. William Verdini, Supply Chain Management, W.P. Carey School of Business

Full articulation of the Engineering Management program on the Tempe campus with existing and new programs being designed on the Polytechnic campus are also being worked in detail. We anticipate that a letter supporting this articulation shall be forthcoming from:

- Dr. Chell Roberts, Engineering Program Director, ASU Polytechnic

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	50	100	150	200

An Industry Focus Group meeting was held at ASU on February 12, 2010. Results and enthusiasm for the Engineering Management program are shown in Appendix D.

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.

ABET (Accreditation Board for Engineering and Technology). Accreditation requirements are available at http://www.abet.org/forms.shtml#For_Engineering_Programs_Only. In addition to the requirements for all engineering programs, Specific Criteria for Engineering Management are

1. Curriculum

The program must demonstrate that graduates have: an understanding of the engineering relationships between the management tasks of planning, organization, leadership, control, and the human element in production, research, and service organizations; an understanding of and dealing with the stochastic nature of management systems. They must also be capable of demonstrating the integration of management systems into a series of different technological environments. The Engineering Management program design meets all ABET requirements and we anticipate pursuing a full ABET accreditation.

2. Faculty

The major professional competence of the faculty must be in engineering, and the faculty should be experienced in the management of engineering and/or technical activities.

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.

Industrial Engineering faculty involved in this program include the following. Many teach in the undergraduate program and will have involvement in the Engineering Management program through the courses they already teach.

Faculty	Rank	Degree	Area	Involvement
Mary Anderson-Rowland	Associate Prof	Ph.D.	Applied Statistics	max 1 course
Ron Askin	Professor	Ph.D.	Logistics, OR	max 1 course
Linda Chattin	Sr. Lecturer	Ph.D.	OR	2 courses
Al Filardo	Prof. in Practice	M.S.	Leadership	max 1 course
John Fowler	Professor	Ph.D.	Scheduling / Simul	2 courses
Esma Gel	Associate Prof	Ph.D.	Stoch. Modeling	max 1 course
Jing Li	Ass't. Prof	Ph.D.	Industrial Statistics	max 1 course
Pitu Mirchandani	Professor	Ph.D.	Transport / OR	max 1 course
Douglas Montgomery	Professor	Ph.D.	Industrial Statistics	max 1 course
Rong Pan	Ass't Prof.	Ph.D.	Quality and Reliab.	max 1 course
George Runger	Professor	Ph.D.	Data Mining	max 1 course
Dan Shunk	Professor	Ph.D.	Engineering Mgmt.	2 – 3 courses
Rene Villalobos	Associate Prof.	Ph.D.	Logistics / OR	max 1 course
Teresa Wu	Associate Prof.	Ph.D.	Information Systems	max 1 course
Nong Ye	Professor	Ph.D.	Information Assurance	max 1 course
Muhong Zhang	Ass't Prof.	Ph.D.	Optimization	max 1 course

b. **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.

Program Administrator. A program administrator is needed with prior industrial experience in engineering management and academic credentials. This would be a senior faculty position but could potentially be a non tenure-track position. If the program is approved, a search will begin in late Summer 2010.

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 program will be administered by the School of Computing, Informatics, and Decision Systems Engineering (SCIDSE). The Faculty of Industrial Engineering will assume responsibility for the curriculum. Advising will be performed by the academic success specialists within SCIDSE.

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.

In addition to the new faculty listed in 9b, new resources required for the program include one academic success specialist and associated office space once the program reaches its expected size in three to five years.

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

These resources will be hired by the Ira A. Fulton Schools of Engineering and the funding will come from increase student credit hour reimbursement and program fees.

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): CIDSE Student Advising Center, Brickyard, Suite 208 (BYENG 208)

Campus Telephone Number: 480-965-3199

Program email address: cidse.advising@asu.edu

Mail Code: 8809

Program website address: http://engineering.asu.edu/cidse (under development)

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.

The Engineering Management graduate will be prepared to begin as a project management team member or lead, system specification and customer relationship management specialist, technical marketing member or lead, production supervisor, supply logistics engineer or similar role and then progress through successively higher levels of management responsibility.

The graduate will leave with a deep understanding of at least one industry sector based upon the focus area they select. Their role in each is projected to be as follows:

Software Industry / Computer Science foundation area
Here the EM graduate would be responsible for the success of teams consisting of members at multiple locations across the globe and is responsible for the full life cycle of support for multiple applications based upon multiple technologies. This includes working with the business side to create the requirements through supporting the product in the field. The EM will manage a team of talented professionals and have the ability to: excite and motivate the team; contribute to the overall performance of the company through solid software engineer techniques and strong cross-functional collaboration; and set the highest standards of integrity and professionalism. The EM will have the ability to solve business needs efficiently, and want to be part of an organization committed to continuous improvement.

Mechanical Products Industry / Mechanical Engineering foundation area
Here the EM graduate would demonstrate a detailed and extensive technical expertise and application of engineering principles, concepts, theory, and practice as well as comprehensive project management and leadership skills including organizing, planning, scheduling, and coordinating workloads to meet established deadlines or milestones for product design, development, manufacturing operations and product portfolio management. The EM will possess the ability to resolve complex management and technical problems; serve as spokesperson on engineering projects; and be a technical expert in one or more areas of engineering. Strong communication, leadership, presentation, and interpersonal skills are required to enable an effective interface with other departments, all levels of management, professional and support staff, customers, potential customers, and government representatives.

Distribution Industry / Supply Chain Management foundation area
Here the EM graduate would be responsible for management and supervision of personnel working supply chain/ logistics programs with responsibilities including: Program planning, execution, personnel supervision, and proposal development. The EM will hold technical management and leadership skills as well as exceptional customer interface skills, foster relationships with customer program leaders for current programs, ensure program execution excellence through accountability of financial, technical, and schedule performance, identify areas of process improvement.

Environmentally-benign Industry / School of Sustainability foundation area
Here the Sustainable EM graduate would must be a licensed Professional Engineer and must be LEED Certified. This position candidate needs to have thorough working knowledge of the LEED point system, and must be able to administer the entire LEED process including all documentation of documented points and submitting to USGBC. Must have a solid working knowledge of the Sustainable Protocol and must be well versed on Energy Star. Need to have experience in developing Energy Life Cycle Cost Analysis (ELCCA). In additional to LEED, they would be managing all ELCCAs with the assistance of a engineering production person. The EM will have good communication skills, thorough organizational skills, and must be highly personable as they are interfacing with key stakeholders at the architect and owner level. They need to be able to self driven and assertive. Additionally, they will manage the sustainable documentation, as well as coordinating write ups with the marketing department. This person will review the trend logs on performance after the facility is in operation and build a track record over a number of years.

Electronics and Semiconductor Industry / Electrical Engineering foundation
Here the EM graduate would manager staff in development, design and implementation of new microelectronic processes and procedures in preparation for assembly production. Serve as a project manager, addressing gaps and driving positive results. Work with manufacturing leadership in implementing new assembly and technology procedures. Lead continuous improvement, new assembly transition, cost reduction and process control projects. Lead factory specific capacity plans and capital equipment justifications. Manage customer ECO process and test yields, design and procurement of customer specific tooling, DFT development through site test engineering and manage component engineering support with other functional groups. Perform periodic performance reviews on staff to assure adequate staffing and provide appropriate resources to support expected job performance and quality standards. Support customer specific RFQ requests and the translation of customer documentation into Plexus standard format, inclusive of Assembly Build Instructions. Support User Group implementations, failure analysis, process qualification/validation work on equipment and compliance of data collection systems within the factory. Support the identification and facilitation of technical training activities Interface with customers as needed, to ensure customer needs are understood and met.

Communication and Networks Industry / Electrical Engineering foundation
Here the EM graduate would perform assignments involving the tactical planning, network technology design, development and/or implementation of comprehensive engineering plans consistent with department/entity strategy and extensive analysis of the central office facilities, circuit and packet switches. Develops and directs the implementation of tactical plans for access, backbone, and interoffice networks; determines cost effective network modifications, applies network and traffic engineering principles and uses database analysis systems to develop network architecture plans; authorizes the allocation of capital and expense; performs network architecture design, feasibility, and cost studies; and, performs needs and/or cost assessments using finance principles to develop and justify the engineering plans. Accurately plans, forecasts, and directs the provisioning of the networks to meet present, future, and technological demands at appropriate service levels in the most economical manner. Prepares the detailed plan to enable the preparation of the engineering job orders which conform to long-range plans that to meet the growth, modernization and replacement demands of the central office facilities and network. Conducts job costing activities.

Power Systems Industry / Electrical Engineering foundation
Here the EM graduate would design, develop, evaluate, and test electrical power equipment and the electric grid. The EM will provide technical leadership and systems integration and management for large projects and will be proficient in systems engineering and systems of systems methodologies, practices and processes. The EM will have ability to execute projects and be highly effective in customer relationship development and engagements. Demonstrable interest in emerging information technologies which support the Smart Grid and Sustainable communities. Support to Smart Grid interoperability and standards development and relationships with DOE National Labs and organizations (e.g., NIST, NRL, NREL, INL, EPRI, GWAC).

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.)

Freshman Admission Requirements: must meet the following standards

1. Minimum of 1100 SAT combined Math and Verbal or minimum 23 ACT combined score; or 3.00 minimum ABOR GPA; or class ranking in the top 25 percent of high school class
2. Admission may be granted with one deficiency in no more than two competency areas. Deficiencies in both math and laboratory science are not acceptable. https://students.asu.edu/admission/competencies

Transfer students with fewer than 24 transferable college credit hours: must meet the following standards

1. Satisfy the freshman admission requirements
2. Minimum transfer GPA of 2.75 for less than 24 transfer hours

Transfer students with 24 or more transferable college credit hours: must meet the following standards

1. Minimum transfer GPA of 2.75 for 24 or more transfer hours

5. **Keywords** List all keywords used to search for this program. Keywords should be specific to the proposed program.

Engineering Management, Technical Marketing, Production Supervisor, Supply Logistics Engineer

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
- ☒ Environmental Issues & Physical Sci
- ☐ Engineering & Technology
- ☐ Interdisciplinary Studies
- ☐ Languages & Cultures
- ☐ Law & Justice
- ☐ Social Science, Policies & Issues

Updated [illegible]

APPENDIX B

MAJOR MAP for ENGINEERING MANAGEMENT PROGRAM

Course Subject and Title *(courses in bold/shading are critical)*	Hrs.	Upper Division	Completed ATP: ☐ Yes ☐ No Transfer Course/Grade	Minimum Grade if Required	Completed AGEC: ☐ Yes ☐ No 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 Major Course: A minimum cumulative GPA of 2.0 required in major courses.
# IEE 100: Intro to Engineering Design	2	☐		Grade of C	
BME 111: Engineering Perspectives on Biological Systems	3	☐			
MAT 265: Calculus for Engineers I	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	
PGS 101: Introduction to Psychology (SB)	3	☐			
TERM TWO: 16-30 CREDIT HOURS					
CSE 110: Principles of Programming with Java (or CSE 100: Principles of Programming with C++) (CS)	3	☐		Grade of C	#Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
MAT 266: Calculus for Engineers II	3	☐		Grade of C	
PHY 121/122: University Physics I/ Laboratory I (SQ)	3/1	☐		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	
# ECN 211:Macroeconomics (SB)	3	☐			
TERM THREE: 31-45 CREDIT HOURS					
# ACC 231: Uses of Accounting Information I	3	☐		Grade of C	• **Complete all 4 critical courses: [ACC 231; CSE 100 or 100; MAT 265, 266]** • Complete First-Year Composition requirement: ENG 101 & 102 or ENG 107 & 108 or ENG 105 **CHM 113 is a prerequisite and does not apply toward degree credit. #Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
COM 263: Elements of Intercultural Communication (SB,G,C)	3	☐			
Global Engineering or Sustainability or Entrepreneurship Elective	3	☐			
MAT 267: Calculus for Engineers III	3	☐		Grade of C	
CHM 114: General Chemistry for Engineers (SQ) OR CHM 116: General Chemistry II (SQ)**	4	☐			
TERM FOUR: 46-60 CREDIT HOURS					
Industry Focus Area Elective	3	☐		Grade of C	#Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
Math or Science Elective	4	☐			
MAT 242: Elementary Linear Algebra	2	☐		Grade of C	
# CSE 205:OJbect-Oriented Programming and Data Structures	3	☐		Grade of C	
# ACC 241: Managerial Accounting	3	☐		Grade of C	
TERM FIVE: 61-75 CREDIT HOURS					
#IEE 300 Economic Analysis for Engineers or FIN 300 Fundamentals of Finance	3	☒			#Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
Math or Science Elective	3	☒			
# IEE 380: Probability and Statistics for Engineering Problem Solving	3	☒			
Industry Focus Area Elective	3	☐			
# IEE 475 Simulating Stochastic Systems	4	☒			
TERM SIX: 76-90 CREDIT HOURS					
#IEE 458: Project Management	3	☒			#Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
# IEE 369: Work Analysis and Design (L)	3	☒			
# IEE 381: Six Sigma Methodology	3	☒			
Industry Focus Area Elective	3	☐			
# IEE 431: Engineering Administration	3	☒			
TERM SEVEN: 91-105 CREDIT HOURS					
# IEE 461 Production Control	3	☒			#Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
Industry Focus Area Elective	3	☒			
# MGT 300: Organization and Management Leadership	3	☒			
#IEE 456 Intro to Systems Engineering	3	☒			
Humanities, Fine Arts & Design (HU) AND Historical Awareness (H)	3	☐			
TERM EIGHT: 106-120 CREDIT HOURS					

# IEE 490: Project in Design/Development (L)	3	☒			#Designates Major Course: A minimum cumulative GPA of 2.0 required in major courses.
Industry Focus Area Elective	3	☒			
#IEE 454: Risk Management	3	☒			
Humanities, Fine Arts & Design (HU)	3	☒			

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:
At least six units of Industry Focus Area Elective courses must be UD.

APPENDIX C
INDUSTRY FOCUS AREA DETAILS

The unique aspect of the Engineering Management program is how we intend to use the Math / Science Electives and the Industry-focus Electives to allow the EM student to develop a deep, industry-focused understanding of a particular industry sector and develop the engineering foundation to successfully operate in said industry. What follows are sample Industry Focus Area templates that we have created to demonstrate the rigor that is needed to be successful. Students are given the option of designing their own Industry Focus Areas.

To date, we have developed the Industry-focus templates in the following areas.

- Software Industry / Computer Science foundation area
- Mechanical Products Industry / Mechanical Engineering foundation area
- Distribution Industry / Supply Chain Management foundation area
- Environmentally-benign Industry / School of Sustainability foundation area.
- Electronics and Semiconductor Industry / Electrical Engineering foundation
- Communication and Networks Industry / Electrical Engineering foundation
- Power Systems Industry / Electrical Engineering foundation.

Industry Focus Area Name	**Total credit hours**	**Industry-focused Electives** (include course name and prefix) (Nominally 15 hours)	**Total Core credit hours**	**Math / Science / Global / Sustain / Entrepreneurship** (include course name and prefix) (Nominally 10 hours)	**Total Elective credit hours**	**Additional Requirements** (i.e. milestones, capstones)
Software Industry	25	• CSE 220 (3) • CSE 360 (3) • CSE 4** (3) • IEE 305 (3) • IEE 405 (3)	15	• MAT 243 (3) • MAT 275 (3) • G/S/E Elect. (3) • General Elect (1)	10	
Mechanical Industry	25	• MAE 212 (4) • MAE 240 (3) • MAE 341 (3) • MAE 351 (3) • MSE 250 (3)	16	• MAE 384 (3) • MAT 275 (3) • G/S/E Elective (3)	9	
Environmentally-benign Industry	25	• SOS 110 (3) • SOS 111 (3) • SOS 320 (3) • SOS 321 (3) • SOS 322 (3)	15	• CHM 231/235 or BIO 181 (4) • SOS 324 (3) • G/S/E Elect (3)	10	
Electronics and Semiconductor Industry	26	• EEE 202 (4) • EEE 352 (4) • EEE 435 (3) • EEE 436 (3)	14	• MAT 362 (3) • PHY 131 (3) • PHY 241 (3) • G/S/E Elect (3)	12	
Communication and Networks Industry	26	• EEE 203 (3) • EEE 350 (3) • EEE 455 (4) • EEE 459 (3) • EEE 4xx Elec (3)	16	• EEE 202 (4) • PHY 131 (3) • G/S/E Elect (3)	10	
Power Systems Industry	25	• EEE 202 (4) • EEE 203 (3) • EEE 3xx/4xx (3) • EEE 463 (3) • MAE 240 (3)	16	• MAT 275 (3) • PHY 131 (3) • G/S/E Elect (3)	9	
Distribution Industry	25	• SCM 300 ((3) • SCM 345 (3) • SCM 355 (3) • SCM 432 (3) • SCM 455 (3)	15	• IEE 376 (3) • IEE 470 (3) • G/S/E Elect (3) • General Elect (1)	10	

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

Specific course titles found in the above table are as follows:

Software Industry
- CSE 220 – Programming for Computer Engineering
- CSE 360 – Introduction to Software Engineering
- CSE 4xx – Computer Science and Engineering 400-level course
- IEE 305 – Information Systems Engineering
- IEE 405 – Developing Information Systems Applications
- MAT 243 – Discrete Mathematical Structures
- MAT 275 – Modern Differential Equations
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective
- General Elective

Mechanical Industry
- MAE 212 – Engineering Mechanics
- MAE 240 – Thermofluids I
- MAE 341 – Mechanism Analysis and Design
- MAE 351 – Manufacturing Processes
- MSE 250 - Introduction to Structures and Properties of Materials
- MAE 384 – Numerical Methods for Engineers
- MAT 275 – Modern Differential Equations
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective

Environmentally-benign Industry
- SOS 110 – Sustainable World
- SOS 111 – Sustainable Cities
- SOS 320 – Society and Sustainability
- SOS 321 – Policy and Governance in Sustainable Systems
- SOS 322 – International Development and Sustainability
- CHM 231/235 – Elementary Organic Chemistry or BIO 181 – General Biology I
- SOS 324 – Sustainable Energy, Materials and Technology
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective

Electronics and Semiconductor Industry
- EEE 202 - Circuits I
- EEE 352 - Properties of Electronic Materials
- EEE 435 - Fundamentals of CMOS and MEMS
- EEE 436 - Fundamentals of Solid-State Devices
- MAT 362 - Advanced Mathematics for Engineers and Scientists
- PHY 131 - University Physics II
- PHY 241 - University Physics III
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective

Communications and Networks Industry
- EEE 203 - Signals and Systems I
- EEE 350 - Random Signal Analysis
- EEE 455 - Communication Systems
- EEE 459 - Communication Networks
- EEE 4xx - Electrical Engineering 400-level elective
- EEE 202 - Circuits I
- PHY 131 - University Physics II
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective

Power Systems Industry

- EEE 202 - Circuits I
- EEE 203 - Signals and Systems I
- EEE 3xx/EEE 4xx – Electrical Engineering 300-leve or 400-level elective
- EEE 463 - Electrical Power Plants
- MAE 240 - Thermofluids I
- MAT 275 - Modern Differential Equations
- PHY 131 - University Physics II
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective

Distribution Industry

- SCM 300 (3) Global Supply Operations
- SCM 345 (3) Logistics Management
- SCM 355 (3) Supply Management
- SCM 432 (3) Planning and Control Systems for Supply Chain Management
- SCM 455 (3) Research and Negotiation
- IEE 376 (3) OR Deterministic Techniques/Applications
- IEE 470 (3) Stochastic Operations Research
- G/S/E Elective – Global Engineering or Sustainability or Entrepreneurship Elective
- General Elective

APPENDIX D
INDUSTRY FOCUS GROUP WORKSHOP RESULTS IN SUPPORT OF THE EM PROGRAM

The School of Computing, Informatics and Decision Systems Engineering will regularly interview employers to make sure that the program objectives are meeting industry standards through both surveys and focus groups. This can be done at meetings of our industry advisory council as well as through online methods. We will also interview employers after the first group of students complete their internships in their senior year and then again after graduation and placement.

As part of the development process, an industry focus group was organized on February 12, 2010 at ASU. The objective of the meeting was to present the Engineering Management program objectives and proposed curriculum to senior leaders of engineering and technology organizations. This group included senior engineering leadership from:

- Raytheon,
- Boeing,
- On Semiconductor,
- Intel Corporation,
- SRP, and
- Honeywell.

The industry participants provided input on the proposed curriculum to recommend changes and modifications to better prepare graduates for employment upon graduation. This included:

- Integration of more risk management into the curriculum,
- Integration of project management leading to certification,
- Stressing technical communications capabilities, and
- Structuring the elective tracks along traditional engineering disciplines.

In addition, the group validated the need to offer a degree completion option "online" to advance experienced technicians with associate degrees allowing them to position themselves for promotion with the completion of the BSE in Engineering Management.

APPENDIX E
LETTERS OF SUPPORT

The following letters of support from the following departments can be found:

- Dr. James Collofello and Dr. Ron Askin for Computer Science
- Dr. Stephen Phillips and Dr. Ravi Gorur for Electrical Engineering
- Dr. Valana Wells for Mechanical Engineering

The W.P. Carey School of Business has launched a formal review of the Engineering Management Program because of the core and Industry Focus Area implications. They will be holding their next Undergraduate Committee meeting on March 26, 2010. At that time we anticipate letters from:

- Dr. Kay Faris, W.P. Carey School of Business
- Dr. William Verdini, Supply Chain Management, W.P. Carey School of Business

Full articulation of the Engineering Management program on the Tempe campus with existing / new programs being designed on the Polytechnic campus are also being worked in detail. We anticipate that a letter supporting this articulation shall be forthcoming from:

- Dr. Chell Roberts, Engineering Program Director, ASU Polytechnic

Letter from Dr. Collofello:

For the software side, I would recommend:

CSE 110
CSE 205
CSE 360 (variation of our current offering)
CSE 4XX (software project, process and quality management) -- new course

James S. Collofello
Associate Dean of Academic and Student Affairs
Professor of Computer Science and Engineering
Ira A. Fulton Schools of Engineering
Arizona State University

Letter from Dr. Askin

March 3, 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: BSE in Engineering Management

The School of Computing, Informatics, and Decision Systems Engineering fully supports the proposal to create a B.S.E. in Engineering Management degree. The proposed program meets an important industry need. In addition, the program provides a new opportunity for both traditional students with strong math and science skills that are interested in the management of technical functions and non-traditional students with successful experience in technical positions that are seeking to advance their career opportunities. Most of the program can be offered by leveraging the courses already taught within our School along with those offered by the other programs that have agreed to participate. However, in order to ensure the success and appropriateness of the program we would want to add an individual to our staff with significant engineering management experience to help oversee the curriculum and student recruitment. This person would need to also have appropriate academic credentials, but would not necessarily need to be a tenure-track faculty member.

cc. J. Fowler, Industrial Engineering Program Chair

Letter from Dr. Phillips

Ron,

The EE program can deliver the "EE-track" courses for this program unless the enrollments become large in which case we would need to hire adjuncts or faculty associates to cover additional sections (we generally prefer to split into multiple sections when enrollments exceed 60). Ravi and I have concerns that a few of the tracks that you include may not be appropriate for these students (e.g. the track leading to EE436 is very aggressive in our opinion) so you may want to consult Ravi or others who are familiar with the concentration areas to choose the specific courses.

Summary:

The EE program has no objections to the proposed program and will participate as appropriate. We suggest engaging EE program faculty on a few of the details of the program.

Steve

From: Ronald Askin
Sent: Thursday, March 04, 2010 9:30 PM
To: Ravi Gorur
Cc: Stephen Phillips; Dan Shunk
Subject: Engr Mgmt

I had a brief talk with Steve about the BSE Engineering Management proposal and my impression is that you all are ok with the proposal and the EE-based career focus tracks provided course prerequisites are followed. Can you please send me a brief statement to this effect? We need to include this as part of the impact and support statements when we take the proposal to the Engineering Curriculum committee next week. We are still tweaking the proposal and may end up reducing the number of electives in the career focus tracks by one course (effectively from six to five), but we will certainly adhere to the prerequisite structures.

Thanks and let me know if you have any questions.
Ron

****
Ronald G. Askin, Professor and Director
School of Computing, Informatics, and Decision Systems Engineering
Arizona State University
Tempe, AZ 85287-8809
e-mail: ron.askin@asu.edu
Phone: 480-965-2567
http://engineering.asu.edu
****

Letter from Dr. Wells

No problem with them taking the classes as long as there is space, which we cannot always guarantee.

My initial reaction is that you have missed the entire thermal side of Mechanical Engineering, but maybe that is on purpose?

I also doubt that ABET would allow EEE 202 as a basic science course. They are pretty particular when it comes to the distinction.

Valana L. Wells, Ph.D.
Program Chair, Aerospace Engineering and Mechanical Engineering
Arizona State University
480 965 4777

From: Ronald Askin
Sent: Wednesday, February 24, 2010 18:38
To: Kyle Squires; Valana Wells
Cc: Jeffrey Goss; John Fowler; Dan Shunk; G Gibson
Subject: Engr Mgmt

We are putting together a proposal for a BSE in Engineering Management. The current plan calls for each student to select and industry/discipline track which will include appropriate specification of a science elective, 2 basic engineering science electives, a math elective, and four track electives. The proposal will list a set of initial tracks that students can take. How would you feel about us including the following track in "Mechanical"

Engr. Science Electives
MAE 212 Engineering Mechanics (4)
MSE 250 Structure and Properties of Materials (3)

Math Elective
MAE 384 Numerical Methods for Engineers (3)

Track Electives
MAE 214 Computer Aided Engineering I (1)
MAE 318 Sensors and Controls (5)
MAE 351 Manufacturing Processes (3)
MAE 341 Mechanical Analysis and Design (3)

Science Elective
EEE 202 Circuits (4) (a little bit of a stretch but I think we can sell the overall program to ABET)

I can send you the entire major map if you would like. Bottom line, we need to know whether you would be ok with letting students in the BSE Engr. Mgmt program take the MAE courses listed above. If you're about to ask how many students we expect, the answer is I don't know but I wouldn't think it would be too large. I believe we will have at least as many of your regular majors that decide to double major and want to count these course for both programs.
Ron

****
Ronald G. Askin, Professor and Director

Thank you for the supportive comments. We will work with you to limit the number of students pursuing the Sustainability option, or assist in finding additional resources, if enrollment becomes a problem.
Ron

Ronald G. Askin, Professor and Director
School of Computing, Informatics, and Decision Systems Engineering
Arizona State University
Ron.Askin@asu.edu
480-965-2567
http://engineering.asu.edu/cidse

From: Charles Redman
Sent: Thursday, April 15, 2010 1:58 PM
To: Ronald Askin; Ann Zell
Cc: Dan Shunk; Rob Melnick; Katherine Spielmann
Subject: Proposed BSE in Engineering Management

Ron and Ann:
I have reviewed the proposal Dan sent me on the BSE in Engineering management and it appears to be a fine program. I was pleased to see that you consider sustainability one of the foci within the program. We are pleased to have some of your students enrolled in the 100 and 300 level classes of ours that you identified. The only caveat I would share with you is that we are under tremendous pressure from large student enrollments right now and we would have to work together to find a way ensure the availability of seats for them in these classes.

Chuck

Charles L. Redman
Director, School of Sustainability
Virginia M. Ullman Professor, Natural History and the Environment
PO Box 875502 | Tempe, AZ 85287-5502 | Phone: (480) 965-8654
http://schoolofsustainability.asu.edu
http://sustainability.asu.edu

ASU ARIZONA STATE UNIVERSITY

April 21, 2010

To: Glenn Irvin, Sr. Associate V. P. for Academic Affairs

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

RE: BSE in Engineering Management degree proposal

This memo is to briefly address the issues raised by the College of Technology and Innovation (CT&I) in their impact statement of April 16th regarding the Ira A. Fulton Schools of Engineering's degree proposal for a BSE in Engineering Management. These issues relate to potential overlap with CT&I's B.S. in Operations Management Technology and B.S.E. in Engineering with a secondary focus in Management. These are addressed in sections a. and b. respectively.

a. The Fulton Schools' proposal is a broad-based Engineering program. It takes advantage of the broad expertise in the Fulton Schools and other units in the University through the incorporation of seven focus area options. Based on individual student interest, the proposed program includes 25 units of industry-focus electives that provide depth of understanding in a particular industry. The proximity to and cooperation of these other units, particularly the Carey School of Business and the School of Sustainability are important components of the proposed degree. This is significantly different than the programs offered by the College of Technology and Innovation. Although the two programs address some similar topics, they do so from different perspectives and have different areas of emphasis. While there may be some future strengthening of the math/science core of the B.S. Operations Management Technology degree as implied by Professor Roberts, there is a fundamental difference between the depth of scientific and mathematical underpinnings provided in technology and engineering degrees. This distinction is reinforced by the separate accreditation commissions within ABET (Accreditation Board for Engineering and Technology). Moreover, Professor Roberts indicates that the B.S. in Operations Management Technology degree will focus on entrepreneurship and innovation management rather than the globalization, sustainability and industry focus of the proposed Fulton program. There should not be significant duplication between the programs, rather they are supportive of one another and provide ASU students with a range of options based on their backgrounds and interests.

b. The B.S.E. in Engineering with a secondary focus in Management in the College of Technology and Innovation should not be adversely affected by the proposed degree. Management is just one of multiple possible secondary foci that are possible within the Technology and Innovation program and it is not a fully-articulated program of courses selected to cover a comprehensive management experience. While a student could use the 12 unit secondary focus to acquire some management acumen, the program lacks the full range of business management and engineering management coursework present in the B.S.E. in Engineering Management proposal. In addition, it is my understanding that an external

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consultant examined the proposal along with the existing programs in the College of Technology and Innovation and Ira A. Fulton Schools of Engineering and recommended that both programs move forward in the directions they are proposing. As the CT&I programs evolve, we in Fulton are most willing to maintain a dialogue with our Polytechnic campus colleagues to ensure that program differentiation is clear and maintained.

We appreciate your consideration of the B.S.E in Engineering Management proposal. Please add this addendum to that proposal and let me know if you require any additional information.

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Undergraduate

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Website: wpcarey.asu.edu

March 31, 2010

TO: Ronald Askin

FROM: Kay A. Faris
Associate Dean

SUBJECT: Proposed Program: BSE in Engineering Management

Thank you for offering the W. P. Carey School an opportunity to review and comment on the proposed BSE in Engineering Management. Based on our review of the materials, we provide the following comments:

- The use of the term "Management" in the title has caused some concern because of the potential appearance that this is a business program. These concerns persist separate from accreditation issues. As proposed this program will not be classified as a business program by the W. P. Carey School or our accrediting agency (AACSB) because no explicit identification of the program as a business program is or will be made by the Engineering program nor will the program require in excess of 30 business hours.. We will request that the BSE in Business Engineering be excluded from review by AACSB during our business accreditation visits.
- AACSB considers any program with 30 or more hours of business to be a business program irrespective of program branding and would require that program to undergo review during an accreditation visit. As this degree is currently proposed, it will not require 30 hours of business, and we caution against any increase in the future to or beyond that 30 hour level.. **However, because the term Management is in the title, we do believe business should play a role in the program and the course work currently proposed (minimum 12 hours in business) should continue to be required as the program proposal moves forward and in the program in future years.** We have discussed the program with each department that has a course proposed in the program and all believe they can handle the additional number of students.
- For a number of years, the W. P. Carey School has wanted a collaborative program with Engineering. We would like to see this program move into a fully joint program between Business and Engineering. We are recommending approval of the BSE in Engineering Management in the hopes that this will provide a first step in this collaborative effort.

ARIZONA STATE UNIVERSITY

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Undergraduate

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After careful consideration of the points above, the W. P. Carey School expressed no objection to the BSE in Engineering Management and hopes that this is a first step in greater collaboration.

ARIZONA STATE UNIVERSITY

April 16, 2010

To: Ron Askins,
Director of the School of Computing, Informatics, and Decision Systems Engineering

From: Chell Roberts,
Chair of Engineering, Chair of Technology Management

RE: Impact Statement for the Proposed Degree of BSE in Engineering Management

The College of Technology and Innovation is the home of the Technology Management department and the main focus of this department is to establish and administer curricula related to technology management. The College is also home to the Engineering department, which offers a degree program with secondary focus areas in a broad range of topics. The proposed degree program in Engineering Management clearly overlaps with undergraduate curricula administered by these departments.

In particular, the College of Technology and Innovation currently offers two bachelor's degrees that would be directly impacted by the offering of a B.S. in Engineering Management through the Fulton Schools of Engineering:

a. The B.S. Operations Management Technology (which is less math intensive than the proposed degree, but covers many of the same topics in the management core and in the technical electives).

b. The B.S.E. in Engineering with a secondary focus in Management (which has essentially the same math/science core as the proposed degree, and opportunity to cover the management core, but less opportunity for coverage of additional management electives).

The B.S. in Operations Management Technology is currently under revision to provide a better alignment with the vision of the College of Technology and Innovation and better fit our pedagogical structure. As such we are strengthening the math/science core of the degree, strengthening the management core, and extending the upper division courses to be more in line with technological entrepreneurship and innovation management. Some of these changes will increase the overlap with the proposed degree.

It is not likely that the mode of delivery of the proposed B.S. Engineering Management degree will be similar to programs offered in the College of Technology and Innovation. However, it may be challenging to differentiate the programs on the basis of topical coverage or anticipated career outcome. For that reason, the offering of the proposed program would, at least initially, impact recruitment of students to our programs in the College of Technology and Innovation and will likely impact our enrollments.

COLLEGE OF TECHNOLOGY AND INNOVATION
Engineering, Chell Roberts, Chair

7231 E. Sonoran Arroyo Mall, Rm 230, Mesa, AZ 85212
(480) 727-2727

rom: Ronald Askin

Sent: Tuesday, April 27, 2010 11:04 AM

To: Glenn Irvin; Julie Ramsden

Cc: Ann Zell; James Collofello; Dan Shunk; Deirdre Meldrum; John Fowler

Subject:FW: COM 263

Glenn,

Please see the note below from Angela Trethewey. The Hugh Downs School of Human Communication is willing to accommodate our BSE Engineering Management students in COM 263.

Ron

****

Ronald G. Askin, Professor and Director

School of Computing, Informatics, and Decision Systems Engineering

Arizona State University

Tempe, AZ 85287-8809

e-mail: ron.askin@asu.edu

Phone: 480-965-2567

http://engineering.asu.edu

****

From: Angela Trethewey

Sent: Tuesday, April 27, 2010 10:49 AM

To: Ronald Askin

Subject: Re: COM 263

Ron,

We would be happy to accommodate your students.

Thanks!

Angela

--

Dr. Angela Trethewey

Director

The Hugh Downs School of Human Communication

College of Liberal Arts and Sciences

Arizona State University

Box 1205

Tempe, AZ 85287-1205

480.965.5095 (o)

480.965.4291 (f)

http://www.asu.edu/clas/communication/people/faculty/trethewey/

On 4/23/10 11:33 AM, "Ronald Askin" <Ron.Askin@asu.edu> wrote:

We (Ira A. Fulton Schools of Engineering) are proposing to create a B.S.E. in Engineering Management degree. Part of the motivation for this degree is to address the need for engineers that can communicate with diverse groups to manage international projects and ensure customer needs are met. It appears to us that

COM 263: Elements of Intercultural Communication

would be a good course for the students and we would like to include it in the major map for the degree program. Once the program is fully operational in a few years I would expect the program would graduate about 30 students per year. Would you be able to accommodate this number of students in COM 263? If yes, we would appreciate a letter from you indicating as such so we can include it in the degree proposal (this is required by the Provost's office). If not, I would welcome suggestions from you on alternative ways we could accomplish this goal with our students. I am attaching a copy of the degree proposal in case you would like to take a closer look.

Thanks for your help,

Ron Askin

****

Ronald G. Askin, Professor and Director

School of Computing, Informatics, and Decision Systems Engineering

Arizona State University

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