Board of Regents, State of Iowa

REQUEST TO IMPLEMENT A NEW BACCALAUREATE, MASTERS, DOCTORAL OR FIRST PROFESSIONAL DEGREE PROGRAM

21 February, 2006

THE PURPOSE OF ACADEMIC PROGRAM PLANNING: Planning a new academic degree program provides an opportunity for a Regent University to demonstrate need and demand as well as the university's ability to offer a quality program that is not unnecessarily duplicative of other similar programs offered by colleges and universities in Iowa.

Institution: **Iowa State University**

Departments involved:

Aerospace Engineering
Agricultural and Biosystems Engineering
Agronomy
Chemical and Biological Engineering
Civil Engineering, Construction, and Environmental Engineering
Electrical and Computer Engineering
English
The Greenlee School of Journalism and Mass Communications
History
Industrial and Manufacturing Systems Engineering
Logistics, Operations and Management Information Systems
Materials Science and Engineering
Mechanical Engineering
Philosophy and Religious Studies

CIP Discipline Specialty Title: Engineering, General

CIP Discipline Specialty Number (six digits): 14.0101

Level: B 4 M D FP

Title of Proposed Program: Minor in Engineering Studies

Degree Abbreviation (e.g., Minor, B.S., B.A., M.A.): Minor

Approximate date to establish degree: Month January Year 2007

Contact person(s): (name, telephone, and e-mail)

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Please provide the following information (use additional pages as needed).

1. Describe the proposed new degree program, including the following:

a. A brief description of the program and a statement of objectives including the student learning outcomes and how the learning outcomes will be assessed;

The Minor in Engineering Studies will offer coursework to assist non-engineering students to improve their understanding of engineering. This minor is not intended to train non-engineering students to do the work of practicing, degree-holding engineers. Instead, students who complete the Minor in Engineering Studies will be able to work more effectively in their primary field by better appreciating the nature, capabilities, and limitations of engineering. Such persons will be more capable workers, voters, and leaders in a society in which engineering factors are pervasive elements in planning and decision-making.

Students who complete this program successfully will be able to:

- Better understand the role of engineering in society and the interactions of engineering with their major field of study.
- Perform simple calculations and estimations using the engineering method.
- Make simple cost-benefit analyses and risk-benefit analyses.
- Appreciate the importance of the underlying assumptions used to produce the cost-benefit analyses and risk-benefit analyses presented by engineers.
- Make informed decisions about the desirability of engineering activities by weighing the benefits of those activities against their environmental risks.
- Understand the interdependence of the economic, environmental, and sociological aspects of technological change.
- Assess the validity and possible weaknesses in predictions presented by others of economic, environmental, and sociological consequences of technological change.
- Attain a basic understanding of the engineering design process.
- Achieve a survey-level understanding of why particular materials and processes are used to produce simple engineering devices and systems.
- Understand the capabilities and limitations of basic manufacturing processes and engineering systems.

Assessment of whether students have met these learning objectives will be made by the instructors of the individual courses involved in the minor.

b. The relationship of the proposed new program to the institutional mission and how the program fits into the institution's, college's, and department/program's strategic plan;

The VISION statement of the Iowa State University Strategic Plan states, "Iowa State University will be the best at advancing the land-grant ideals and putting science and technology to work. Students will become broadly educated, global citizens who are culturally informed, technologically adept, and ready to lead. The spirit of Iowa State University will be evident in the integration of the sciences and humanities and in the energy and creativity of its people."

The section of the University Strategic Plan headed "Priority: Education" states that the goals of the educational endeavors at the University include:

- Strengthen students' critical thinking, creative abilities, and communication skills.
- Create an environment that welcomes students to explore a variety of disciplines and career paths.
- Increase interdisciplinary and experiential learning opportunities.
- Leverage strengths in science and technology to enhance research and scholarly excellence with emphasis on interdisciplinary initiatives involving biological, materials, and information sciences.

An engineering minor for non-engineering students would strengthen the University's ability to meet each of the goals listed above.

c. The relationship of the proposed new program to other existing programs at the institution; describe how the proposed program will enhance other programs at the university.

By offering to expand the technological awareness of students in all other curricula at Iowa State University, this minor will provide students with a better understanding of the history, fundamental principles, potential, and limitations of engineering. This, in turn, can improve the students' appreciation of the interactions between engineering and their major disciplines and improve students' abilities to make informed decisions on issues involving engineering and technology factors.

d. The relationship of the proposed new program to existing programs at other colleges and universities in Iowa, including how the proposed program is different or has a different emphasis than the existing programs;

There are two state-supported engineering degree-granting programs in Iowa, one at Iowa State University (Ames) and the other at the University of Iowa (Iowa City). There are two private college engineering degree-granting programs in Iowa at Dordt College

(Sioux Center) and Loras College (Dubuque). No program like the proposed Minor in Engineering Studies is presently offered at any of the engineering schools in Iowa.

The University of Iowa does not offer any engineering minors (source: Alec Scranton, Associate Dean of Academic Programs in the College of Engineering at Iowa University). A Minor in Nondestructive Evaluation is the only engineering minor offered at Iowa State University; enrollment in that minor is restricted to students with an engineering major. Since the proposed Minor in Engineering Studies is designed for students who are not majoring in engineering, there is no overlap of the proposed minor and the one that already exists at Iowa State. Neither Dordt College (source: Ethan Brue, Professor of Engineering at Dordt) nor Loras College (source: Danial Neebel, Division Chair for Engineering at Loras) offers any minors in engineering for non-engineering students.

e. Special features or conditions that make the institution a desirable, unique, or appropriate place to initiate such a degree program.

Iowa State University is a Land Grant Institution with one of the ten largest colleges of engineering in the United States. As such, it is well positioned to offer a Minor in Engineering Studies to allow non-engineering students to better understand the history, fundamental principles, potential, and limitations of engineering.

f. Does the proposing institution have personnel, facilities, and equipment adequate to establish and maintain a high quality program?

Yes.

g. How does student demand for the proposed program justify its development?

A survey was conducted during January, 2006, in which all juniors and seniors in non-engineering majors at Iowa State University were asked if they would have enrolled in the proposed Minor in Engineering Studies if it had been available when they were freshmen. Of the 379 students who responded, 152 (40%) answered "yes". A larger percentage (68%) said that although they would not have enrolled in the Minor in Engineering Studies, they would have taken at least one of the new courses proposed for this Minor.

Thus, demand appears to be more than adequate to meet the planned enrollment for the program (please see Sec. 3 below).

2. Describe the state and/or national workforce need and/or demand for graduates of the proposed program currently and in the near future (provide documentation about the sources of data used to estimate need and demand.)

The proposed Minor in Engineering Studies is intended to address the following needs:

- Engineering advances over the past two centuries have permitted an enormous increase in the Earth's human population and improvements in the quality of life. Sustaining that population and improving the quality of life while maintaining a viable eco-system will require still greater reliance upon engineering. However, only a tiny fraction of Earth's population has actually studied engineering principles.

- The accelerating pace of technological development makes engineering concepts essential factors in decision making within government, education, industry, religious institutions, and health care, yet most of these decisions are made by persons who have received little or no engineering education. Moreover, those who inform the public about such issues often have only a cursory understanding of engineering, which limits their ability to explain these issues to their constituencies.

- The population of the United States is experiencing an undesirable bifurcation into two subsets. A comparatively small "technologically literate" subset is comprised of persons with extensive knowledge of the physical, mathematical, and biological sciences. A second, much larger subset is a diverse mixture of persons whose expertise lies in non-engineering disciplines such as liberal arts, business administration, and law, as well as persons who have received minimal education in any field. Progressively greater separation of these two subsets imperils the cohesion and general welfare of the Nation.

- There is growing concern about future U.S. competitiveness. U.S. engineering schools award 65,000 engineering B.S. degrees each year, while China produces 400,000 per year. Only 5% of U.S. students study any engineering, compared to 50% of China's students. Although U.S. schools lack the resources to drastically increase their output of engineering degree holders, they could expand the numbers of non-engineers familiar with basic engineering principles.

In short, the policy makers of the future will need a better understanding of engineering concepts to make prudent decisions, but there is no realistic prospect that a large fraction of these decision makers will be engineering degree-holders. However, it would be possible for persons in a wide variety of occupations and educational backgrounds to acquire an

understanding of basic engineering principles without completing an entire engineering degree program.

List all other public and private institutions of higher education in Iowa currently operating programs similar to the proposed new degree program. (For comparison purposes, use a broad definitional framework, e.g., such identification should not be limited to programs with the same title, the same degree designation, having the same curriculum emphasis, or purporting to meet exactly the same needs as the proposed program.)

No other Iowa institution offers a minor of this type. In fact, only one other minor of this type is offered in the United States (Lehigh University).

If the same or similar program exists at another public or private institution of higher education in Iowa, respond to the following questions:

a. Could the other institution reasonably accommodate the need for the new program through expansion? Through collaboration?

b. With what representatives of these programs has there been consultation in developing the program proposal? Provide a summary of the response of each institution consulted.

c. Has the possibility of an inter-institutional program or other cooperative effort been explored? What are the results of this study? (Consider not only the possibility of a formally established inter-institutional program, but also how special resources at other institutions might be used on a cooperative basis in implementing the proposed program solely at the requesting institution.)

3. Estimate the number of majors and non-majors students that are projected to be enrolled in the program during the first seven years of the program.

a. Undergraduate

Undergraduate	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
Majors	NA	NA	NA	NA	NA	NA	NA
Non-Majors	50	100	100	100	100	100	100

b. Graduate

Graduate	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
Majors	NA	NA	NA	NA	NA	NA	NA
Non-Majors	NA	NA	NA	NA	NA	NA	NA

c. What are the anticipated sources of these students?

Students from all the colleges at Iowa State University except the Engineering College, the Graduate College, and the College of Veterinary Medicine may enroll in this program.

4. If there are plans to offer the program away from the campus, briefly describe these plans, including potential sites and possible methods of delivery instruction.

No off-campus program delivery is anticipated.

5. Has the proposed program been reviewed and approved by the appropriate campus committees and authorities? List them:

   Engineering College Curriculum Committee (voted not to recommend approval due to concerns about adequacy of funding plan)

   Engineering College faculty (voted to approve the proposal)

   Faculty Senate Curriculum Committee (now under consideration)

   Provost's Office

6. List date the program proposal was submitted to the Iowa Coordinating Council for Post High School Education (ICCPHSE) and the results of listserv review. (THIS WILL BE COMPLETED BY THE PROVOST OFFICE.)

7. Will the proposed program apply for accreditation? When?

   No

8. Will articulation agreements be developed for the proposed program? With whom?

   No

9. Describe the faculty, facilities, and equipment that will be required for the proposed program.

   The faculty, facilities, and equipment for the proposed program will be those already supporting the degree-granting departments of the Engineering College and those of other colleges now used to support the eleven existing non-Engineering courses being taught at Iowa State that are included among the courses eligible for credit in the Minor in Engineering Studies (Agronomy 342; History 284, 285, and 380; English 314 and 411; Journalism and Mass Communication 474; MIS 437X; OCSM 320; Philosophy 343; and Technology and Social Change 341).

10. From where will the financial resources for the proposed program come (list all that apply, e.g., department reallocation, college reallocation, grants, new to the university)?

SOURCES	TOTAL AMOUNT
Private fundraising and new grants to university	$110,000
Reallocations from budget lines vacated by retiring faculty and staff	$110,000

11. Estimate the total costs/total new costs (incremental increases each year in expenditures) that will be necessary for the next seven years as a result of the new program:

The costs for delivering the minor are based on the following assumptions:

a. Development of a new course is a one-time cost of $15-20k
b. Delivery of a course is recurring cost of $15-20k.
c. Requirements of 7 courses for minor will be satisfied over 2 years (3.5 courses/year/student).
d. Sections are on the average 50 students.
e. On the average a minimum of 7 sections/year are required to satisfy demand. An average of 8 will be offered.
f. First year cohort is 50 students. Steady state is 100 students.
g. For the launching of the minor, of the initial 7 courses, 3 will be developed (ES285, ES270 and 1 addition) and 4 are now available (ENGR 160 and approved electives).
h. 8 additional ES courses will be developed over 4 years.
i. Fixed cost of $20k/year for director.

	New Courses	**Sections**	**Director**	**TOTAL COSTS**	**TOTAL <u>NEW</u> COSTS**
Year 1	3	3.5	$20k	$117.5k -$155k	$117.5k - $150k
Year 2	2	7	$20k	$155k - $200k	$37.5k – $45k
Year 3	2	8	$20k	$170k- $220k	$15k - $20k
Year 4	2	8	$20k	$170k- $220k	0
Year 5	2	8	$20k	$170k- $220k	0
Year 6	0	8	$20k	$140k - $180k	decrease of $15k-$20k
Year 7	0	8	$20k	$140k - $180k	0

Supplemental materials
(to be used at Iowa State University in the review of the proposal):

13. Program requirements, including:
a. prerequisites for prospective students;

Any non-Engineering undergraduate student at Iowa State University may enroll in the Minor in Engineering Studies. The prerequisites for the courses supporting the Minor in Engineering Studies taught within the College of Engineering are the same as those for admission to the University: high school courses that include four years of study of English/Language Arts; one year each of algebra, geometry, and advanced algebra; one year of study in each of two subjects from the following three - biology, chemistry, and physics; and two years of social studies. Some courses that are already being taught at the University by departments outside the College of Engineering will be acceptable for credit toward the Minor in Engineering Studies; for these courses, the prerequisites are set by the offering department, and these vary from

course to course. However, none of these non-engineering courses is required for the Minor in Engineering Studies.

b. language requirements;

None

c. courses and seminars presently available for credit toward the program;

This information is included in the response to Item 13.d. below.

d. proposed new courses or modifications of existing courses;

The Minor in Engineering Studies is structured so that no ISU student will be excluded due to insufficient prior preparation in mathematics or the sciences. Thus the proposed courses are specifically designed to offer a range of prerequisites so that students from such diverse curricula as sociology, physics, journalism, business, mathematics, and music could all find coursework that would support an accessible and intellectually stimulating program of study.

The courses offered for the Minor in Engineering Studies bearing the designation “ES” (as described below) are closed to students whose major curriculum is in the College of Engineering. The Minor in Engineering Studies will be awarded only to students whose major curriculum is a non-engineering program.

The proposed minor would require that a student complete a total of 21 course credits from the following courses:

- Courses 1a (or 1b), 2, and 3 (described on the following pages) are required; courses 1b, 2, and 3 will be 200-level courses.
- Twelve additional credits are to be earned from the approved list of eligible courses; a minimum of six of those 12 credits must be courses that bear the designation "ES" (as described below) or are courses offered by Engineering departments. Eligible courses will include those 200-level and higher courses offered by the Engineering College departments that are expressly designated by the department's curriculum committee for use in the Minor in Engineering Studies. Eligible courses also include courses 4 – 25 listed below.
- The proposed program will comply with all University requirements for minors, including the requirement that a minimum of 6 credits in a minor be 300-level or above courses taken at Iowa State University and the requirement that a minimum of 9 credits used to satisfy the course credits required for the minor may not be used to satisfy any other department, college, or University requirement.

Courses 1b through 13 are newly created for the minor; courses 1a and 14 – 25 are courses already listed in the University Bulletin.

Thus, the requirements for the proposed Minor in Engineering Studies would be:

Total Credits Required for the Minor in Engineering Studies = 21
1) Required course #1a (Engr 160) or 1b (ES 260), but not both (3 cr.)
2) Required course #2 (ES 265) (3 cr.)
3) Required course #3 (ES 270) (3 cr.)
4) A minimum of 6 additional credits in courses that bear the designation "ES" (as described below) or courses offered by Engineering departments and expressly approved by that department's curriculum committee for use in the Minor in Engineering Studies program.

The following is a partial listing of approved courses for the Minor in Engineering Studies. The designation "ES" is an abbreviation for "Engineering Studies" and indicates that the course will be administered by the Engineering College to serve students who are not majoring in Engineering. An Engineering Studies section will be added to the University catalog as a separate section clearly delineating these courses from other engineering courses. That section of the catalog will list the program objectives for the minor and will contain language that explains the role of the minor relative to other engineering programs.

Additional courses may be added to this list by action of the individual Engineering College department curriculum committees, designating courses offered by their departments deemed suitable for inclusion on the approved course listing:

1a. Engr 160. Engineering Problems with Computer Applications Laboratory. (2-2) Cr. 3. F.S.SS. *Prereq:* Satisfactory scores on mathematics placement examinations; credit or enrollment in Math 142, 165. Solving engineering problems and presenting solutions through technical reports. Significant figures. Use of SI units. Graphing and curve-fitting. Flowcharting. Introduction to material balance, mechanics, electrical circuits, statistics and engineering economics. Use of spreadsheet programs to solve and present engineering problems. Solution of engineering problems using computer programming languages.

1b. ES 260. Introduction to Engineering Estimation, Computation, and Problem Analysis [new course, 200-level] (3 credits) - The engineering method as applied to solving micro-scale problems (i.e., individual calculations) and macro-scale problems (i.e., broader social problems); the engineering problem solving method; modeling and simulation methods; estimation methods; survey of cost-benefit analyses for

engineering projects; illustrative examples of how the major engineering disciplines apply computation and estimation procedures to their particular computing tasks.

2. ES 265. Survey of the Impacts of Engineering Activity [new course, 200-level] (3 credits) - Survey of the economic, environmental, societal, and political benefits and problems resulting from engineering activity. Effects of engineering projects on human health, social structures, and the environment. Examination of improvements in economic opportunities and quality of life resulting from engineering activity. Case studies of the effects of engineering activity.

3. ES 270. Survey of How Things Work [new course, 200-level] (3 credits) - An overview of the similarities and differences of the major engineering disciplines; methods used to manufacture products, build structures, and design systems. Laboratory exercises in measuring properties of basic engineering materials, welding, casting, and machining; case studies in product development; student design exercises.

4. ES 305. Introduction to Electrical and Computer Engineering (2-3 credits) [new course, 300-level] – An overview of electrical and computer components of different electrical systems such as radios, phones, and microprocessors, and their basic operation. Basic design and testing of circuits; principles of thinking about the engineering process; an "under the cover" look at such systems. Practice with basic control and basics of analog-to-digital conversion and digital-to-analog conversion; interconnection among various subsystems.

5. ES 310. Introduction to Computers: Logic, architecture, and computer interfacing (3 credits) [new course, 300-level] - Design and structure of computer systems. Basic components: processor, memory, input/output, and their interconnections. Introduction to logic and logic circuit design and their use in systems such as vending machine design. Input sensing and output control. Laboratory exercises.

6. ES 315. Introduction to Signals, Sensors and Communications (2 credits) [new course, 300-level] – A non-calculus approach to the basic operating principles of cell phones and wireless systems. History of communication systems, telephone, and data networks. Introduction to signal generation, wired and wireless communication, and fiber optics communication basics. Basic ideas, vocabulary, and concepts of physical layer systems. Laboratory exercises.

7. ES 320. Introduction to Signals Processing and Control (3 credits) [new course, 300-level] – Basic concepts of robots and machine control. Concepts in control, signals, power and related issues for practical fields such as robotics. Laboratory exercises in programming legorobots. Basic principles of control, sensing, embedded programming, and computer hardware interfacing.

8. ES 325. Survey of Changing Precepts in 21st Century Transportation (2 credits) [new course, 300-level] - New transportation technologies: maglev trains; hydrogen fuel cell automobiles; superjumbo, supersonic, hypersonic, ekranoplane, and personal aircraft; segway and other personal conveyances. Fundamental principles of engines and motors (turbines, fuel cells, piston engines, electric motors); Carnot efficiency; aerodynamics and fluid dynamics; materials limitations on performance; societal limitations on performance. Support infrastructures (fuel distribution systems, roadways, ground and air traffic control). Environmental consequences.

9. ES 330. An adaptation of Engr 312. Engineering Connections. (2-2) Cr. 3. S. Hands-on in class experiments connecting engineering concepts with K-6 mathematics and science curricula. Engineering use of simple machines, pressure, force, and equilbrium utilizing levers, gears, and truss structures.

10. ES 335. An adaptation of Engr 322. Engineering Mechanics for Teachers. (1-0) Cr. 1. S.SS. *Prereq:* Teaching license; concurrent enrollment in C I 522. Exploration of material properties, equilbrium, deflections and natural occurrence of mathematical functions using design of simple truss structures. Applications in 8-12 classroom settings.

11. ES 340. Introduction to Nuclear Power, Weapons, Proliferation, and Waste [new course, 300-level] (2 credits) - An examination of nuclear processes and their effects on society. Fundamentals of radioactivity, nuclear fission and fusion, reactor design and control, nuclear weapons design, the environmental benefits and dangers of nuclear power, potential for catastrophic radioactive contamination, the threat of nuclear terrorism, radioactive waste handling and long-term storage.

12. ES 345. Survey of Sustainable Engineering [new course, 300-level] (3 credits) - An examination of engineering devices and systems for use in third-world nations; utilization of appropriate technologies to improve sanitation, energy utilization, and agriculture to improve the quality of life in third world communities; adaptation of existing engineering systems to environments where electrical power, potable water, and sewage treatment facilities are primitive or absent; sociological consequences of the introduction of new technologies to less-technologically-developed cultures.

13. ES 350. An Introduction to Engineering Economics for Non-engineers [new course, 300-level] (3 credits) - A survey of engineering economics covering basic principles of the time value of money, depreciation, tax consequences, and productivity of engineering devices and systems; just-in-time inventory; lean manufacturing; quality assurance; total cost analysis.

14. Hist 284. Introduction to History of Technology and Engineering I. (Same as M E 284.) (3-0) Cr. 3. F. Technology in various civilizations from Sumer and Egypt to early 18th century Europe.

15. Hist 285. Introduction to History of Technology and Engineering II. (Same as M E 285.) (3-0) Cr. 3. S. Technology in Western world in nineteenth and twentieth centuries.

16. Con E 380. Engineering Law. (3-0) Cr. 3. F.S. *Prereq: junior classification*. Introduction to law and judicial procedure as they relate to the practicing engineer. Contracts, professional liability, professional ethics, licensing, bidding procedures, intellectual property, products liability. Emphasis on development of critical thinking process, abstract problem analysis and evaluation. Nonmajor graduate credit.

17. Phil 343. Philosophy of Technology. (Same as T SC 343.) (3-0) Cr. 3. F.S. *Prereq: 6 credits of social science or T SC 341 and 3 credits of social science.* Conditions under which technological innovations contribute to human emancipation, relationship of technology and democracy, utility and limits of technical rationality, and problems of ensuring that benefits of technological advance are communally shared. Issues discussed with reference to contemporary developments in microelectronics, technology transfer to the Third World, etc. Nonmajor graduate credit.

18. Hist 380. History of Women in Science, Technology, and Medicine. (Same as W S 380.) (3-0) Cr. 3. *Prereq: sophomore classification*. Bix. History of women's relationship to the fields of science, technology, and medicine, as students and professionals, consumers, subjects and patients, family members, workers and citizens. Concentrates especially on 19th and 20th century United States, concluding with an examination of current issues of special interest to women in science, technology, and medicine.

19. Agron 342. World Food Issues: Past and Present. (Same as Env S 342, FS HN 342, T SC 342, U St 342.) (3-0) Cr. 3. F. S. *Prereq: junior classification.* Salvador. World hunger and malnutrition in social, ethical, historical, and environmental context. Emphasis on the origins and effects of global inequity on population trends, socioeconomic policies, and food systems in the developing world. Exploration of directions and improvements for the future. Team projects. Nonmajor graduate credit. H. Honors Section. (For students in the University Honors Program only.)

20. Jl MC 474. Communication Technology and Social Change. (Same as T SC 474.) (3-0) Cr. 3. *Prereq: junior classification.* Examination of historical and current communication technologies, including how they shape and are shaped by the cultural and social practices into which they are introduced.

21. T SC 341. Technology: International, Social, and Human Issues. (3-0) Cr. 3. F. *Prereq: junior classification.* An interdisciplinary study of the international significance of technology and of the societal and human issues attending its development and adoption.

22. Engl 314. Technical Communication. (3-0) Cr. 3. F.S.SS. *Prereq*: *Engl 105, junior classification.* Theories, principles, and processes of effective written communication in the technical disciplines. Attention to the major strategies for composing technical discourse; techniques for analyzing audiences and writing situations, and for organizing data and information.

23. Engl 411. Technology, Rhetoric, and Professional Communication. (3-0) Cr. 3. S. *Prereq*: *Engl 310; 302, 309, 313, 314; junior classification.* Study of the implication of technologies, especially computer technology, for the writing and reading of business, technical, and academic texts. Focus on selected technology-related topics. Nonmajor graduate credit.

24. OCSM 320. Production/Operations Management. (3-0) Cr. 3. S.

Prereq: *Stat 226.* Introduction and analysis of the basic concepts in production/operations management. Topics include: applied forecasting, aggregate planning, scheduling, shop floor control, total quality management, inventory management, facility layout, and project management.

25. MIS 437X Project Management. (3-0) Cr. 3. Study of team activities in the general project management environment. Project management techniques, including the use of software tools; project initiation; risk assessment; estimating and contracts; planning; human factors; project execution; and standard methods. Case studies, personal experience, and real-world projects will be used to demonstrate tools and techniques.

e. thesis and non-thesis options in master's programs;

f. implications for related areas within the university;

The proposed minor has the potential to increase the workload of one or more of the departments that offer courses designated for credit in the Minor in Engineering Studies. These are: Agronomy 342; English 314 and 411; History 284, 285, and 380; Journalism and Mass Communication 474; MIS 437X and OCSM 320 (both offered by Logistics, Operations and Management Information Systems); Philosophy 343; and Technology and Social Change 341. If enrollment in some or all of those courses increases to the point that additional sections must be offered, then additional resources may be needed to support those courses. However, for the planned steady-state enrollment in the Minor (100 students), the anticipated increase in student enrollment in these courses is expected to be modest and is likely to increase class sizes somewhat, but will probably not necessitate adding new sections.

g. admissions standards for graduate programs

14. Attach to the program proposal memos from the department chair(s), the college dean(s), and other appropriate persons, agreeing to the allocation of new resources and/or the reallocation of resources as described in the Regents questions

15. Attach to the program proposal, letters of support, recommendations, and statements when appropriate:
a. from programs at the other Regents universities
b. from programs and departments at ISU which are associated with the proposed program or have an interest in the proposed program

Note:

The CIP Specialty name and number shown on page 1 was found at:
http://nces.ed.gov/pubs2002/cip2000/

IOWA STATE UNIVERSITY
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8 February 2006

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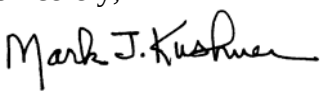
The courses for the Minor in Engineering Studies program in the College of Engineering at Iowa State University will be taught and developed by existing faculty in the College. The faculty teaching these courses will be given release time from some of their other responsibilities, and the costs of providing that release time will be funded by reallocations from budget lines vacated by retiring faculty and staff, and by donors and grants external to the university. I endorse the use of funds within the College of Engineering for this purpose.

Sincerely,



Mark J. Kushner
Dean of Engineering
James and Kathy Melsa Professor of Engineering