

Board of Regents, State of Iowa

**REQUEST TO IMPLEMENT A NEW BACCALAUREATE
DEGREE PROGRAM**

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: Electrical and Computer Engineering

CIP Discipline Specialty Title: Computer Technology/Computer Systems Technology

CIP Discipline Specialty Number (six digits): 15.1202

Level: B

Title of Proposed Program: Information and computer engineering technology

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

Approximate date to establish degree: Month Aug Year 2010

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

Dr. Doug Jacobson

515-294-8307

dougj@iastate.edu

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;

Currently, ISU offers Bachelor of Science degrees in Computer Science, Computer Engineering and Software Engineering. Students typically enter these degree programs directly from high school as college freshmen. The students who graduate from these programs fill a need throughout the country for design and research engineers. However, Iowa employers have indicated there is an unfilled need for graduates who have the technical and managerial skills necessary to enter careers in the design, application, installation, operation, maintenance and security of computer and/or network systems. The proposed bachelors of engineering technology (BET) degree program will help satisfy these needs that were confirmed by the Industrial Focus Group advising Iowa State University on programs, curriculum, and competencies

In addition, the current BS programs at ISU do not offer a smooth transition for students who have earned credits or an associate's degree at a community college. Often community college transfer students need to take more than three years of additional courses at ISU to obtain one of the traditional computing degrees. In Iowa, there is a movement to have a 2+2+2 program where students can start taking classes toward a degree in high school, continue with two years at the community college and complete at a four-year institution with only two more years. The new Information and Computer Engineering Technology degree will fit well with these demographics and the current educational environment. The proposed program will also meet one of the requirements of House File 815 (AN ACT RELATING TO ARTICULATION AGREEMENTS BETWEEN PUBLIC POSTSECONDARY INSTITUTIONS AND TO THE DISSEMINATION OF ARTICULATION INFORMATION.). This requirement is *“Develop and implement by January 1, 2012, a process to examine a minimum of eight new community college associate of applied science degree programs for which articulation agreements between the community colleges and the institutions of higher education governed by the board would serve students' continued academic success in those degree programs.”*

Program Educational Objectives

The objective of the information and computer engineering technology program at Iowa State University is that its graduates should demonstrate expertise, engagement, learning, leadership, and teamwork within five years after graduation.

- **Expertise:** Graduates should establish peer-recognized technical expertise together with the skills to articulate that expertise and use it for problem solving in the design, application, installation, operation, and/or maintenance of computer systems, networks, associated software systems, including system development, integration and implementation, using contemporary practices.
- **Engagement:** Graduates should be engaged in the engineering technology profession contributing through the ethical, competent, and creative practice of information and computer engineering technology in industry, academia, or the public sector.
- **Learning:** Graduates should demonstrate sustained learning through professional improvement opportunities and through self study, and they should demonstrate the ability to adapt in a constantly changing field.
- **Leadership:** Graduates should exhibit leadership and initiative to advance professional and organizational goals, facilitate the achievements of others, and obtain results.
- **Teamwork:** Graduates should demonstrate effective teaming and commitment to working with others of diverse cultural and interdisciplinary backgrounds by applying engineering abilities, communication skills, and knowledge of contemporary and global issues.

Student learning outcomes and assessments

Graduates of the Information and Computer Engineering Technology program must demonstrate knowledge and hands-on competence in:

- the application computer programming, associated software applications, microcomputers, operating systems, electric circuits, electronics, and local area networks to the building, testing, operation, and maintenance of computer systems and associated software systems.
- the applications of physics to computer systems in a rigorous mathematical environment at or above the level of algebra and trigonometry.
- the application of electrical, electronic, telecommunications, and digital signal propagation fundamentals in the building, testing, operation, and maintenance of hardware and software systems.
- the ability to analyze, design, secure, maintain, and implement hardware and software computer systems.
- the ability to apply project management techniques to computer systems and information processing.
- the ability to utilize statistics/probability, transform methods, discrete mathematics in support of computer systems and networks.

In addition all graduates must have:

- an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines
- an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
- an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes
- an ability to apply creativity in the design of systems, components, or processes appropriate to program educational objectives
- an ability to function effectively on teams
- an ability to identify, analyze and solve technical problems
- an ability to communicate effectively
- a recognition of the need for, and an ability to engage in lifelong learning
- an ability to understand professional, ethical and social responsibilities
- a respect for diversity and a knowledge of contemporary professional, societal and global issues
- a commitment to quality, timeliness, and continuous improvement

Outcomes Assessment

The learning outcomes assessment is modeled after the assessment plan for the electrical and computer engineering programs at Iowa State. These programs have a long history of robust outcomes assessment. The table below summarizes the assessment measurement tools

Tools	Direct or Indirect		Quant or Qual		Source
	Direct	Indirect	Quant	Qual	
Senior design industry panel scoring	x		x		Employer
Portfolio assessment by EAB members	x		x	x	Employer
OPAL-based survey from employers	x			x	Employer
OPAL-based survey from students		x	x		Students
Senior design student survey responses		x	x		Students
Student comments		x		x	Students

Course assessment	x		x	x	Faculty
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- 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 new program fits into the land grant mission of Iowa State University.

Create, share, and apply knowledge to make Iowa and the world a better place.

In carrying out its mission, Iowa State will increase and support diversity in the university community. Diversity enlivens the exchange of ideas, broadens scholarship, and prepares students for lifelong, productive participation in society.

Create knowledge through world-class scholarship in teaching, research, and creative endeavors.

Share knowledge through outstanding undergraduate, graduate, professional, and outreach programs.

Apply knowledge to improve the quality of life for current and future generations.

This program also fits into several of the priorities identified by Iowa State University in the strategic plan.

Education:

- *Partner with K-12 schools and community colleges to facilitate transfer to and student success at Iowa State University.*

Economic Impact:

- *Strengthen educational and outreach programs aimed at Iowa's economic, workforce, and technology development.*

Iowa Life:

- *Expand learning opportunities for Iowans of all ages*

The program also is in alignment with the mission of the College of Engineering

Provide leadership through innovative education, research, and public engagement to improve the quality of life in Iowa, the nation, and the world, while leading the 21st century mission of land grant Colleges of Engineering.

The department of electrical and computer engineering will be the home for this new program and the mission of the department in part is to "Provide an outstanding educational program that enables our graduates to become leaders

in their profession by imparting fundamental principles, skills, and tools to innovate and excel.”

This program will provide new opportunities for students that are currently unmet at Iowa State. The strong partnership with community colleges will provide a program that will meet the needs of transfer students. The program's goals and objectives are consistent with the land grant mission of ISU.

- 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.

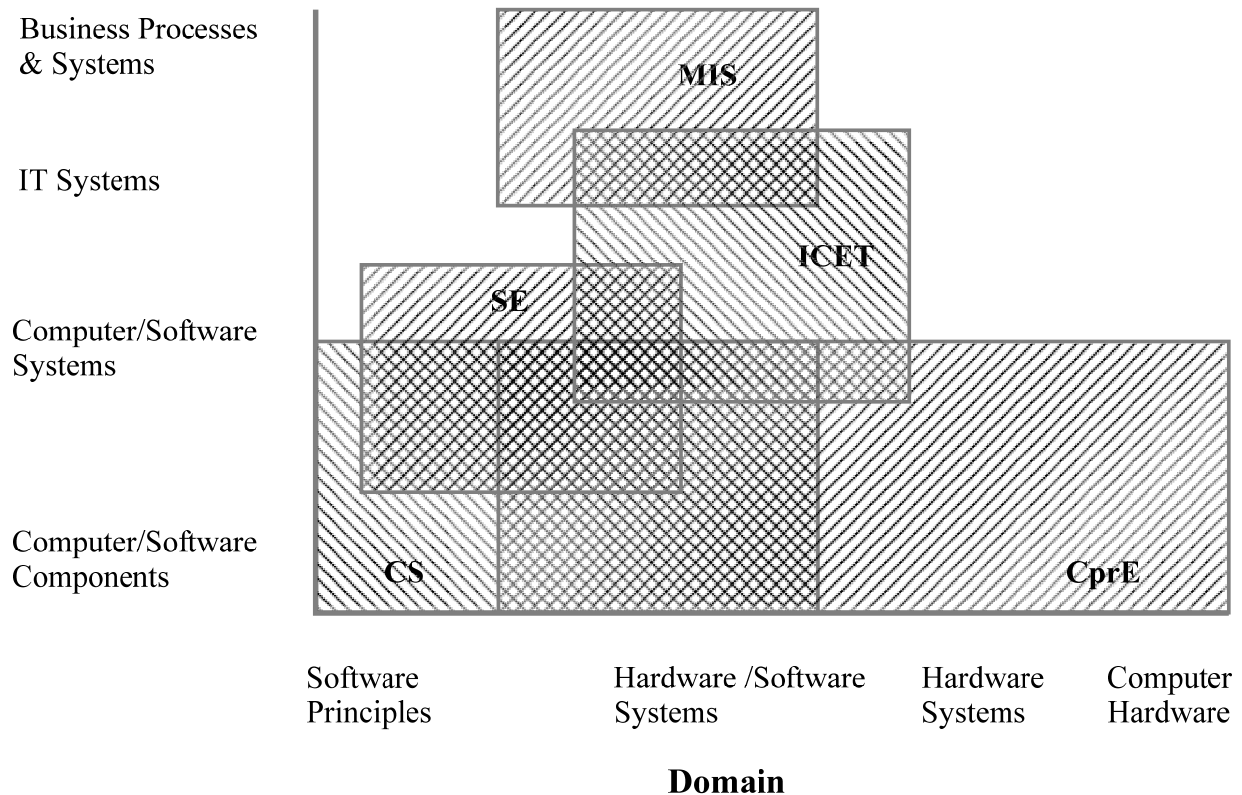
There are no other engineering technology degrees at Iowa State University. The program has some overlap with the Computer Engineering BS degree at Iowa State. This overlap is by design in that some of the courses currently offered by the Computer Engineering program will be used by the new technology degree. Since the new program is housed in the same department as the computer engineering degree there will be sharing of resources. The only two other related programs at Iowa State are Computer Science and Management Information Systems (MIS).

There is very little overlap with the computer science program. Students in computer science tend to focus on the foundations of computer science, including the problem solving and system design skills necessary for designing and building robust, efficient, reliable, scalable, and flexible software systems. The new technology degree will accept several computer science courses as technical electives.

Likewise there is very little overlap with the MIS program at ISU. The MIS program has a business emphasis first (accounting, finance, management, etc.), supported with technical skills and background. The ISU MIS uses technical skills to provide problem solving ability in business decision making. The proposed program will require 2 courses from MIS and allow several other MIS courses as technical electives.

This chart below compares the 5 computer/software related degree programs showing the areas of coverage within computing. There are multiple possible metrics that could be used to compare the various computing degrees. This metric is designed to give a quick visual representation of the areas of difference and the areas of overlap. The vertical axis shows the level of abstraction ranging from a component level to a business processes. The horizontal axis ranges from pure software domain to pure hardware. This chart is general representation of the areas of coverage. Individual students within any of the majors may focus on areas outside those shown for their major.

Level of Abstraction



Program educational objectives comparison:

Listed below are excerpts from the program educational objectives for each of the computing degrees.

Computer Science

- Formulating and solving problems in computing,
- the analysis, design and evaluation software systems, and
- the application of sound principles to the synthesis and analysis of computer systems.

Computer Engineering

- Peer-recognized expertise together with the ability to articulate that expertise
- problem solving in the analysis, design, and evaluation of computer and software systems, and
- system integration and implementation, using contemporary practices.

Software Engineering:

- peer-recognized expertise together with the ability to articulate that expertise,

- problem solving in the planning, design, development, validation, and evolution of software using contemporary practices

Management Information Systems:

- comprehensive training in the application, use, and management of information systems
- preparing students to provide effective information services and support.
- business emphasis first (accounting, finance, management, etc.), supported with technical skills and background.
- Use of technical skills to provide problem solving ability in business decision making

Information and Computer Engineering Technology:

- peer-recognized technical expertise together with the skills to articulate that expertise,
- problem solving in the design, application, installation, operation, and/or maintenance of computer systems, networks and associated software systems, and
- system development, integration and implementation, using contemporary practices.

- 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; and

There are no Information and Computer Engineering Technology programs offered in the state of Iowa. There are programs offered in Computer Engineering, Computer Science, and MIS offered at many different universities across the state. The issues of relationships between the proposed degree and computing degree offered across the state are the same as with programs internal to ISU. This degree will be the first Computer Engineering Technology degree offered in Iowa.

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

Iowa State has a long history computing degrees and is the home of the first computer engineering degree in the state. The proposed degree provides a logical continuation from other current ISU Electrical and Computer Engineering department endeavors including the establishment of a statewide, high school IT club and competition (IT-Adventures/ IT-Olympics) framework and conducting Cyber Defense competitions at the high school, community college, and collegiate (open) levels.

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

Yes, we will utilize current laboratory facilities that are housed in the new addition to Coover Hall. The program will also utilize some existing faculty in the department of Electrical and Computer Engineering along with some new staff positions. The department has a dedicated staff to manage and maintain the laboratories needed for the new degree.

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

While students may enter the proposed degree directly from high school, this is not our primary market. We do, however, believe some students will enter directly into the four year program from high school.

The second entry point, and the one we expect to provide the largest pipeline, is from a community college program. The versatility of the Information and Computer Engineering Technology Degree and the primary intent to increase the number transfer of students from a variety of technical programs at the community college level will broaden the path for articulation.

Over the past year we have been working with instructors from 10 of 15 community colleges in the state. They have indicated somewhere between 20 and 25 students would enter the program after they graduated from their community college. In addition we believe there is a market for this degree by students that completed an AAS degree and are currently in the workforce.

Some number of students will also transfer into the program for other degrees at ISU. The largest number of these students is expected from Computer Engineering and Computer Science programs where students would have left the department and college after discovering that computer engineering/computer science was not suited for them.

We estimate between 35 and 50 students entering the program each year for the first couple of years and for that number to increase to after that.

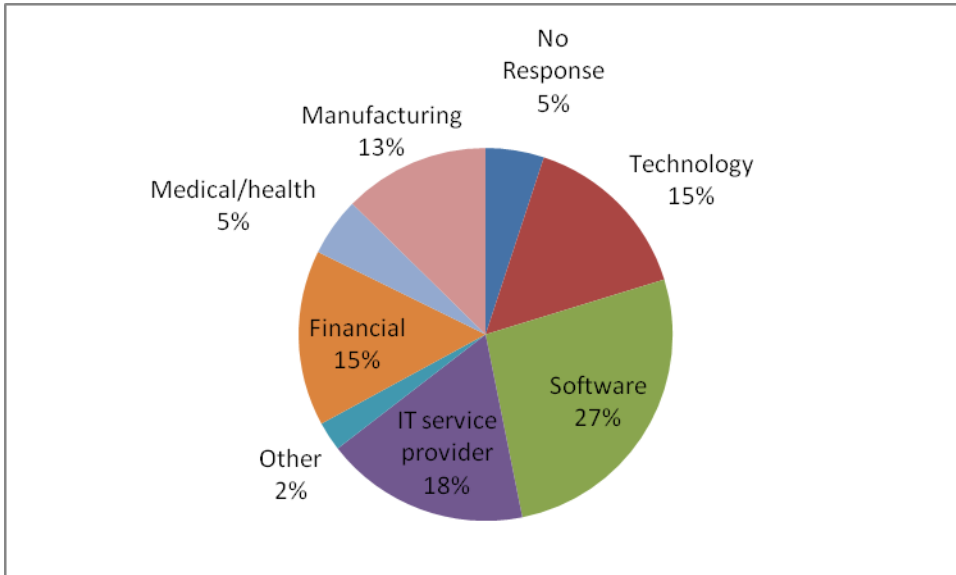
2. Describe the state and/or national workforce need and/or demand for graduates of the proposed program currently and in the near future (provide documentation about the sources of data used to estimate need and demand.)

The proposed degree responds to projected needs and focused initiatives within Iowa to advance IT-related training, as reported in the Battelle Report (2005). Additional drivers to the creation of the degree come from the Central Iowa Works (www.centraliowaworks.org) and from House File 815.

In the fall of 2008 we held a workshop with community college faculty to determine if there was interest from the faculty to pursue the new degree. The consensus of the attendees was to pursue the new degree. The faculty members in attendance were willing to work with ISU to help develop the degree program and to examine their own degree programs to help insure a smooth transition for the transfer students.

Also in the fall of 2008 we held a workshop with representatives from several major potential employers in the state. The meeting was the beginning of a gap analysis to see what the industry needs and/or what is missing in the current graduates placed in their companies. Additionally, attendees were asked to forecast what type of skills an employee would need to have in 15 years. The goal of the exercise was to determine if and how a new proposed degree could be mutually beneficial to students seeking a four-year degree and employers wishing to hire them.

After the presentation and the initial work on the gap analysis, a group brainstorming session ensued which helped to sharpen the focus on the needed skill sets, as well as provide a rough outline of outcomes needed from courses in the new program. The outcome from this meeting was the development of a survey that was sent out to Iowa based business and industry to help determine the core competencies and the potential demand for the graduates. 79 companies responded to an online survey. The table below shows the break down based on business type that responded to the survey.



The companies were also asked to provide estimates of the number of IT related jobs they are expecting to fill in the next 5 years and in the next 5 to 10 years. 60 of the companies indicated they will need to fill between 1 and 100 IT positions in the next 5 years. Eight companies indicated they would need to fill between 100 and 500 positions in the next 5 years. And 20 companies indicated they would need to fill between 100 and 500 positions 5 to 10 years from now. These numbers were collected during the summer of 2009 in a downward trending economy.

According to the Bureau of Labor Statistics

Employment of network and computer systems administrators is expected to increase by 23 percent from 2008 to 2018, [much faster than the average](#) for all occupations. Computer networks are an integral part of business, and demand for these workers will increase as firms continue to invest in new technologies. The increasing adoption of mobile technologies means that more establishments will use the Internet to conduct business online. This growth translates into a need for systems administrators who can help organizations use technology to communicate with employees, clients, and consumers. Growth will also be driven by the increasing need for information security. As cyber attacks become more sophisticated, demand will increase for workers with security skills.

Projections data from the National Employment Matrix

Occupational Title	2008 Employment	Projected 2018 employment	Change 2008-20018	
			Number	Percent
Database administrators	120,400	144,700	24,400	20
Network and computer systems administrators	339,500	418,400	78,900	23
Network systems and data communications analysts	292,000	447,800	155,800	53
All other computer specialists	209,300	236,800	27,500	13

Earnings:

Median annual wages of network and computer systems administrators were \$66,310 in May 2008. The middle 50 percent earned between \$51,690 and \$84,110. The lowest 10 percent earned less than \$41,000, and the highest 10 percent earned more than \$104,070. Median annual wages in the industries employing the largest numbers of network and computer systems administrators in May 2008 were as follows:

<i>Management of companies and enterprises</i>	<i>\$70,680</i>
<i>Computer systems design and related services</i>	<i>70,490</i>
<i>Wired telecommunications carriers</i>	<i>66,950</i>
<i>Colleges, universities, and professional schools</i>	<i>57,380</i>
<i>Elementary and secondary schools</i>	<i>56,320</i>

Median annual wages of database administrators were \$69,740 in May 2008. The middle 50 percent earned between \$52,340 and \$91,850. The lowest 10 percent earned less than \$39,900, and the highest 10 percent earned more than \$111,950. In May 2008, median annual wages of database administrators employed in computer systems design and related services were \$78,510, and for those in management of companies and enterprises, wages were \$74,730.

Median annual wages of network systems and data communication analysts were \$71,100 in May 2008. The middle 50 percent earned between \$54,330 and \$90,740. The lowest 10 percent earned less than \$41,660, and the highest 10 percent earned more than \$110,920. These wages encompass network architects, telecommunications specialists, Webmasters, and Web developers. Median annual wages in the industries employing the largest numbers of network systems and data communications analysts in May 2008 were as follows:

<i>Wired telecommunications carriers</i>	<i>\$75,930</i>
<i>Insurance carriers</i>	<i>74,910</i>
<i>Management of companies and enterprises</i>	<i>73,720</i>

Computer systems design and related services
Local government

72,410
 64,230

3. 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.)

There are no other ABET accredited engineering technology degrees offered in the state of Iowa by any institution of higher learning. While there are computer degrees offered by many institutions in Iowa those degree are different than the scope and focus of the proposed degree.

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.)
4. 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	40	90	146	183	213	243	264
Non-Majors							

- b. Graduate N/A
- c. What are the anticipated sources of these students?

The table below shows a more detailed breakdown of entering enrollment for each of the three student groups; direct entry from high school (HS), Articulate from a community college (CC), and transfer from another major at ISU (Xfer). The enrollment numbers are very conservative. The community college instructors we have been working with think that we will have closer to 25 students from the community colleges the first year. The total number of students in the program is calculated based on losing some students each year.

Entering Enrollment							
	2010	2011	2012	2013	2014	2015	2016
HS	10	15	20	25	30	35	35
CC	15	25	30	35	40	45	45
Xfer	15	15	15	15	15	15	15
Total	40	90	146	183	213	243	264
Graduates	0	0	26	41	49	56	64

5. 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.

There are no current plans to offer the degree away from campus, however as the program grows we can see that we may need to offer some classes via distance learning.

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

Group	Date Approved
Department of Electrical and Computer Engineer Curriculum Committee	January 27, 2010
Department of Electrical and Computer Engineer faculty	February 5, 2010
College of Engineering Curriculum Committee	February 19, 2010
College of Engineering faculty	March 19, 2010
Faculty Senate Curriculum Committee	
Faculty Senate	

7. 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 FILLED IN BY THE PROVOST OFFICE.)

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

Yes, the program will seek ABET accreditation the year after the first graduate.

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

Yes, we are currently working on articulation agreements with:

- Des Moines Area Community College
- Kirkwood Community College
- Indian Hills Community College

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

The new program will be housed in the Department of Electrical and Computer Engineering, which is located in Coover Hall and on the 3rd floor of Durham Hall. The department has about 70,000 sq ft of space including a new addition which has over 7,000 sq ft of teaching laboratory space. The laboratories are equipped with state of the art equipment. There is currently enough capacity in our current labs to accommodate the new degree program. The department of has 46 full time active tenured or tenure track faculty members and 1 senior lecturer. The department is planning on hiring two additional lecturers the first year to handle the additional teaching load. As the program becomes established and if enrollments meet expectations the department will hire additional tenure track faculty members.

11. 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
Department Reallocation	\$250,000
College Reallocation	\$250,000
New Tuition revenue	\$3,286,000

12. 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:

These expenses are based on the conservative enrollment numbers shown above. If the enrollment is higher the costs will increase, but the tuition revenue will also increase and will offset any increase in costs. More detailed budget numbers are included below.

	TOTAL COSTS	TOTAL NEW COSTS
Year 1	217,000	125,000
Year 2	303,000	125,000
Year 3	407,000	64,000
Year 4	424,000	17,000
Year 5	455,000	31,000
Year 6	471,000	16,000
Year 7	547,000	76,000

The program will create between 20 new courses and will require additional teaching resources. The program will offer 8 new courses year 1 and an additional 8 new courses year 2. These courses will be taught by both existing faculty and by new hires. To start we propose to hire 2 lecturers during the first two years to add to the overall department faculty. These lecturers will teach in both the new degree and in the current computer engineering degree. The department currently does not have any lecturers teaching computer engineering courses. We expect the demand for this program will increase rapidly and will be able to cash flow after 3 years. As the program grows so will the staffing needs which can be covered by the increases in enrollment. The tables

below show the estimated costs and revenues for the first 6 years of the degree program based on a set of assumptions listed.

Assumptions:

\$165 of income per SCH taught which does not include any differential tuition or income from computer fees.

Faculty Cost		TA Costs	
Base	\$60,000	Base	\$13,500
Fringe	1.31	Fringe	1.14
Class / year	6	Class / year	8
Cost / class	\$13,100	Cost / class	\$1,924

We assume three different types of incoming students each with a different length of stay in the program. The direct entry from high school students will take 4 years, the students transferring from a community college will take 2.5 years and the students transferring from other programs at ISU will take 3 years.

The next two tables show the estimated costs and revenue based on estimated enrollment numbers. There are two scenarios shown. The first is a conservative estimate and the second is a more optimistic scenario. The costs shown in the table are only salary costs.

Entering Enrollment								
	2010	2011	2012	2013	2014	2015	2016	
HS	10	15	20	25	30	35	35	
CC	15	25	30	35	40	45	45	
Xfer	15	15	15	15	15	15	15	
Total	40	90	146	183	213	243	264	
Graduates	0	0	26	41	49	56	64	

	2010	2011	2012	2013	2014	2015	2016	Total
Costs	\$217,885	\$303,928	\$407,689	\$424,456	\$455,982	\$471,615	\$547,945	\$2,829,500
Revenue	\$98,588	\$230,258	\$404,308	\$516,701	\$599,891	\$683,082	\$753,551	\$3,286,378
Delta	-\$119,298	-\$73,670	-\$3,381	\$92,245	\$143,909	\$211,467	\$205,606	\$456,878

Entering Enrollment								
	2010	2011	2012	2013	2014	2015	2016	
HS	15	20	25	30	35	40	40	
CC	30	50	60	70	80	90	90	
Xfer	15	15	15	15	15	15	15	

Total	60	138	224	283	326	370	400
Graduates	0	0	38	66	78	90	102

	2010	2011	2012	2013	2014	2015	2016	Total
Costs	\$218,847	\$322,203	\$425,003	\$645,003	\$677,491	\$699,857	\$737,253	\$3,725,656
Revenue	\$133,650	\$337,343	\$604,894	\$784,823	\$906,347	\$1,027,872	\$1,127,748	\$4,922,677
Delta	-\$85,197	\$15,139	\$179,892	\$139,820	\$228,857	\$328,015	\$390,495	\$1,197,020

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

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

The new degree will have the same admissions standards as the admission standards for ISU.

- b. language requirements;

The language requirements will be the same as the requirements for the engineering college

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

Of the 124.5 credits 43.5 credits are currently offered by other departments at ISU. 54 credits are new courses and the remaining 27 credits are a combination of new courses taught by the department and existing courses taught by the department.

Existing courses:

English 150: Critical Thinking and Communication
English 250: Written, Oral, Visual, and Electronic Communication
Biology 101: Introduction to biology
Library 160: Library Introduction
Math 160: Survey of Calculus I
Physics 111: General Physics
Physics 112: General Physics
15 credits of general education electives (offered by various departments across campus)
Elective courses:
Computer Engineering 281: Digital Logic
Computer Engineering 288: Embedded Systems I: Introduction
Computer Engineering 488: Embedded Systems Design
Computer Engineering 431: Basics of Information System Security
Computer Engineering 430: Introduction to network security
Any 300 or 400 level course offered in computer engineering
Selected Courses from other departments like computer science and MIS

d. proposed new courses or modifications of existing courses;

New Information and Computer Engineering Technology (ICET) courses:

Number	Credits	Title
110	4	Numerical problem solving tools
171	4	Introduction to Windows OS & Problem solving
172	4	Introduction to Unix & Problem solving
220	4	Basic Networking concepts
240	4	Computer systems and Architecture
250	4	Computer scripting
251	4	Web Programming
241	4	Enterprise Computing
342	4	Virtual Resource Management
320	4	Computer & network security basics
210	3	Mathematical Foundations of IT
211	3	Statistical and simulation concepts for IT
440	3	SOA
442	3	Business continuity, disaster recovery, backup
451	4	Advanced web programming
432	4	Implementation and management of security
420	4	Implementation and management of networking systems
421	4	Network Infrastructure

These courses are taught as electrical and computer engineering courses. In some case there might be special sections for the new degree program.

101	R	Orientation
166	R	Professional Program Orientation
294	R	Program Discovery
394	R	Program Exploration
491	3	Senior Design Project I and professionalism
492	2	Senior Design Project II

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

Not applicable

f. implications for related areas within the university;

This is a new degree type for ISU. While there is some overlap in concepts with MIS and computer science the focus of the new program does not overlap. There is a potential for computer engineering, computer science, and MIS to lose a few students to this program.

g. admissions standards for graduate programs

Not applicable

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

ECE
COE
Provost

15. Attach to the program proposal, letters of support, recommendations, and statements when appropriate:
a. from programs at the other Regents universities

UNI
U of I
Presidents of several community colleges

b. from programs and departments at ISU which are associated with the proposed program or have an interest in the proposed program

CS
MIS

Notes:

1. The CIP Specialty name and number is found at:
<http://nces.ed.gov/pubs2002/cip2000/>

Date: April 5, 2010

To: Dr. Doug Jacobson
Department of Computer and Electrical Engineering

From: Sree Nilakanta
Chair, College of Business Curriculum Committee

Re: Proposed Bachelor of Information and Computer Engineering Technology (BET)

The College of Business Curriculum Committee has completed its review of the above referenced degree proposal. The Bachelor of Information and Computer Engineering Technology (BET) proposal from the College of Engineering had raised strong objections from faculty in the Management Information Systems (MIS) area within the Logistics, Operations, and Management Information Systems department of the College of Business. Since then the Committee had heard from Professor Jacobson (the proposer) and Professor Hu (Chair of LOMIS) explaining their efforts to address the MIS faculty concerns and make changes to the original proposal as well as cooperate on the development of curriculum for the proposed BET degree. The committee also learnt from the Dean's office that efforts are underway to establish a joint panel of advisers and faculty to oversee all information and computer technology related curricula and programs at Iowa State University with an aim to diffuse conflicts and encourage cooperation among the various stakeholders.

The College of Business Curriculum Committee agreed that the major concerns regarding the proposed degree had thus been reasonably addressed. The Committee therefore decided to approve the revised BET proposal. The Committee will continue to monitor the effect of the proposed BET degree on the MIS program. The Committee also recommends that the joint advisory committee be established at the earliest and report to Curriculum Committees of the affected Colleges.

Copy to:

Dr. Jim Thompson, Chair, Faculty Senate Curriculum Committee
Dr. Qing Hu, Chair, Dept. of Logistics, Operations, and Management Information Systems
Dr. Kay Palan, Associate Dean, Undergraduate Program, College of Business
College of Business Curriculum Committee

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Liberal Arts and Sciences
Department of Computer Science
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515 294-4377
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Interoffice Communication

DATE: April 8, 2010

TO: Jim Thompson, Chair, Faculty Senate Curriculum Committee

FROM: Carl K. Chang, Professor and Chair



SUBJECT: Computer Science Faculty's Response to the BET Proposal
COPY TO: Rob Wallace, Chair, LASCC
Zora Zimmerman, Associate Dean, LAS

Computer Science faculty met on Tuesday April 7, with Doug Jacobson and Arun Somani participating as guests. After lengthy discussions, and kind explanation of the background and rationale of the BET proposal by Drs. Jacobson and Somani, the following resolution passed unanimously.

Given the significant overlap of the proposed Information and Computer Engineering Technology degree program with the field of computer science, the faculty resolves that the new program be jointly governed and administered by Computer Engineering, Computer Science, and MIS.

To that end, an organizational committee shall be formed prior to establishment of the new program to develop the governance and administrative structures, and to define objectives to distinguish clearly this degree from existing degrees. For example, a governance committee may be established to consist of two faculty members from Computer Engineering, two faculty members from Computer Science, and two faculty members from MIS.

ISU Software, computer, and information based curriculum coordination committee

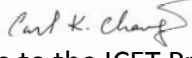
With the addition of the new BET in Information and computer engineering technology ISU will have 5 degree that have a focus on some aspect of computing. The degrees are housed in three colleges and three departments. To facilitate this coordination and interaction between the programs ISU should create a committee. The committee will consist of a faculty member from each program and a representative from each college. The committee will help the programs:

- coordinate sharing of curriculum information between programs
- share information about current and future activities
- coordinate recruiting and marketing messages
- look for ways to jointly develop classes that can be shared
- look for new opportunities across programs

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Interoffice Communication

DATE: April 23, 2010
TO: Suzanne Hendrich, Chair, Faculty Senate Academic Affairs Council
FROM: Carl K. Chang, Professor and Chair 
SUBJECT: Computer Science Faculty's Response to the ICET Proposal
CC: Rob Wallace, Chair, LASCC
Zora Zimmerman, Associate Dean, LAS
Shashi Gadia, Associate Chair, Computer Science

This is to convey to the Faculty Senate Academic Affairs Council the approval by the Computer Science department, of the concept of developing a new degree program in Information and Computer Engineering Technology (ICET) in principle, as proposed by Electrical and Computer Engineering, in order to serve the intended audience.

It is also the purpose of this memo to express our concern regarding the implementation details and governance structure of the proposed ICET program. Computer Science faculty met on Tuesday April 7 and the following resolution passed unanimously:

Given the significant overlap of the proposed Information and Computer Engineering Technology degree program with the field of computer science, the faculty resolves that the new program be jointly governed and administered by Computer Engineering, Computer Science, and MIS.

To that end, an organizational committee shall be formed prior to establishment of the new program to develop the governance and administrative structures, and to define objectives to distinguish clearly this degree from existing degrees. For example, a governance committee may be established to consist of two faculty members from Computer Engineering, two faculty members from Computer Science, and two faculty members from MIS.