MICHIGAN STATE
UNIVERSITY

October 22, 2010

MEMORANDUM

TO: Dr. Douglas Estry, Associate Provost for Undergraduate Education and Dean of Undergraduate Studies

FROM: Dr. Linda O. Stanford, Associate Provost for Academic Services

RE: Request for a New Linked Bachelor of Science Degree in Computer Engineering and Master of Science Degree in Computer Science

For Transmittal to the University Committee on Academic Policy (UCAP)

The request referenced above is being sent to the University Committee on Academic Policy (UCAP) in accordance with the *Bylaws for Academic Governance*, 4.4.

UCAP Response Requested:

Please ask the UCAP to consider the request referenced above and provide consultative commentary. Please mail the related materials referenced under the heading Attachments at the end of this memorandum to the UCAP members.

After receiving UCAP's consultative response, the Provost will make a determination to forward or not to forward the request to the University Committee on Curriculum for its approval of curriculum and degree requirements.

If you have any questions, please call Joy Speas, University Curriculum Administrator, at
5-8420.

Thank you.

Attachments:

1. Request to Establish a New Academic Program form dated October 14, 2010: Linked Bachelor of Science Degree in Computer Engineering and Master of Science Degree in Computer Science and attachments.

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University Curriculum and Catalog

176 Administration Bldg.
East Lansing, MI
48824-1046

517-355-8420
Fax: 517-353-1935

COLLEGE OF ENGINEERING

1. Request to establish a Linked **Bachelor of Science Degree in Computer Engineering** and **Master of Science Degree in Computer Science** in the Department of Computer Science and Engineering. The University Committee on Academic Policy (UCAP) will consider this request at its November 18, 2010 meeting. The University Graduate Council (UGC) will consider this request at is November 8, 2010 meeting.

   Per University policy:

   A candidate for a Linked Bachelor's-Master's Degree from Michigan State University may request the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's Program are not eligible to be applied to any other graduate degree program.

   a. Add the following statement to the Department of Computer Science and Engineering and the Department of Electrical and Computer Engineering:

      LINKED BACHELOR'S-MASTER'S DEGREE IN COMPUTER SCIENCE
      Bachelor of Science Degree in Computer Engineering
      Master of Science Degree in Computer Science

      The department welcomes applications from Michigan State University Computer Engineering undergraduate students in their junior and senior year. Admission applications must be made during the prior spring semester for an anticipated spring graduation or the prior fall semester for an anticipated fall graduation to allow admission before the final semester as a Computer Engineering undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.5 and an approved program of study for the Master of Science degree in Computer Science at the time of admission. Admission to the Linked Bachelor's-Master's program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's program are not eligible to be applied to any other graduate degree program.

   Effective Summer 2011.

View a Program

Main Menu

Joy Speas, RO	Thursday, 10/14/2010
Program Name: Computer Engineering and Computer Science Linked BS/MS Program **Degree: LINK Sequence Number: 1**	Program Request ID: 1827

Effective Dates: Spring 2011 - Open Status: Interim Initial Action: New

Requested Date: 9/29/2010 10:00:04 AM

1. Department/School/College:

16172 .... Department of Computer Science and Engineering

2. Name of Program:

Computer Engineering and Computer Science Linked BS/MS Program

3. Name of Degree:

LINK

4. Type of Program:

Other

5. Effective Start Semester:

Spring 2011

6. Target student audience for the program:

Computer Engineering Undergraduates w/high graduate student potential

7. Enrollment:

What is the expected enrollment per year: 5

What is the minimum enrollment acceptable: 1

8. Source of budget for the program:

To align academic planning and curricular change, ALL requests for NEW funds must be included in the College's annual planning letter. Provost approval of new funds and the effective date for the new program must align. If funding is not approved, then the program request will not be forwarded to Academic Council.

Internal reallocation

If new funds, was this request included in the College's annual planning letter? Indicate yes or no. If no, then this is a department or college fund reallocation (If the program is implemented, no additional resources are required.).

9. Projected Costs as compared to other programs in unit:

Lower

10. Staff requirement:

How many additional staff will be required: 0

Who will provide the primary instruction. Describe any external linkages(industry, government, etc.):

11. Will additional equipment be required:

Approximate cost: 0

Source of funding:

12. Will additional library materials be required:

Approximate cost: 0

Source of funding: None

13. Will additional space be required:

Type:

Approximate amount: None

14. If the program requirements contain a named concentration, do you wish for the concentration to be noted on the student's transcript?:

No

15. Detailed Description:

Bachelor of Science Degree in Computer Engineering
Master of Science Degree in Computer Science

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16. Are there admissions requirements for this program?:

Grade or grade-point average requirements and if so in which course(s), portfolio requirement, audition, essay, etc. If there are not admission requirements other than those required by the University policy indicate "none".

None

DEPARTMENT LEVEL APPROVAL STATUS

Approved: Department of Computer Science and Engineering

10/5/2010 9:33:18 AM by Taylor Logan for Matt W. Mutka, Acting Chairperson

SIGNOFFS STATUS

Signed Off: Department of Computer Science and Engineering
10/5/2010 10:11:43 AM by Abdol Esfahanian for Matt W. Mutka, Acting Chairperson

COLLEGE LEVEL APPROVAL STATUS

Approved: College of Engineering
10/14/2010 9:06:48 AM by Taylor Logan for Manoochehr Koochesfahani, Associate Dean

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DEPARTMENT of COMPUTER SCIENCE and ENGINEERING

Matt W. Mutka, Chairperson

UNDERGRADUATE PROGRAM

Computer science encompasses the broad areas of information processing and problem solving using digital computers. Students learn to analyze, design, and build integrated software and hardware digital systems that process, transmit, and reason about information in order to solve problems. Computer science graduates are employed in essentially all areas of industry, government, and education. They serve as system analysts involved with problems in business and research, designers and planners of process and production control software systems, computer component and system designers, programmers, and teachers.

The Bachelor of Science program provides both a theoretical foundation in computer science, required for continued success in this rapidly changing field, as well as practical experience with current tools and techniques. To achieve these goals, students take courses that span a spectrum of knowledge ranging from theoretical foundations, which enable rigorous analysis of computational problems and solutions, to applied design and engineering methods. At the upper level, students choose from a wide range of elective courses focusing on computer networks, computer architecture, artificial intelligence, database systems, computer security, software engineering, and computer graphics. The senior year culminates with a team-oriented design course building on much of what one has learned throughout the undergraduate experience. Complementing these major areas, the cognate provides an excellent opportunity to develop an individually selected area of interest.

Students majoring in computer science with interests in other areas have the opportunity to consult and work with interested faculty from a wide range of academic disciplines.

Students who are enrolled in the Bachelor of Science degree program with a major in computer science may elect a Specialization in Game Design and Development. For additional information, refer to the *Specialization in Game Design and Development* statement in the *Department of Telecommunication, Information Studies and Media* section of this catalog.

Requirements for the Bachelor of Science Degree in Computer Science

1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Computer Science.

   The University's Tier II writing requirement for the Computer Science major is met by completing Computer Science and Engineering 498, referenced in item 3. b. below.

   Students who are enrolled in the College of Engineering may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading **Graduation Requirements for All Majors** in the College statement.
2. The requirements of the College of Engineering for the Bachelor of Science degree.

   The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.
3. The following requirements for the major:

	CREDITS
a. Bioscience - Courses may not be used to satisfy both (1) and (2) below	4 to 6
(1) One of the following courses:	
BS 110 Organisms and Populations	4
BS 111 Cells and Molecules	3
ENT 205 Pests, Society and Environment	3
MMG 201 Fundamentals of Microbiology	3
PLB 105 Plant Biology	3

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PSL 250 Introductory Physiology 4
ZOL 141 Introductory Human Genetics 3
Biological Science 110 satisfies both requirement 3.a.(1) and 3.a.(2).

(2) One of the following courses:
BS 110 Organisms and Populations 4
BS 111L Cell and Molecular Biology Laboratory 2
CEM 161 Chemistry Laboratory I 1
CEM 162 Chemistry Laboratory II 1
PHY 191 Physics Laboratory for Scientists, I 1
PHY 192 Physics Laboratory for Scientists, II 1
PLB 106 Plant Biology Laboratory 1

b. All of the following courses: 32
CSE 100 Computer Science as a Profession 1
CSE 231 Introduction to Programming I 4
CSE 232 Introduction to Programming II 4
CSE 260 Discrete Structures in Computer Science 4
CSE 320 Computer Organization and Architecture 3
CSE 331 Algorithms and Data Structures 3
CSE 335 Object-Oriented Software Design 3
CSE 410 Operating Systems 3
CSE 498 Collaborative Design (W) 4
STT 351 Probability and Statistics for Engineering 3

c. An additional five courses selected from the following: 15
CSE 420 Computer Architecture 3
CSE 422 Computer Networks 3
CSE 425 Introduction to Computer Security 3
CSE 435 Software Engineering 3
CSE 440 Introduction to Artificial Intelligence 3
CSE 450 Translation of Programming Languages 3
CSE 452 Organization of Programming Languages 3
CSE 460 Computability and Formal Language Theory 3
CSE 471 Media Processing and Multimedia Computing . . . 3
CSE 472 Computer Graphics 3
CSE 475 Introduction to Computational Linguistics 3
CSE 480 Database Systems 3
CSE 484 Information Retrieval 3
Students may substitute two of the five courses with mathematics or statistics courses. All substitutions must be preapproved by the student's academic advisor.

d. Required Cognate: 15
Cognates in the following areas are available to students in Computer Science: business, communication arts and sciences, foreign language, mathematics, the natural sciences, philosophy, psychology, the social sciences, and telecommunication. Students may complete cognates in other areas with the approval of the Department of Computer Science and Engineering academic advisor. The cognate should enhance the student's ability to apply analytical procedures in a specific subject area.

The cognate requires a minimum of four courses totaling 15 or more credits outside the College of Engineering selected from (1) or (2) below. The academic advisor of the Department of Computer Science and Engineering must pre approve both the cognate and the cognate courses.

(1) At least 6 of the 15 credits must be in courses at the 300-400 level. The cognate in The Eli Broad College of Business requires a specific set of courses: ACC 230, EC 210, FI 320, GBL 323, and MKT 327.
(2) A sequence of at least four courses in a foreign language.

MINOR IN COMPUTER SCIENCE

The Minor in Computer Science and Engineering is administered by the Department of Computer Science and Engineering. This minor will provide students with a basic foundation in computer science that is applicable to many disciplines. This will also provide opportunities for students in industry or government, as well as prepare students for graduate-level study in computer science.

The minor is available as an elective to students who are enrolled in bachelor's degree programs at Michigan State University other than the Bachelor of Science Degree in Computer Science or the Bachelor of Science Degree in Computer Engineering . With the approval of the department and college that administers the student's degree program, the courses that are used to satisfy the minor may also be used to satisfy the requirements for the bachelor's degree. At least 12 unique credits counted towards the requirements for a student's minor must not be used to fulfill the requirements for that student's major.

Students who plan to complete the requirements for the minor must apply to the Department of Computer Science and Engineering. The minimum criteria for acceptance is the completion of Computer Science and Engineering 231 and 260 with a combined grade-point average in those two courses of 3.0. Enrollment may be limited. Application forms are available at *www.cse.msu.edu*.

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Requirements for the Minor in Computer Science

Complete 18 credits in the Department of Computer Science and Engineering from the following:

				CREDITS
1.	All of the following courses (12 credits):			
	CSE	231	Introduction to Programming I	4
	CSE	232	Introduction to Programming II	4
	CSE	260	Discrete Structures	4
2.	One of the following courses (3 credits):			
	CSE	320	Computer Organization and Architecture	3
	CSE	331	Algorithms and Data Structures	3
	CSE	335	Object-Oriented Software Design	3
3.	One of the following courses (3 credits):			
	CSE	410	Operating Systems	3
	CSE	420	Computer Architecture	3
	CSE	422	Computer Networks	3
	CSE	425	Introduction to Computer Security	3
	CSE	435	Software Engineering	3
	CSE	440	Introduction to Artificial Intelligence	3
	CSE	450	Translation of Programming Languages	3
	CSE	452	Organization of Programming Languages	3
	CSE	460	Computability and Format Language Theory	3
	CSE	471	Media Processing and Multimedia Computing	3
	CSE	472	Computer Graphics	3
	CSE	475	Introduction to Computational Linguistics	3
	CSE	480	Database Systems	3
	CSE	484	Information Retrieval	3

TEACHER CERTIFICATION OPTION

A computer science disciplinary minor is available for teacher certification.

Students who elect the computer science disciplinary minor must contact the Department of Computer Science and Engineering.

For additional information, refer to the statement on *TEACHER CERTIFICATION* in the *Department of Teacher Education* section of this catalog.

Insert (1)

LINKED BACHELOR'S-MASTER'S DEGREE IN COMPUTER SCIENCE

Bachelor of Science Degree in Computer Science
Master of Science Degree in Computer Science

The department welcomes applications from Michigan State University Computer Science undergraduate students in their junior and senior year. Admission applications must be made during the prior spring semester for an anticipated spring graduation or the prior fall semester for an anticipated fall graduation to allow admission before the final semester as a Computer Science undergraduate. Admission to the program requires a minimum undergraduate grade-point average of 3.5 and an approved program of study for the Master of Science degree in Computer Science at the time of admission. Admission to the Linked Bachelor's-Master's program allows the application of up to 9 credits toward the master's program for qualifying 400-level and above course work taken at the undergraduate level at Michigan State University or an external accredited institution. The number of approved credits, not to exceed 9, are applied toward the credit requirement of the master's degree. Credits applied to the Linked Bachelor's-Master's program are not eligible to be applied to any other graduate degree program.

GRADUATE STUDY

The Department of Computer Science and Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Advanced study is available in a variety of computer science research areas such as algorithms, computer security, databases, data mining, machine learning, natural language processing, networking, pattern recognition and image processing,

Insert (1)

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and software engineering, as well as many interdisciplinary research areas such as bioinformatics, cognitive science, and digital evolution.

Students who are enrolled in master's or doctoral degree programs in the Department of Computer Science and Engineering may elect an Interdepartmental Specialization in Cognitive Science. For additional information, refer to the statement on *Interdepartmental Graduate Specializations in Cognitive Science* in the *College of Social Science* section of this catalog. For additional information, contact the Department of Computer Science and Engineering.

Master of Science

In addition to meeting the requirements of the university and of the College of Engineering, students must meet the requirements specified below.

Admission

Applicants for admission should possess a bachelor's degree in computer science or a related field such as mathematics, physics, or electrical engineering. All applicants must submit their scores from the Graduate Record Examination (GRE) General Test. They must also submit their scores from the GRE Subject Test in Computer Science or a closely related field.

Requirements for the Master of Science Degree in Computer Science

The student must complete a total of 30 credits for the degree under either Plan A (with thesis) or Plan B (without thesis) and meet the requirements specified below:

Requirements for Both Plan A and Plan B:

The student must complete:

1. At least one semester of a graduate seminar.
2. A minimum of 20 credits in 800–900 level courses, excluding Computer Science and Engineering 890.

Additional Requirements for Plan A:

The student must complete:

1. At least **one** course from **each** of the following groups of courses:
   a. Computer Science and Engineering 802, 803, 841. Computer Science and Engineering 845 and 846 combined may be substituted for one of those courses.
   b. Computer Science and Engineering 807, 808, 814, 880.
   c. Computer Science and Engineering 812, 820, 822, 838.
   d. Computer Science and Engineering 830, 835, 860, 862.
2. At least 6, but not more than 8, credits of CSE 899 Master's Thesis Research.

Additional Requirements for Plan B:

The student must complete **one** of the following two options:

1. A minimum of 30 credits in courses approved by the student's academic advisor.
2. Complete the following:
   a. At least **one** course from **each** of the following groups of courses:
      (1) Computer Science and Engineering 802, 803, 841. Computer Science and Engineering 845 and 846 combined may be substituted for one of those courses.
      (2) Computer Science and Engineering 807, 808, 814, 880.
      (3) Computer Science and Engineering 812, 820, 822, 838.

(4) Computer Science and Engineering 830, 835, 860, 862.

b. A supervised project while enrolled in 4 credits of Computer Science and Engineering 898.

Doctor of Philosophy

In addition to meeting the requirements of the university and of the College of Engineering, students must meet the requirements specified below.

Admission

Applicants should be in the top 25 percent of their master's degree classes and should have a grade–point average of at least 3.50 on a scale of 4.0. For persons who are enrolled in Michigan State University's master's degree program in computer science, their progress in the Ph.D. Qualifying Examination will also be considered.

Applicants must submit their scores on the Graduate Record Examination General Test and Subject Test in Computer Science. A score of 85 percent or higher on the Computer Science Subject Test is required for admission.

Applicants who have a Bachelor of Science degree and who demonstrate exceptional potential for graduate study may be accepted for admission to the doctoral program.

Requirements for the Doctor of Philosophy Degree in Computer Science

In addition to meeting the requirements of the university and of the College of Engineering, students must meet the requirements specified by their guidance committees. All courses that are used to satisfy the requirements for the degree must have been completed under the numerical grading system.