APPROVED BY SENATE
03/04/2013

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE:

Revision to the Master of Computer Science (M.C.S.) Degree
Department of Computer Science, College of Engineering

SPONSOR:

Dr. Rob Rutenbar
Department Head of Computer Science
(217) 333-3373
rutenbar@illinois.edu

COLLEGE CONTACT:

Victoria Coverstone
Associate Dean for Graduate and Professional Programs
(217) 265-4560
vcc@illinois.edu

BRIEF DESCRIPTION:

The Department of Computer Science (CS) is requesting a decrease in the total hours of the Master of Computer Science (M.C.S.) degree from 36 hours to 32 hours. The change will be implemented by reducing the number of credit hours in elective courses from 8-12 credit hours to 4-8 credit hours.

JUSTIFICATION:

The Department of Computer Science submitted a proposal over a year ago to revise its M.C.S. curriculum, which was approved and implemented in fall 2011. This was the first time in 30 years that the curriculum had been revised. The revisions updated the curriculum to allow students freedom to select their own "breadth" courses within 8 core subject areas, which allowed students the flexibility to select courses that relate to their technical interests and career goals. The previous M.C.S. curriculum required a set of "distribution" courses from three subject areas and allowed almost no elective freedom for our students. Therefore, the previous M.C.S. curriculum had 12 credit hours of elective courses built in to allow students some ability to select courses that best suit their professional career interests. After reviewing our revised curriculum over the last year, the CS Graduate Study Committee determined that students no longer need all 12 credit hours of electives to build breadth and depth within Computer Science. Our students are achieving this breadth through the revised core courses and have the opportunity to build depth through the 500-level courses and the elective hours with the improved flexibility

of the revised curriculum. This proposal is thus to reduce the elective hours from 8-to-12 to 4-to-8, which results in a total of 32 credit hours for the degree.

Students achieve breadth across a minimum of four disciplinary areas of Computer Science (with the ability to select 4 core courses from a selection of 8 functional areas of Computer Science). The curriculum gives students the opportunity to build depth in their chosen area of Computer Science by completing 12 hours of advanced courses at the 500-level and a minimum 4 hours of electives for a total of 16 hours that could be focused in one area of Computer Science.

Feedback from both students and industry indicate that an M.C.S. degree, which totals 32 hours and can be completed in one academic year would be beneficial to students and their potential employers.

NEEDS OF PROSPECTIVE STUDENTS

The M.C.S. degree is a non-thesis professional master's degree that is offered both on-campus and online. Students applying to a professional master's degree for on campus want to be able to complete this degree in one year, which allows them to achieve their academic goals and join the work force in a timely fashion. Students applying to this program are either 1) students coming right from their undergraduate studies and who want to only spend one additional year earning their master's degree, or 2) mid-career students who have received a one-year leave of absence from their job to complete their master's degree. Not having a degree that clearly allows the possibility of a one-year completion via intense course-taking places our on campus program at severe disadvantage in this regard. It is important to note that, especially for mid-career students looking at a professional master's as a way to "up-skill" to attain a new job, or to advance to a higher-level position which requires new or deeper CS skills, it is exceedingly difficult to make a commitment to step away from their current positions for more than one year. Students in a professional master's program also fund their own degree, which means they will choose the program that will require minimum loans to be secured. In addition, companies often partner with universities to promote these types of professional master's degrees to their employees. Since our program is not a one-year program, it is our current belief that this has made it difficult for us to build these relationships with companies in support of our current degree. For example, we are in current discussion with Qualcomm, who currently markets Stanford and Berkeley's one-year professional master's program to their employees. Qualcomm has informed us that their educational committee is still reviewing our degree requirements and the time commitment required for our professional M.C.S. program.

PROFESSIONAL MASTER'S TRENDS IN COLLEGE OF ENGINEERING

The former Dean of the College of Engineering, Dean Adesida (and now Provost), has been watching the trends of the professional master's degrees in Engineering. He challenged all the departments within the College of Engineering to offer a professional master's degree that can be completed in one year. One clear example of a competitor already ahead of Illinois in this regard is Cornell, whose engineering program offers a full range of Master of Engineering (M.Eng) professional degrees across the entire college. As the Cornell M.Eng home page says: "This one-year program will prepare you to hit

the ground running and stand out in the career of your choice." Not having a one-year program puts us at a serious disadvantage.

Computer Science was the first department within the College to offer a professional master's degree. We have a very extensive base of experience (over 30 years) for what is needed to create a well-rounded, successful professional master's degree program here. We have spent the last two years working to revamp the program to be more competitive with our peers, both nationally and regionally. Our goal is to increase the domestic student population in this program, as well as build partner relationships with companies to help their current employees to earn their master's degree via our offering. The current 36-hour architecture of the M.C.S. degree is presenting serious challenges to our ability to achieve this goal.

ADMISSION STATISTICS

In the last two years, the Department of Computer Science has been focused on increasing the enrollment both on-campus and online, especially domestic enrollment, of the professional master's degree. During that time, 57 recruits have declined our offer out of 158 offers. Twenty-seven of these informed us that they chose to complete their professional master's at a different university. It is our understanding that these recruits are going to our competitors to complete their master's based on verbal feedback we have received from recruits. It is also our understanding that our degree's basic 36-unit architecture – which simply cannot be completed in a single year by our typical students – is the active obstacle in this regard. Right now, we feel we are at a competitive disadvantage in recruiting domestic students to choose our program over our competitors. Below are the admission statistics for the last two years for our M.C.S. program, including both on-campus and online applicants.

Summer-Fall 2011 Admission Statistics

M.C.S. Program	Total Offers	Total Acceptances	Total Declines
Total	56	40 (12 domestic; 28 international)	16 (11 chose a different university)
On-Campus	41	27 (2 domestic; 25 international)	14
Online	15	13 (10 domestic; 3 international)	2

Summer – Fall 2012 Admission Statistics

M.C.S. Program	Total Offers	Total Acceptances	Total Declines
Total	102	61 (13 domestic; 48 international)	41 (16 chose a different university)
On-Campus	78	42 (0 domestic; 42 international)	36
Online	24	19 (13 domestic; 6 international)	5

These admission stats do not include our spring admissions, which is small. The spring 2011 admission for both on-campus and online was 16 (2 on-campus; 14 online) acceptances and the spring 2012 admissions was 21 (6 on-campus; 15 online)

acceptances. Students currently admitted to the program may finish in 1½ years if they are on-campus or 3 to 4 years if they are online.

COMPETITIVE DISADVANTAGE

The Department of Computer Science strongly feels that the M.C.S. degree is at a competitive disadvantage with several peers who offer a professional master's degree in Computer Science between 30 and 32 credit hours. This allows students to complete the degree in two semesters vs. three semesters. CS is requesting the slight reduction of credit hours to allow our students to complete our rigorous degree (from a top-5 institution) in one academic year by eliminating 4 credit hours of elective coursework. Students will still complete all required coursework in this revised program that current students in the program are completing today, which ensures no loss of academic rigor to the program.

To offer context on this point, we note that the proposed change to the degree structure keeps the degree a highly focused, professional master's experience, with the same strong breadth (the core courses), the ability to build depth (the 500-level and elective hours), and advanced coursework:

M.C.S.-36 credit hours	**Proposed M.C.S.-32 credit hours**
Breath Requirement: 12-16 credit hours from across 8 technical areas of CS	**Same**
Advanced Coursework Requirement: 12 credit hours of work at CS 5XX course level.	**Same**
Additional Coursework Requirement: 8-12 credit hours of additional coursework	**Now**: 4-8 hours of additional course work

The salient point in the proposed new architecture is that students will demonstrate the same technical breadth across CS; will demonstrate mastery of the same advanced material; and they will continue to have the opportunity to take 1-2 electives of their own choosing.

With respect to competitive disadvantage, we offer first the following data from our national and regional peer CS departments:

National Competitors

- Stanford (30 semester hours when converted)
- CMU (32 semester hours when converted)
- Berkeley (32 semester hours when converted)
- Cornell (30 semester hours when converted)

We note that the first three of these national competitors are ranked *above* the University of Illinois at Urbana-Champaign (Illinois) in the most recent (2010) cycle of the US News & World Report rankings for graduate Computer Science Departments. The last of

these is currently *tied* with Illinois CS in these USN&WR rankings. Moreover, Cornell has recently announced plans for a new partnership with the city of New York, to open a new campus called the Cornell NYCTech Campus. That campus is, at the outset, to be entirely focused on professional M.S. degrees. CS Department Head Prof. Rob Rutenbar was asked to review one of their planned degree programs (since all new degrees require state level approval, and require outside expert review). Those programs are offered in 30 semester hours – again, one year programs. Thus, it is fair to say that we are in a serious race here to adjust our professional M.C.S. offering to be nationally competitive, not only for existing degree programs at our peers, but also for soon-to-appear programs from our peers.

Big Ten Competitors (Midwest)

- Purdue (33 credit hours)
- University of Minnesota (31 credits)
- University of Iowa (32 credits)
- University of Michigan (30 credit hours)

Again, we note that one of our most serious regional competitors, the University of Michigan CSE department, is again already ahead of us in offering their non-thesis MS degree in our desired one-year 30-32 units.

SUMMARY

We believe the proposed new 32-unit professional M.C.S. degree program is the best degree structure for our potential students, both on-campus and online: it remains rigorous and technically complete; it retains the flexibility to choose breadth/depth areas, and flexibility to choose multiple elective classes; it can be completed in one year of course elections, which makes it feasible for mid-career students to step away from their current jobs and pursue this degree on campus; it is fully competitive with similar offerings at national (Stanford, CMU, Berkeley) and regional (Purdue, Michigan, Iowa, Minnesota) CS peers; it is also fully competitive with soon-to-appear offerings from national CS peers (Cornell).

BUDGETARY AND STAFF IMPLICATIONS:

A. *Additional staff and dollars needed:* No additional staff or dollars are anticipated from the university. The current enrollment, which includes newly admitted and current students, is approximately 150 (100 online[1] and 50 on-campus[2]) in the program. Our target is to grow both the online and on campus enrollment by 25% and 100%, respectively (i.e. an additional 25 online students and an additional 50 on-campus students) to reach a goal of 225 students, resources permitting, over the next few years. Current staffing can accommodate some growth in enrollment. Graduate tuition dollars returned to COE from the Office of the Provost Budget and Resource Planning will be distributed to DCS to fund additional instructional resources (if any) needed to support the M.C.S. curriculum following the agreed upon tuition model

[1] Online students currently graduate in 3 to 4 years.
[2] On-campus students currently graduate in 3 to 4 semesters.

below between the Department of Computer Science and the College of Engineering

Tuition Distribution Model

Tuition returned to the CoE (net of campus overhead; currently 10% of total graduate tuition received) will be distributed as follows: Single Department Major and/or Concentration: Tuition will be initially split 20% CoE and 80% Computer Science.

B. *Internal reallocation (e.g., change in class size, teaching loads, student-faculty ratio, etc.):* No internal reallocations are anticipated due to reducing the number of credit hours in elective courses.

C. *Effect on course enrollment in other units and explanation of discussions with representatives of those departments:* There are no required courses in the M.C.S. program that reside in other units. Therefore, we do not anticipate any enrollment increase to other departments' courses.

D. *Impact on the University Library:* No impact on the University Library is anticipated.

E. *Impact on computer use, laboratory use, equipment, etc.:* None. Graduate student use of computer laboratories in the MCS program is minimal. There is no use of research laboratories.

DESIRED EFFECTIVE DATE:

Spring 2013

STATEMENT FOR THE PROGRAMS OF STUDY CATALOG:

See Appendix A.

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

CLEARANCES:

Unit Representative	Date: 2-2-12
College Representative	Date: 2-13-12
Graduate College Representative	Date: 11-12-12
Provost Representative	Date
Educational Policy Committee Representative	Date

Appendix A: Statement for Programs of Study Catalog

The only modifications to the POS Statement occur in the M.C.S. Degree Requirements table, excerpted from the full POS statement below. The edits are shown in Track Changes format.

Computer Science

Master of Computer Science, Computer Science

This degree is offered as an on-campus program or via the Internet through the I2CS (the URL for this is http://cs.illinois.edu/online) program.

Requirements	
Credit Hours	**Hours**
Total Credit for the Degree	***3236***
Course Work	3236
Breadth Requirement: four different courses, each from a different core area out of the eight core areas	12-16
Advanced courses – chosen from CS 500 - CS 590 and CS 598; CS 597, or an approved non-CS 500-level course may satisfy 4 credit hours of this requirement.	12
Elective courses (subject to Other Requirements and Conditions below)	4-88-12
Other Requirements and Conditions (may overlap):*	
A minimum of 16 CS credit hours must be taken from the Illinois campus.	
A minimum of 12 500-level credit hours overall.	
A maximum of 4 hours of CS 591 and CS 491 may be applied toward the degree.	
A grade of B- or higher is required for Breadth course work.	
The minimum program GPA is 3.0.	
At most, 12 semester credit hours of previous graduate course work may be transferred and applied to the M.S. degree requirements.	
All degree requirements must be completed within five consecutive semesters (only fall and spring semesters are counted). Off-campus students have 5 years in which to complete this degree.	

Appendix B: Revision to the Master of Computer Science (M.C.S.) Degree (Proposed Curriculum Revisions)

Current Requirements:	Current Hours	Revised Requirements:	Revised Hours
Major Core Requirement		*Major Core Requirement*	
Total Credit Hours	36 hours	**Total Credit Hours**	32 hours
Breadth Requirement	12-16 hours	**Breadth Requirement**	12-16 hours
Advanced Courses	12 hours	**Advanced Courses**	12 hours
Elective Requirement	8-12 hours	*Elective Requirement*	4-8 hours

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

University Library
Office of Dean of Libraries
and University Librarian
230 Main Library, MC-522
1408 West Gregory Drive
Urbana, IL 61801

February 25, 2013

Victoria L. Coverstone
Associate Dean, Office of Graduate and Professional Programs
College of Engineering
401 Engineering Hall
MC-266

Dear Dean Coverstone:

Thank you for providing the University Library with the opportunity to review the College of Engineering's proposal to the Senate Committee on Educational Policy to reduce the total hours for the Master of Computer Science (M.C.S.). Based upon the proposal that we reviewed, we do not believe that there will be any substantive impact on existing library offerings—either in terms of library materials or personnel.

The librarians in the Grainger Engineering Library have an excellent relationship with the College and if additional services or materials are required as the program develops, I have every confidence that we will be able to work together to meet the needs of the students.

Sincerely,

Paula Kaufman

Paula Kaufman
Juanita J. and Robert E. Simpson
Dean of Libraries and University Librarian

c: Thomas Teper
William Mischo
Mary Schlembach
Elizabeth Stovall, Graduate Programs Director, CoE

telephone 217-333-0790 • *fax* 217-244-4358

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Provost and Vice Chancellor
for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820

December 3, 2012

Gay Miller, Chair
Senate Committee on Educational Policy
Office of the Senate
228 English Building, MC-461

Dear Professor Miller:

Enclosed is a copy of a proposal from the Graduate College and the College of Engineering to revise the Master of Computer Science (M.C.S.) in Computer Science.

This proposal has been approved by the Graduate College Executive Committee and the College of Engineering Executive Committee. It now requires Senate review.

Sincerely,

Kristi A. Kuntz
Assistant Provost

KAK/njh

Enclosures

c: M. Bragg
W. Buttlar
V. Coverstone
M. Lowry
R. McElroy
R. Rutenbar
E. Stovall

UNIVERSITY OF ILLINOIS
AT URBANA–CHAMPAIGN

Graduate College

204 Coble Hall
801 South Wright Street
Champaign, IL 61820-6210

Executive Committee

2012-2013 Members

Debasish Dutta, *Chair*

Members

Barry Ackerson
David Ceperley
Lin-Feng Chen
Kent Choquette
Jennifer Cole
Brooke Elliott
Susan Garnsey
David Hays
Christine Jenkins
Ashleigh Jones
Tina Mattila
Ramona Oswald
Yoon Pak
Joseph Rosenblatt
Alex Winter-Nelson
Assata Zerai

November 12, 2012

Kristi Kuntz
Office of the Provost
207 Swanlund MC-304

Dear Kristi,

Enclosed is the proposal entitled "Revision to the Master of Computer Science (M.C.S.) Degree in the Department of Computer Science, College of Engineering." The Graduate College Executive Committee has approved this proposal. I send it to you now for further review.

Sincerely,

William G. Buttlar
Associate Dean, Graduate College

c: M. Bragg
R. Campbell
V. Coverstone
M. Lowry
R. McElroy
R. Rutenbar
E. Stovall

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

College of Engineering

Executive Committee
306 Engineering Hall, MC-266
1308 West Green Street
Urbana, IL 61801

RECEIVED
FEB 15 2012
GRADUATE COLLEGE

February 13, 2012

Andrea Golato
Associate Dean
Graduate College
204 Coble Hall
MC-322

Via: Ilesanmi Adesida, Engineering College

Dear Dean Golato:

The College of Engineering Executive Committee has reviewed and approved the following proposal:

Revision to the Master of Computer Science (M.C.S.) Degree in the Department of Computer Science

Attached is a copy of the requests.

Sincerely yours,

Jonathan B Freund

Jonathan Freund, Secretary
Executive Committee

Approval Recommended:

Ilesanmi Adesida, Dean
College of Engineering

2/13/12
Date

JBF/jmh

Enclosure

c: Victoria Coverstone
Jean Hanks
Brent Heuser
Rob Rutenbar
Elizabeth Stovall

Draft Minutes
College of Engineering Executive Committee (EC) Meeting
Tuesday, 12:30pm, February 7, 2012
301 Engineering Hall

Present:

Dan Abrams (CEE)-
David Ceperley (Physics)-
Jonathan Freund (MechSE)-
John Hart (CS)-
Brent Heuser (NPRE)-
Prasanta Kalita (ABE)-
Chuck Tucker (Admin)-
Petros Voulgaris (AE)-
Martin Wong (CSL)-

Absent:

Ali Abbas (ISE)
Ilesanmi Adesida (Admin)
Richard Blahut (ECE)
Shun-Lien Chuang (MNTL)
Vicki Coverstone (Admin)***
Daniel Pack (ChBE)
John Weaver (MatSE)

*guest **alternate ***sabbatical

The meeting was called to order at 12:34pm.

1. Approval of Draft Minutes from January 31, 2012

   Vote: Unanimous approval

2. Course and Program Proposals/Reports

   a. New/Revised Course Outlines and Program Proposals

   i. CEE 548 " Scientific Writing"

   Special charges, which should be considered by the subcommittee:

   - There was concern about this course being used for 500-level course credit toward a degree a requirement.
   - There was also concern that the title is too broad if it is targeted (by its prerequisite) toward environmental engineering.

   Proposed subcommittee: Laura Green (Physics), Cliff Singer (NPRE, chair), Benito Marinas (CEE)

   ii. Revision to Master of Computer Science (M.C.S.) Degree

   Vote: Unanimous acceptance.

3. Adjournment (12:55)

The minutes have not yet been approved.
Respectfully submitted,

Jonathan B Freund

Jonathan B. Freund, Secretary

c: Brent Heuser
Jean Hanks
Elizabeth Hayes Stovall