

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

EP.02.28

Office of the Provost and Vice Chancellor  
for Academic Affairs

Swanlund Administration Building  
601 East John Street  
Champaign, IL 61820



February 26, 2002

R. Linn Belford, Chair  
Senate Committee on Educational Policy  
Office of the Senate  
228 English Building, MC-461

Dear Professor Belford:

Enclosed are copies of a proposal from the College of Engineering for the revised Computer Science/Engineering Curriculum.

This proposal has been approved by the College of Engineering Executive Committee; it now requires Senate review.

Sincerely,

A handwritten signature in cursive script that reads "Keith A. Marshall".

Keith A. Marshall  
Assistant Provost

KAM/ml

c: C. Livingstone  
D. Daniel  
M. Snir  
D. Padua  
K. Darr

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

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



February 19, 2002

RECEIVED

FEB 26 2002

OFFICE of the PROVOST

Marian Stone  
Program Administrator  
208 Swanlund Administration Building  
MC-304

Via: Dean D. E. Daniel, Engineering College

Dear Dr. Gonzo:

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

Computer Science/Engineering Curriculum

Enclosed is a copy of the request.

Sincerely yours,

S. Lance Cooper, Secretary  
Executive Committee

Approval Recommended:

\_\_\_\_\_  
D. E. Daniel, Dean  
College of Engineering

2/22/02  
Date

SLC/kad  
Enclosure  
c: Marc Snir  
David Padua  
Kathy Darr

University of Illinois  
at Urbana-Champaign

Department of Computer Science  
Rhonda McElroy, Academic Advisor

1304 West Springfield Avenue  
Urbana, Illinois 61801-2987  
USA

phone: (217) 244-2745  
fax: (217) 244-6073  
e-mail: [rmcelroy@cs.uiuc.edu](mailto:rmcelroy@cs.uiuc.edu)  
www: <http://www.cs.uiuc.edu>

DATE: January 4, 2002  
TO: Kathy Darr  
FROM: Rhonda McElroy  
RE: Revised CS Curriculum with the College of Engineering

Enclosed you will find a revised CS/Engineering curriculum. The revised curriculum includes CS 210, Professional Ethics and Issues, as a required course for students complete in their junior year. This course has been created to meet the requirements for the ABET/CAC accreditation and must be a required course in the program. Without this required course, the accreditation board will not accredit the CS/Engineering program.

The CS department would like the COE Executive committee to review it at their next appropriate meeting. The CS faculty at their December 17, 2001 faculty meeting approved this change.

If you have any questions, please contact Professor Kamin at [kamin@cs.uiuc.edu](mailto:kamin@cs.uiuc.edu) or 333-7505.  
Thank you.

**University of Illinois  
at Urbana-Champaign**

Department of Computer Science  
Sam Kamin, Director of Undergraduate Programs in Computer Science

1304 West Springfield Avenue  
Urbana, Illinois 61801-2987  
USA

*phone:* (217) 333-7505  
*fax:* (217) 244-6073  
*e-mail:* kamin@cs.uiuc.edu  
*www:* <http://www.cs.uiuc.edu>

**DATE**            January 4, 2002  
  
                      COE Executive Committee  
  
**FROM**            Sam Kamin  
  
                      Revised CS/Engineering Curriculum

The CS department has a proposal for a revised CS/Engineering curriculum, which includes CS 210, Professional Ethics and Issues, as a required course. This change to the curriculum is required in order to get the program accredited by ABET/CAC. This proposal has been voted on and approved by the CS faculty in their last faculty meeting on December 17, 2001. Therefore, we need the COE Executive committee to review and approve this proposal. The outline for CS 210 has been submitted to the Executive Committee separately.

The changes that you will find under the "Statement for the Bulletin" section of the proposal are:

Under "Typical Schedule", we have added CS 210 to the third year, first semester.

- Under "Overview of Curriculum Requirements", we have added CS 210 to the Computer Science Core Requirements.

In addition, we made a format change to the "Overview of Curriculum Requirements" section. Currently, in the bulletin, RHET 105 and Social Sciences and Humanities electives are under Basic Mathematics and Science Requirements. We have created a new category called "General Education Requirements" and have moved these two requirements to this new section and also included the Advanced Composition and Foreign Language requirements in this section. Note that this is a cosmetic change only. The addition of CS 210 is the only substantive change.

Allow me to add that this change has a certain urgency, since CAC expects the requirement to be in place by Fall 2002 semester. Therefore, I would request that the processing of this revision be handled, to the extent possible, on an expedited basis.

If you have any questions, please feel free to contact me at [kamin@cs.uiuc.edu](mailto:kamin@cs.uiuc.edu) or 333-7505.

FORMAT FOR PRESENTATION OF PROPOSALS  
TO THE SENATE COMMITTEE ON EDUCATIONAL POLICY

**SPONSOR**

<u>NAME</u>	<u>PHONE #</u>	<u>EMAIL ADDRESS</u>
Professor Sam Kamin	33-7505	kamin@cs.uiuc.edu

**BRIEF DESCRIPTION**

The Computer Science department would like to make the following change to the Computer Science program within the College of Engineering:

- o Require students to complete CS 210, Professional Ethics and Issues

The additional requirement to the program has a prerequisite of CS 225, which is already required in the program. The two credit hours for this new course can be taken out of the credit hours allocated to free electives in the program. By doing this, it would not increase the number of credit hours, 128, required to graduate from the program.

**JUSTIFICATION**

The Computer Science department is in the process of getting this program accredited by the Accreditation Board for Engineering and Technology, Computing Accreditation Commission (ABET/CAC). In order to get the Computer Science program within the College of Engineering accredited, we need to require students to take a semester of Professional Ethics. The above change would satisfy this requirement.

**BUDGETARY AND STAFF IMPLICATIONS**

- a. Currently, this change would require hiring a half-time instructor. The CS department is able to handle this cost.
- b. The class size for this course would be roughly 100 students per semester. Our plan is to offer four sections per semester with 25 students in each section, which would allow for class discussions, presentations, and group work.
- c. This change in the program would not impact any other department.
- d. There will only be a slight impact on library, computer use, laboratory use, equipment, etc.


**GUIDELINES FOR UNDERGRADUATE EDUCATION**

Students completing this revised curriculum for the Computer Science program will still continue to meet the guidelines for undergraduate education. The additional course in Professional Ethics will strengthen their knowledge on appropriate ethical behaviors in the computer industry as well as inappropriate behaviors. These are all skills that are critical to help students be successful in a job within the computer industry.

Students who graduate from this program will have solid, theoretical knowledge in the areas of software, architecture and foundations within computer science. Graduating seniors will be able to advance and/or lead development projects within computer science with the knowledge and skills they have gained through this program.

**CLEARANCES**

	1/4/02
Department/Unit Head	Date

	2/22/02
School Approval (if applicable)	Date
Assoc. Dean, College of Engineering	Date

Assoc. Dean, Graduate College	Date
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Assoc. Provost	Date
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# STATEMENT FOR THE BULLETIN

## CURRICULUM IN COMPUTER SCIENCE

Department of Computer Science  
2270 Digital Computer Laboratory  
1304 West Springfield Avenue  
Urbana, IL 61801  
(217) 333-4428  
URL: <http://www.cs.uiuc.edu>

### **For the Degree of Bachelor of Science in Computer Science**

This curriculum is offered by the Department of Computer Science for students seeking a broad and deep knowledge of the theory, design, and application of digital computers and information processing techniques. The first two years are spent on basic work in mathematics, physics, and an introduction to the fundamental areas of computer science: computing, programming, the organization of digital machines, hardware, numerical analysis, and theory of computation. The third year completes the work in basic computer science and requires electives to broaden the background of the student. During the fourth year, the student is encouraged to deepen his or her understanding of topics of particular interest and ability. In addition, each student is required to complete an "application sequence", which consists of a sequence of courses in an area of the student's interest outside computer science to which computers may be applied.

### **EDUCATIONAL OBJECTIVES AND OUTCOMES**

The Department of Computer Science strives to provide students with a broad knowledge of the fundamentals of computers and computation and a deep knowledge of software systems construction. We feel that students should also gain grounding in some area of application of computers, and a sense of responsibilities and ethical demands of the computing professions. Considerable importance is placed on keeping up-to-date both our courses and our lab equipment. A faculty consisting of top researchers ensures that courses are at once intellectually challenging, timely, and authoritative.

Given these objectives, the department has adopted a set of educational outcomes that we expect each student to have achieved by the time of graduation. Above all, students should leave our program with a fundamental knowledge and study skills that will enable them to be lifelong learners; in a field of constant growth and change, this is essential. We expect graduates to be able to think clearly and precisely about computational problems and to be able to apply their knowledge of mathematics, computer engineering, software engineering, and application areas to the solution of these problems. Students should learn how to work productively in a team environment, and should possess excellent written and oral communication skills. Finally, they should gain a general knowledge of contemporary issues in our society and should understand the role of the computer professional and the importance of professional integrity and ethics. We continually monitor our success in achieving these desired educational outcomes through various methods and seek ways to improve our educational programs.

### **REVIEW OF ACADEMIC PROGRESS**

Each student's progress is reviewed after the student completes 30 hours of technical (MATH, CS, ECE) courses; this will normally be at the end of the sophomore year, as shown in the schedule below. At that time, the student must have a combined grade point average in those courses of 2.25 (A=4.0) to qualify for registration in CS classes in the following semesters. A student who does not qualify may transfer to another department or seek a waiver of the requirement from the Director of Undergraduate Programs in CS.

In order to graduate or continue in the computer science curriculum, a student must have a 2.0 technical grade point average including the following courses:

All computer science courses  
ECE 205/206  
Math 120, 130, and 242 or 243; or Math 135 and 245  
Math 225 or 315  
Math 285 or 341  
Math 361/STAT 351 or Math 363/STAT 310  
The curriculum requires 128 hours for graduation

### **TYPICAL SCHEDULE**

Differing backgrounds and interests preclude the construction of a single schedule that will fit all students. The following is a typical schedule for a student entering the CS department as a freshman with no AP credit.

#### First Year

Hours	First Semester
3	Chem 101 – General Chemistry

1	Chem 105 – General Chemistry Laboratory
1	CS 100 – Freshman Orientation in Computer Science <sup>1</sup>
0	ENG 100 – Engineering Lecture
5	Math 120 – Calculus and Analytic Geometry I
	RHET 105 – Principles of Composition <sup>2</sup>
	Electives
17	Total

**Hours Second Semester**

4	CS 125 – Introduction to Computer Science
2	CS 173 – Discrete Mathematical Structures
3	Math 130 – Calculus and Analytical Geometry II
4	Physics 111 – General Physics (Mechanics)
3	Electives
16	Total

**Second Year**

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**Hours First Semester**

4	CS 225 – Data Structures and Software Principles
3	CS 273 – Introduction to Theory of Computation
3	Math 242 – Calculus of Several Variables
4	Physics 112 – General Physics (Electricity and Magnetism)
2	Electives
16	Total

**Hours Second Semester**

3	CS 231 – Computer Architecture I
2	Math 225 – Introductory Matrix Theory
3	Math 285 – Differential Equations and Orthogonal Functions
	Physics 113 – General Physics (Fluids and Thermal Physics) <sup>3</sup>
	Electives
16	Total

**Third Year**

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**Hours First Semester**

3	CS 233 – Computer Architecture II
3	CS 257 – Numerical Methods
3	Math 361 – Introduction to Probability Theory I
2	Physics 114 – General Physics (Waves and Quantum Physics) <sup>3</sup>
3	Application Sequence
2	CS 210 – Professional Ethics and Issues
16	Total

**Hours Second Semester**

3	CS 323 – Operating System Design
3	ECE 205 – Introduction to Electric and Electronic Circuits
1	ECE 206 – Introduction to Electric and Electronic Circuits Laboratory
3	Computer Science electives
3	Application Sequence
3	Other Electives
16	Total

**Fourth Year**

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**Hours First Semester**

	CS 321 – Programming Languages and Compilers
3	CS 292 – Senior Project in Computer Science I <sup>4</sup>
3	Computer Science electives
3	Application Sequence
4	Other Electives
16	Total

**Hours Second Semester**

3	CS 293 – Senior Project in Computer Science II <sup>4</sup>
6	Computer Science electives Application Sequence Other Electives
16	Total

- 
1. This course is highly recommended for freshman, which may use it to help meet free elective requirements.
  2. RHET 105 may be taken in the first or second semester of the first year.
  3. Either Physics 113 or 114 may be replaced by a physical or biological sciences course from an approved list available in the department.
  4. Or CS 299 – Senior thesis, or free electives.

**OVERVIEW OF CURRICULUM REQUIREMENTS**

The curriculum requires 128 hours for graduation and is organized as follows:

**Hours General Education Requirements**

4	RHET 105 – Principles of Composition
3	Advanced Composition <sup>1</sup>
18	Social Science and Humanities electives
0 – 12	Foreign Language <sup>2</sup>
25 – 37	Subtotal

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1. The Advanced Composition requirement may be overlapped with other requirements.
  2. Completion of three years of one foreign language in high school also satisfies this requirement.

**Hours Basic Mathematics and Science Requirements**

10 – 11	Math through 242, 243 or 245 – Calculus and Analytic Geometry. Choice of math sequence depends on placement test results.
2-3	Math 225 or 315 – Linear Algebra
3	Math 285 or 341 – Differential Equations
3 – 4	Math 361/Stat 351 or Math 363/Stat 310 – Probability or Statistics
12	Physics 111, 112, 113 <sup>1</sup> , 114 <sup>1</sup>
4	Chem 101 and 105
34 – 37	Subtotal

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1. Either Physics 113 or 114 may be replaced by a physical or biological science course from an approved list available in the department.

**Hours Computer Science Core Requirements**

1	CS 100 – Freshman Seminar in Computer Science <sup>1</sup>
4	CS 125 – Introduction to Computer Science
2	CS 173 – Discrete Mathematical Structures
2	CS 210 – Professional Ethics and Issues
4	CS 225 – Data Structures and Software Principles
6	CS 231 and 232 – Computer Architecture I and II
3	CS 257 – Numerical Methods
3	CS 273 – Introduction to Theory of Computation
4	ECE 205 and 206 – Introduction to Electric and Electronic Circuits and Laboratory
29	Subtotal

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1. Recommended for beginning freshmen.

**Hours 300-Level Computer Science Electives**

At least six 300-level courses in computer science, including:

6	Software	Both CS 321 and CS 323
3	Architecture	Either CS 331 or CS 333
3	Foundations	Either CS 373 or CS 375
5	Two more CS courses number 311-389 or 397	
18	Subtotal	



**Hours Senior Project or Thesis**  
0 – 6 CS 292-293 or 299 (optional)

**Note:** fulfills the General Education Advanced Composition requirement. If not taken, another course from the campus General Education Advanced Composition list must be taken to satisfy the requirement.

**Hours Application Sequence**  
12 A sequence of courses directed toward study of a specific problem area related to computer use. This sequence must be taken from the list approved by the department. Alternatively, a special sequence may be taken, provided the director of undergraduate programs of the department approves it.

**Hours Free Electives**  
4 – 14 Additional course work so that there are at least 128 credit hours.

### **HONORS**

For graduation with highest honors, a student must complete at least 2 hours of CS 290 – Individual Study, CS 292 – 293 – Senior Project, or CS 299 – Senior Thesis and must obtain the favorable recommendation of those instructor(s), in addition to all other requirements of the College of Engineering.

### **SOFTWARE ENGINEERING SPECIALIZATION**

For students interested in a career in software engineering, this program will provide the depth and breadth necessary for satisfying possible future software engineering accreditation requirements. It is open to all students in the computer science curriculum. To successfully complete this specialization, the following courses must be taken with an overall B average:

- CS 321 and CS 323
- CS 331 or CS 333
- CS 373 or CS 375
- CS 311 and CS 328

*The courses above satisfy the 300-level computer science electives requirements given earlier.*

- CS 327 and CS 329
- Two more course from a list of 300-level CS courses that can be found on the department's Web page.

**EFFECTIVE DATE:** Fall 2002 Semester