To: David Andereck, Associate Dean, College of Arts and Sciences

From: Xiaodong Zhang, CSE Department Chair

Date: 21 December 2010

Re: Semester Proposals for *BS-CIS, BA-CIS, and CIS Minor Programs*

The faculty of Computer Science and Engineering have worked diligently since early Au09 to prepare the semester proposals for the BS-CIS, BA-CIS, and CIS Minor programs. The CSE Semester Task Force comprising about fifteen CSE faculty members, academic advising staff, and undergraduate and graduate students, began meeting weekly at the start of Au09 to plan the semester conversion. Data collected during these deliberations included historical feedback from BS-CSE graduates (compiled as part of accreditation-based assessment processes of that program over the past 10+ years), input from the CSE Department Industrial Advisory Committee, a survey of all CSE faculty on various issues related to the transition, the Undergraduate Forum (an annual open meeting with undergraduate students), and comparisons with about a dozen computer science and engineering, computer science, and similarly named programs at major peer institutions. I should note that the data based on the BS-CSE program also provides information about the BS-CIS, BA-CIS, and the Minor programs because of the many CSE courses that are common to these programs.

One primary concern in designing the BS-CIS program was to keep it similar, in terms of the computing technical content, to the BS-CSE degree. This gives students a clear choice: BS-CSE if you want the non-computing focus to lie within engineering *vs.* BS-CIS if you want the non-computing focus of the program to lie in the liberal arts. In designing the BA-CIS program, the primary concern was to keep it substantially smaller, in terms of computing technical content, than the BS-CIS degree. This gives students a clear choice between our two degree programs in ASC: BS-CIS if you want a stronger computing technical focus *vs.* BA-CIS if you want a stronger focus on how to apply computing in a sophisticated way to a specific related field. The CIS Minor is intended for a student whose primary interest is not in computing but one who still wants to acquire a reasonable grasp of technical computing fundamentals. These considerations have been important during nearly the entire history of our department and have been suitably addressed in our semester proposals.

The faculty have voted to approve the attached proposals as our semester plans for the *BS-CIS, BA-CIS, and CIS-Minor programs*, and I also recommend approval. The vote of all CSE faculty members on the proposals was 39 in favor, 0 opposed, 0 abstentions.

Xiaodong Zhang

Robert M. Critchfield Professor, and CSE Department Chair

Date: 30 November 2010

To: Randy Smith
Vice Provost, Office of Academic Affairs

From: David Tomasko
Associate Dean, Undergraduate Education and Student Services

Subject: Semester Conversion Proposals for the BS-CIS, BA-CIS,   and CIS Minor
programs in the College of Arts & Science

The College of Engineering fully supports the continued offering of a Bachelor of
Science degree in Computer and Information Science, a Bachelor of Arts degree in
Computer and Information Science, and a Minor program in Computer and Information
Science, by our Department of Computer Science and Engineering through the College
of Arts & Science under semesters.

Minor in Computer and Information Science

Primary Contacts: Bruce W. Weide (weide.1, 292-1517) and Neelam Soundarajan (neelam@cse.ohio-state.edu, 2-1444)

1.   Fiscal Unit / Academic Organization

Department of Computer Science and Engineering (1435)

2.   Administering College / Academic Group

College of Natural and Mathematical Sciences (NMS)

3.   Co-administering College / Academic Group

College of Engineering (administrative home college for CSE)

4.   Semester Conversion Designation

c. Converted with minimal changes to program goals and/or curricular requirements

5.   Program / Plan Name

Minor in Computer and Information Science

6.   Type of Program

Undergraduate minor

7.   Program Plan Code Abbreviation

CPTRINF-MN

8.   Degree Title

Not applicable

9.   Specializations / Sub-plans

Not applicable

10.   Program Learning Goals

Not required at this time for minors

11.   List of Semester Courses

See Attachment #1: CIS Minor Proposed Program Requirements.

The proposed program consists of three components. The first is the *programming fundamentals* component consisting of a sequence of two courses that will help students develop essential programming skills and develop their understanding of some key foundational concepts. This component has three different versions (*Tracks A, B, or C*) and students are required to complete one of the tracks. The second component is the *CIS Core* and consists of two courses, CSE 2321, which helps students understand some key theoretical concepts of the field; and CSE 3501, a one credit course on professional and ethical issues in computing which helps students develop

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insight into such questions as copyright and privacy. The third component is the *technical electives* which requires students to take two or more CSE courses (totaling 6 or more credit hours) at the 2000-level and above. Students may choose from among the following courses:

- CSE 2231, 4 hrs; Software II: Software development and design
  Pre-req: CSE 2221; co-req: CSE 2321

- CSE 2331, 3 hrs; Foundations II: Data structures and algorithms
  Pre-req: CSE 2231, 2321

- CSE 2421, 4 hrs; Systems I
  Pre-req: CSE 2231, 2321

- CSE 3241, 3 hrs; Introduction to database systems
  Pre-req: CSE 2231, 2321

- CSE 4251, 1 hr, Unix programming environment
  Pre-req: CSE 2231

- CSE 4252, 1 hr, Programming in C++
  Pre-req: CSE 2231

- CSE 4253, 1 hr, Programming in C#
  Pre-req: CSE 2231

- CSE 4254, 1 hr, Programming in Lisp
  Pre-req: CSE 2231

- CSE 4521, 3 hrs, Survey of AI for non-majors
  Pre-req: CSE 1211 or 1221 or 1222 or 1223 or 2221

- CSE 5471, 3 hrs, Information security
  Pre-req: CSE 2231, 2321

12.   Program Rationale

The Computer and Information Science Minor is intended to permit students majoring in other disciplines to gain enough background and experience in computing foundations and software to understand in depth the relationships between their major field and computing. Graduates who can communicate in clear terms with software professionals who are tasked with designing computing applications (e.g., in the student's major field) are becoming increasingly valuable to employers. Moreover, looking at problems through the lens of "computational thinking" can bring new insights to students' future research in their major field, for those interested in graduate education.

The semester program is essentially a direct translation of the existing quarter program that will continue to address the above needs for students in the CIS Minor. Note that this minor is intended not just for students majoring in science and engineering, but rather for majors across the academy.

13.   Quarters Curriculum Advising Sheet

See Attachment #2: Current Advising Sheet.

14.   Semesters Curriculum Advising Sheet

See Attachment #3: Proposed Advising Sheet.

15.   Curricular Map

Not applicable

16.   Associated Pre-Major or Area of Interest

Not applicable

17.   Credit-Hour Changes

	Number of qtr-cr-hrs in current program	Calculated result for 2/3 of current qtr-cr-hrs	Number of sem-cr-hrs required for proposed program	Change in cr-hrs
Total minimum cr-hrs required for completion of program	25	16.7	16 to 17	–0.7 to +0.3
Required cr-hrs offered by the unit	22	14.7	13 to 17	–1.7 to +2.3
Required cr-hrs offered outside of the unit	3	2.0	0 to 3	–2.0 to +1.0
Required prerequisite cr-hrs not included above	5	3.3	5	+1.7

18.   Rationale for Significant Change in Credit Hours

Not applicable

19.   Transition Policy

No student who begins the Computer and Information Science Minor under quarters will have progress toward completion impeded by the transition to semesters. Computer and Information Science Minor requirements beginning Summer 2012 will be those in force for students under semesters; but *every* quarter-credit-hour that would have counted toward a Computer and Information Science Minor under the quarter-based program will count (as 2/3 of a semester-credit-hour) toward the requirements for the semester version. If necessary, a revision of specific requirements will be worked out for any Computer and Information Science Minor student who is caught in the transition, in consultation with the CSE Associate Chair.

— Xiaodong Zhang, CSE Department Chair

The transition policy is based on the following principles:

- The switch to semesters will impede no student's progress toward graduation.

- All students who graduate under semesters, even during the first semester, will do so by meeting the requirements of the semester program.

- Each semester program requirement may be met either by taking an appropriate semester course or sequence, or by substituting a substantially equivalent quarter course or sequence for the corresponding semester course or sequence.

- Excess equivalent credit-hours resulting from such substitutions—either positive or negative—will be credited against technical elective requirements.

Attachment #4: CIS Minor Proposed Transition Worksheet is a sample (for a particular student, Alice) of a web-based form that will be used to calculate the effect of observing these principles. The cells with a <mark style="background-color: darkgreen; color: white;">dark green background</mark>, along the first column and near the bottom, contain information specific to a student, and are intended to be filled in by the student working with an academic advisor. The remaining cells are fixed, and indicate the substitution mapping between courses that are part of the current CIS Minor program and those of the semester program.

In the sample shown, Alice has completed CSE 200, CSE 201, CSE 214, and Math 366 from the current CIS Minor program (the rows containing a "1" in column 1). All but the first of these courses substitute for particular courses in the semester program. Near the bottom of the worksheet, the row containing "Anything else counted now" shows 5 additional qtr-cr-hrs that would have counted toward Alice's CIS Minor under quarters, i.e., CSE 200. The spreadsheet calculates for Alice the values labeled "Total Completed cr-hrs", "Total Remaining cr-hrs", and "Remaining Tech Elective cr-hrs".

The results: Alice has 16 qtr-cr-hrs toward the CIS Minor. Her substitutions result in a deficit of 4.33 sem-cr-hrs in technical electives, i.e., Alice still has 4.33 cr-hrs of technical electives to take: all net differences in all other categories with satisfied substitutions are combined with remaining technical electives. This number is rounded down to 4 so Alice cannot lose even a fraction of a cr-hr from courses taken under quarters. She must complete all requirements of the semester program not covered by these substitutions.

Alice can see by this method that she has completed all but the requirements shown in **bold** in the sample transition worksheet: "CSE 2501: Professionalism and Ethics" (1 cr-hr), plus 4 cr-hrs of technical electives. In other words, Alice still needs to complete these 5 cr-hrs under semesters in order to complete her CIS Minor. Once she does this, she will be able to graduate having completed 10.67 + 6 = 15.67 equivalent sem-cr-hrs rather than the minimum 16 sem-cr-hrs in the new CIS Minor program.

It is possible that a student might have enough cr-hrs as of the end of Sp12 to graduate within two quarters, but might have failed to cover specific requirements rather than flexible technical electives that would take, say, two semesters to complete. We will rely on systematic advising of students during the year 2011-2012 in order to prevent this from happening.

The main issue facing students in transition is that one substitution calls for completion of a sequence of courses (***bold red italics*** in the transition worksheet) to complete a semester requirement. We will use two approaches to address this problem.

First, we will offer "bridge courses" in Su12 (CSE 222) and Au12 (CSE 321) in order to accommodate students who wish to start into the CSE 221/222/321 sequence in Wi12 or Sp12. The table below shows the schedules such students will be advised to follow, depending on which quarter they start this sequence. Students who do not plan to take classes during Su12 will be advised to take CSE 2221: "Software I" in Au12 rather than taking CSE 221 in Sp12.

Wi12 (qtr)	Sp12 (qtr)	Su12 (sem)	Au12 (sem)
CSE 221	CSE 222		CSE 321 (bridge)
	CSE 221	CSE 222 (bridge)	CSE 321 (bridge)

Second, via systematic advising, we will seek to prevent students from starting into this sequence in the transition worksheet if they are not confident that they can complete it under quarters.

All other issues will be handled on a case-by-case basis. The student, the CSE Advising Office, and if necessary the CSE Undergraduate Studies Committee will negotiate custom arrangements to fill the gap through a combination of allowing the substitution anyway, offering independent studies to make up deficiencies, and/or very limited requirements waivers. Students who find their progress toward graduation impeded *by failure to meet with an advisor and complete the transition worksheet, by failure to schedule and complete courses as advised, or by a failing grade in any course,* may find themselves with little recourse. The transition worksheet will, therefore, be accompanied by a transition scheduling plan that shows exactly how the student should expect to complete the CIS Minor program without being impeded by the switch to semesters. The student will be asked to sign their own personalized transition worksheet and transition scheduling plan at the advising appointment where such details are worked out with an academic advisor. These meetings will take place starting as soon as this proposal is officially approved.

20.   Assessment Practices

Not applicable

Attachment #1:

CIS Minor Proposed Program Requirements

- One of Programming Fundamentals Track A, B, or C is required
- All courses under CIS Core must be completed
- Technical Electives may be any CSE courses approved by the CSE Advising Office, or Discrete Mathematics
- Minor program final approval is obtained from the CSE Advising Office
- ASC minor guidelines apply to transfer credits, overlaps, grades, etc.

Programming Fundamentals: Track A	Course Number	Cr-hrs
Computational Thinking in Context: Images, Animation, and Games	CSE 1211	3
Software I: Software Components	CSE 2221	4
Total Track A cr-hrs (= 7)		7

Programming Fundamentals: Track B	Course Number	Cr-hrs
Introduction to Computer Programming in C++ for Engr and Sci	CSE 1222	3
Data Structures Using C++	CSE 1232	3
Total Track B cr-hrs (= 6)		6

Programming Fundamentals: Track C	Course Number	Cr-hrs
Introduction to Computer Programming in Java	CSE 1223	3
Data Structures Using Java	CSE 1233	3
Total Track C cr-hrs (= 6)		6

CIS Core	Course Number	Cr-hrs
Foundations I	CSE 2321	3
Professionalism and Ethics	CSE 3501	1
Total CIS Core cr-hrs (= 4)		4

Technical Electives	Course Number	Cr-hrs
Technical Elective		
Technical Elective		
Total Technical Electives cr-hrs (≥ 6)		

Grand Total (≥ 16)		

Attachment #2: Current Advising Sheet

Department of Computer Science & Engineering,
395 Dreese Laboratories, 2015 Neil Avenue
Columbus, OH 43210-1277; 614-292-1900
http://www.cse.ohio-state.edu

The minor in computer and information science (CIS) consists of a minimum of 25 credit hours in one of two tracks: programming and algorithms, or information systems. See the course lists below. If you complete the minor following these guidelines, you should file the Minor Program Form with a college or school counselor. Any variation from the program described here needs the approval of the coordinating adviser in the Department of Computer Science & Engineering. **CIS minors do not pay a computing fee (at least not as part of their minor), they do not get permanent computer accounts on the CSE machines, and do not get priority scheduling**. For further information about the minor program, contact the CSE advising office.

Information systems track

Required courses

CSE 200, 201, 214, 670
Mathematics (Math) 366

Elective course (select a minimum of two)**

CSE 314, 551, 616, 671

Programming and algorithms track

Required courses

CSE 201 or 202, 221, 222, 321,
Math 366

Elective courses (select a minimum of two)**

CSE 360, 541, 551, 581, 621,625,630, 670, 671, 675.01 or 675.02, 677, 680.

**Other courses as approved by CSE Advising Office

Arts and Sciences minor program guidelines

The following guidelines govern minors.

Required for graduation   No

Credit hours required A minimum of 20 (some minors require more)

Transfer credit hours allowed A maximum of 10

Overlap with the GEC Permitted, unless specifically disallowed by an individual minor program.

Overlap with the major Not allowed and
• The minor must be in a different subject than the major.
• The same courses cannot count on the minor and on the major.

Overlap between minors Each minor completed must contain 20 unique hours.

Grades required
• Minimum C- for a course to be listed on the minor.
• Minimum 2.00 cumulative point-hour ratio required for the minor.
• Course work graded Pass/Non-Pass cannot count on the minor.

Approval required The minor program description sheet indicates if the minor course work must be approved by:
• The academic unit offering the minor, or
• A college or school counselor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college or school counselor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by:
• The academic unit offering the minor, or
• A college advisor (depending on the minor).

Department of CSE
01/10

Attachment #3: Proposed Advising Sheet

Undergraduate Minor in
Computer and Information Science

Computing has become the key enabler of fabulously rapid advances across nearly all disciplines of the academy and throughout all segments of society. Students who understand—in some depth—the relationship between their major field and computing, who know how computer software works as well as its capabilities and limitations, and who can communicate both with sophisticated computing users and with those who design and build computing applications used in their major field, are becoming increasingly valuable to employers. Moreover, looking at problems through the lens of "computational thinking" can bring new insights to students' future research, for those interested in graduate education.

The *Computer and Information Science (CIS) Minor*, administered by the OSU Department of Computer Science and Engineering (CSE), is designed to provide such knowledge and skill. It educates undergraduate students in both conceptual and practical aspects of computer and information science and helps prepare them to contribute to the applications of computing in their major field.

Impact for the Student

Completion of the program leads to a transcript designation that can and should be advertised to prospective employers. Candidates with serious knowledge of computing are very attractive to most employers and prospective graduate schools.

Curriculum

The CIS Minor consists of minimum of 16 cr-hrs in the areas of computing foundations, software, and (typically) applications.

Prerequisites

All students earning the CIS Minor must complete the first semester of calculus (a prerequisite to one of the CIS Minor's required courses). Calculus is not counted as part of the minor.

Getting Started

Prospective students should begin by contacting the CSE Department's Undergraduate Advising Office (DL 374, 2-1900).

Course options listed on reverse.
For more details, please see:
http://www.cse.ohio-state.edu/ugrad/cisminor.shtml

rev. 12/2010

- One of Programming Fundamentals Track A, B, or C is required
- All courses under CIS Core must be completed
- Technical Electives may be any CSE courses approved by the CSE Advising Office, or Discrete Mathematics
- Minor program final approval is obtained from the CSE Advising Office
- ASC minor guidelines apply to transfer credits, overlaps, grades, etc.

Programming Fundamentals: Track A	Course Number	Cr-hrs
Computational Thinking in Context: Images, Animation, and Games	CSE 1211	3
Software I: Software Components	CSE 2221	4
Total Track A cr-hrs (= 7)		7

Programming Fundamentals: Track B	Course Number	Cr-hrs
Introduction to Computer Programming in C++ for Engr and Sci	CSE 1222	3
Data Structures Using C++	CSE 1232	3
Total Track B cr-hrs (= 6)		6

Programming Fundamentals: Track C	Course Number	Cr-hrs
Introduction to Computer Programming in Java	CSE 1223	3
Data Structures Using Java	CSE 1233	3
Total Track C cr-hrs (= 6)		6

CIS Core	Course Number	Cr-hrs
Foundations I	CSE 2321	3
Professionalism and Ethics	CSE 3501	1
Total CIS Core cr-hrs (= 4)		4

Technical Electives	Course Number	Cr-hrs
Technical Elective		
Technical Elective		
Total Technical Electives cr-hrs (≥ 6)		

Grand Total (≥ 16)		

Attachment #4:

CIS Minor Proposed Transition Worksheet

Bold red italics: combination required

Done?	Quarter Course Completed	q-cr-hrs	Equiv s-cr-hrs	Substitutes For	s-cr-hrs	Excess s-cr-hrs
	CSE 203 or CSE 204	4	2.67	CSE 1211: Computational Thinking in Context: Images, Animation, and Games	3	-0.33
	CSE 221 and CSE 222	8	5.33	CSE 2221: Software I: Software Components	4	1.33
	CSE 202	4	2.67	CSE 1222: Introduction to Computer Programming in C++ for Engr and Sci	3	-0.33
	CSE 230	4	2.67	CSE 1232: Data Structures Using C++	4	-1.33
1	CSE 201	4	2.67	CSE 1223: Introduction to Computer Programming in Java	3	-0.33
1	CSE 214	4	2.67	CSE 1233: Data Structures Using Java	3	-0.33
1	Math 366	3	2.00	CSE 2321: Foundations I: Discrete Structures	3	-1.00
	CSE 601	1	0.67	**CSE 2501: Professionalism and Ethics**	1	-0.33
1	Anything else counted now: [list here]	5	3.33	**Technical Electives**	6	-2.67

* Any equiv s-cr-hr difference counts in tech electives.

16	10.67	Total Completed cr-hrs
	5.33	Total Remaining cr-hrs
	4.33	Remaining Tech Elective cr-hrs

After meeting with my academic advisor, I understand the conversion of my
coursework from quarters to semesters. I also understand that:

1) I will not be impeded toward completion if I follow the plan put forward
in this transition worksheet and the attached timetable for completion, and

2) if I fail to make satisfactory progress on my part, fail to schedule
promptly and appropriately and complete courses as advised,
and/or otherwise fail to follow this plan, completion in a timely fashion
may not be possible.

Student printed name / signature / date: _____ / _____ / _____

Advisor printed name / signature / date: _____ / _____ / _____