CSCE 190: COMPUTING IN THE MODERN WORLD

Catalog Description:

190—Computing in the Modern world. (1) (Corequisite of CSCE 145, 204, 206, or equivalent) An introduction to the field of computing—trends in computing technology, the profession and careers; subdisciplines in computing; the nature of research and development. Open to all majors.

Co-requisite: CSCE 145, 204, 206, or equivalent.

Textbook(s) and Other Required Material:

Lecture notes will be provided. Some material will come from websites of professional organizations.

Computing Platform: None specified. Papers and presentations will be required but can be prepared with tools of the student's choice.

Course Outcomes: {Assessment Methods Shown in Braces}

1. An understanding of "the big picture" of computing. {tests}
2. Knowledge of milestone events in the history of computing and what the future of computing will look like {tests and the proposal}
3. Knowledge of some advanced directions in computing research {tests and the proposal}
4. A familiarity with career trends in computing {tests}

Topics Covered:

1. The curricula in computing at USC (1 hour)
2. The job market and employment trends in computing and IT (1 hour)
3. Trends in computing—hardware, devices, HCI, software, and the web (5 hours)
4. Research methodology in computing (1 hour)
5. Research topics in computing at USC (2 hours)
6. Lectures from the real world (3 hours)
7. Exams (1 hour)

Course Work:

Written assignments, examinations, and class discussions. The major written assignment will be a proposal for a research project in computing, a brief business plan for a startup company in computing, or a proposal for a comparable professional activity in computing.

Syllabus Flexibility:

Low. The Undergraduate Committee approves the choice of lecture material and syllabus.

Estimated CSAB Category Content:

Not relevant to this course.

Algorithms:	?
Data Structures:	?
Software Design:	?
Concepts of Programming Languages	?
Organization and Architecture	?

Oral and Written Communication:

Written proposal.

Social and Ethical Issues:

Introductory overview.

Theoretical Content:

Introductory overview.

Analysis and Design:

Introductory overview.

Class/Laboratory Schedule:

Lecture: 1 periods of 50 minutes per week

Assessment Activities

Student course evaluations (each semester)
Specific assessments as indicated below.

Course Coordinator: Duncan Buell

Modification and Approval History

Prepared by Duncan Buell Fall 2006.

Lecture by lecture plan for the semester

1. The USC and national curricula in computing: what are the core courses, how do they fit together, what are the "tracks" one can follow in electives (tracks such as computational math/scientific computing, graphics/visualization/multimedia, agents/ecommerce, bioinformatics, etc.)
2. The job market and employment trends. What do job titles mean? What should one expect as a career path?

3. Trends in the infrastructure of computing: processing, storage, bandwidth
4. Trends in the control of physical devices: robots, pervasive/embedded computing
5. Trends in HCI, including vision, speech, visualization, multimedia
6. Trends in software design and development
7. How do the internet, the Web, and Google work?

8. Exam

9. Methodologies for research in computing
10. Research in computing at USC 1 (might be overlap/subsumption with lectures 3-7)
11. Research in computing at USC 2 (ditto)

12. Outside speaker 1
13. Outside speaker 2
14. Outside speaker 3

Explanation
First of all, the three outside speakers will be scheduled for whenever they can be scheduled, but for the purpose of looking at a course plan we can act as if they come at the end.

The trends lectures would be planned to tie in to the core curriculum and to research programs at USC. The development of cache, microprocessors, etc., is closely tied to what we teach in 212. The history of operating systems can be tied to 311. The history of personal computers is connected to client server models and networks. And so forth. These lectures should be done so as to provide the background of how we got to what we have and teach today; this was developed over time and not all invented in one night.

My thinking for the research lectures is that they should be propaganda setups for the 500/600 level courses. The first 30 or 35 minutes of a security lecture could resemble, for example, an overview of the table of contents of the 522 text (in the sense that this provides an organized look at the issues that are addressed in computer security in general), followed by some specifics, geared to freshman students, of what Farkas or Huang are doing in security research. The goal would be to cover topics (varying from one semester to the next) in faculty research as well as to clue students in on the nature of the 500/600 level courses.

The methodologies lecture would cover the different approaches to research (theoretical, building, simulating, measuring, and modeling) and be the directions to the students about how to do a proposal for research. This will also give some context for the research lectures that follow.

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End of Course Analysis of Outcomes

Spring 2007—Duncan Buell

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Textbook(s) and Other Required Material:

Lecture notes will be provided. Some material will come from websites of professional organizations.

Course Outcomes:

After completing this course students should be have:

1. An understanding of "the big picture" of computing. {tests}
2. Knowledge of milestone events in the history of computing and what the future of computing will look like {tests and the proposal}
3. Knowledge of some advanced directions in computing research {tests and the proposal}
4. A familiarity with career trends in computing {tests}

Topics Covered

1. The curricula in computing at USC (1 hour)
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6. Lectures from the real world (3 hours)
7. Exams (1 hour)

Assessment of Learning by Course-Outcome:

Summary of Results

Coursework	Topic	Outcomes																			
		OC. 1				OC. 2				OC. 3				OC 4				OC. 5			
		CE	CS	CIS	Other	CE	CS	CIS	Other	CE	CS	CIS	Other	CE	CS	CIS	Other	CE	CS	CIS	Other
Lab 4	Array Lists																				
Lab 7	Singly Linked Lists																				
Lab 8	Doubly Linked Lists																				
Lab 5	Stacks																				
Lab 6	Queues																				
Lab 10	Recursion																				
Lab 11	Expression Trees																				
Lab 12	Binary Search Trees																				
Lab 13	Heaps																				
Lab 15	Run time measurement, Big Oh																				
Homework #1	Big Oh																				
Homework #2	Interfaces																				
Exam	Comprehensive																				
Programs on Exam	Program 1 #17																				
	Program 2, #18																				
	Program 3, #19																				
Average																					

* Averages based on XX Computer Engineering, XX Computer Science, XX Computer Information Systems students who completed the course.

Outcome 1. ***An understanding of "the big picture" of computing.***

Coverage of Material.

The lectures will include an overview of the ubiquitous nature of computing in the modern world, including business data processing, analysis of information flow in businesses and the use of information technology to satisfy the information need, scientific computing such as is done by the Department of Defense, the Department of Energy, the oil, automotive, and aerospace industries, and "new economy" use of IT in web applications and e-commerce. Students will be assessed through the exams and their project proposal as to how well they understand at least some aspect of the total world of computing.

Outcome 2. ***Knowledge of milestone events in the history of computing and what the future of computing will look like.***

Coverage of Material.

Hardware, systems and applications software, and expanding markets can be seen as part of general patterns of growth as technology has changed. Students will be expected to know how we got to where we are now, what would be the path of computing were there to be no new disruptive technologies introduced, and how we might expect a disruptive technology to change the world of

computing in a discontinuous way. Students will be assessed based on their understanding of these historical trends. The proposal, being a forward looking plan for future work, should reflect their ability to find a position in the changing world of computing of which advantage can be taken.

Outcome 3. ***Knowledge of some advanced directions in computing research.***

Coverage of Material.

Students should have entered into a computing curriculum with some notion of what their subdiscipline interests might be. The advanced directions portion of this class will introduce them to some aspects of upper-level computing and associated research. They will be assessed based on their ability to provide a brief overview of one such subdiscipline that interests them. The proposal should include material which demonstrates that the student has understood some aspect of advanced computing.

Outcome 4. ***A familiarity with career trends in computing.***

Coverage of Material.

Medial hype about outsourcing has jaundiced the view of the employment situation in computing, and yet the outlook for most computing careers is stronger than for practically any other technical discipline. To be successful in a lifelong career in computing will require students to be agile and adaptable. They will be assessed on their ability to associate career trend synopses with technical content and thus their ability to position themselves for success later in life.