

Academic Assessment Committee
Feb 4, 2009

CS Department Outcomes Project
(A Work in Progress)

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Phase 1: Identify Degree Objectives

Quoted from the *CS Outcomes* document:

Introduction

This document specifies the learning objectives and outcomes for the BA degree with a major in Computer Science (CS): CS concentration. *Objectives* are knowledge, skills, and attitudes that students should possess three to five years after completing the major; that is, they are long range goals. *Outcomes* are knowledge, skills, and attitudes that students are to be measured against during their progression through the major and that students graduating with this major should have achieved.

Preamble

The following learning objectives apply to graduates in the Computer Science concentration:

Objectives (continued)

Objective 1

graduates shall have been prepared for professional careers in a variety of roles such as computer programmer, software engineer, software systems designer, software applications developer, technical software project lead, computer systems analyst, computer systems programmer, software applications tester and maintainer.

Objective 2

graduates shall have acquired the knowledge and skills to do advanced studies and research in computer science and related disciplines.

Objective 3

graduates shall have acquired communication skills – including oral, written, and visual – to be effective team-oriented problem solvers and effective communicators with people who are not trained in computer technology.

Objective 4

graduates shall have acquired the knowledge and skills necessary to participate as effective team members or team leaders in the development of large computer and software systems covering a broad range of applications.

Learning Outcomes

All graduating students with a major in CS (CS Concentration) shall demonstrate:

Math:

knowledge of discrete and continuous mathematics – including elementary probability and statistics – and the ability to apply logic and mathematical proof techniques to computing problems.

Theory:

knowledge of basic theory of computability and complexity of computation.

Programming:

knowledge of and the ability to apply programming fundamentals in at least two programming languages.

Algorithms:

knowledge of fundamental data structures and algorithms – including analysis of their correctness and complexity – related to various fields of computer science, and the ability to apply this knowledge to problems through the use of appropriate programming languages.

Arch/OS/Networks:

knowledge of computer architecture and organization, computer operating systems, and computer networks, and the ability to apply this knowledge to problems through the use of appropriate programming languages.

Learning Outcomes – continued

All graduating students with a major in CS (CS Concentration) shall demonstrate:

Communication:

competence and effectiveness in technical oral, written, and visual communication, particularly as they apply to the dissemination of technical information on subjects dealing with computing technology and applications.

Software engineering:

knowledge of and skill in applying good practices in software engineering.

Teamwork:

the ability to function effectively in teams to accomplish a common goal.

Professional Practice:

an understanding of professional, ethical, legal, security, and social responsibilities and issues, including an awareness of impact of computing on individuals, organizations and society.

Professional Development:

a commitment to continuing professional development.

Next step: Developing rubrics for specific competencies

Example rubric for Programming (item 3 in the outcomes):

Note: This is taken verbatim from the California State University Long Beach CS Department. We are in the process of modifying this and other programming rubrics to meet our needs.

Trait	Unsatisfactory score = 0	Amateur score = 1	Acceptable score = 2	Exceptional score = 3
<i>Specifications</i>	The program produces incorrect results.	The program produces correct results but does not display them correctly.	The program works, produces the correct results and displays them correctly. It also meets most of the other specifications.	The program works and meets all of the specifications.
<i>Readability</i>	The code is poorly organized and very difficult to read.	The code is readable only by someone who knows what it is supposed to be doing.	The code is fairly easy to read.	The code is exceptionally well-organized and very easy to follow.

Other Programming grading rubrics are defined for:

- *Reusability*
- *Documentation*
- *Delivery*
- *Efficiency*

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Mapping outcomes to required courses – continued

Second try:

Sheet1

CS BA mapping of objectives to required courses – December 17, 2008															
	CIS 201	CIS 203	CIS 300	CIS 301	CIS 303	CIS 310	CIS 356	CIS 380	CIS 405	CIS 410	CIS 420	CIS 480/490	MATH 125	MATH 151	MATH 152
	CS I	CS II	Discrete	Theory	Algorithms	OS	Arch.	Ethics	SE	Networks	Databases	Capstone	Prob/Stat	Calc I	Calc II
1 Math		1	3	2	3						1		3	3	3
2 Theory		1	0	3	2					1	1				
3 Programming	2	3	1		2	2	3		2	2	2				
4 Algorithms	1	2	2	2	3	2		0	1	2	2				
5 Arch/OS/Networks		1				3	3			3					
6 Communication		1						3	3	0	0	3			
7 Software Engineering	1	1				2		2	3	1	1	3			
8 Teamwork	2	2	0		0			1	3	0					
9 Professional Practice	1	1						3	2			2			
10 Professional Dev.		1						2	2			2			
Proficiency															
1=recognition															
2=familiarity															
3=mastery															



Mapping outcomes to required courses – continued

Final result:

Sheet1

CS BA mapping of objectives to required courses – December 17, 2008															
	CIS 201	CIS 203	CIS 300	CIS 301	CIS 303	CIS 310	CIS 356	CIS 380	CIS 405	CIS 410	CIS 420	CIS 480/490	MATH 125	MATH 151	MATH 152
	CS I	CS II	Discrete	Theory	Algorithms	OS	Arch	Ethics	SE	Networks	Databases	Capstone	Prob/Stat	Calc I	Calc II
1) Math		1A	3C	3B	3B		2B			1A	3B				3C
2) Theory		0		3C	2B					0					
3) Programming	2C	3C	3A		3C	3B	3C		3C	3B	3C				
4) Algorithms	1A	2B	2A	2C	3C	2B			0	2B	2A				
5) Arch/OS/Networks		0				3C	3C			3C					
6) Communication		1A						3C	3C			3C			
7) Software Engineering	1A	1A				2A		0	3C	2A	2A	0			
8) Teamwork		2B	2B					2A	3C						
9) Professional Practice	1A	0						3C	2A				2A		
10) Professional Dev.		1A						2B	2A				2A		
Proficiency															
1=recognition															
2=familiarity															
3=mastery															
Coverage															
A=minimal															
B=moderate															
C=substantial															

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