



CALIFORNIA STATE  
UNIVERSITY  
E A S T B A Y

**COMMITTEE ON ACADEMIC PLANNING AND REVIEW  
ANNUAL PROGRAM REPORT**

College	CoS
Department	Math and Computer Science
Program Unit	Computer Science
Reporting for Academic Year	2013-2014
Department Chair	Matt Johnson
Date Submitted	9/29/14

**1. SELF-STUDY (about 1 page)**

**A. Five-year Review Planning Goals**

The B.S. program in Computer Science faces challenges common to subject areas with constant change. While there is a stable core of concepts, developments in equipment and in the uses of computers have created new areas of study as well as renewed ideas that were once thought impractical.

Students graduating with the B.S. in Computer Science almost always seek employment after graduation. Our program has the highest rate of degree-related job placement at CSUEB. In fact, the Washington Post recently ranked our program #8 in the country at producing graduates with mid-career income potential. Attrition from the program predominantly comes from students being unable to satisfy its academic requirements.

Our goals from the last five year review were to increase enrollment in the program, replace retiring faculty, and to implement an assessment plan. Since then, our program has been steadily growing since then at a rate of about 15% and we now serve well over 300 students. The

department was able to hire one new faculty member, Dr. Jiaofei Zhong, to teach Computer Science theory. We have another search this year for a general computer scientist with knowledge in topical areas such as big data, application development, and cloud computing.

Our assessment plans have been moving forward. We have mapped institutional learning outcomes to program and student learning outcomes. We have aligned EACH of our courses with program learning outcomes. In the last year, we have implemented assessment in 11 key courses in our B.S. Computer Science program. We are compiling results and modifying our process as we further develop our assessment model.

The Program Prioritization report was useful as a self-study, and we have pinpointed several areas for improvement in our assessment plan, and in meeting institutional learning outcomes.

## **B. Five-year Review Planning Goals Progress**

In our five year review, we mentioned the need to increase enrollment, replace faculty that were FERPing or retiring, and institute an assessment plan. The demand for the Computer Science degree is primarily external and based on location and employment opportunities. Our program is quite diverse, with many international students and students of Asian heritage. Computer Science attracts students because the university is so near to Silicon Valley. The Bureau of Labor statistics projects a 22% increase in jobs over the next 6 years.

Six faculty members in the Computer Science program are FERPing. It is essential to replenish faculty to both cover existing requirements and find faculty with more direct experience with newer technology. We have difficulties hiring Computer Science lecturers due to salary constraints and opportunities in Silicon Valley. Luckily, we were able to hire a new tenure track faculty member and anticipate hiring another tenure track faculty member this year.

At the time of our last five year review, we were just starting to identify program learning outcomes and student learning outcomes. In the past two years we have finalized program learning outcomes, aligned those to our courses, and have begun implementing post-assessment examinations for each course. The exams are deployed through Blackboard and automatically scored. We are looking at ways to streamline this process.

### C. Program Changes and Needs

Since our last five year review, two new hybrid courses have been added to the Computer Networks curriculum: Security in Mobile, Wireless, Grid and Pervasive Computing (CS 4526) and Security Management (CS 4527).

#### Faculty Data:

<b>Name</b>	<b>Base</b>
Billard, Ted	0.11 (FERP)
Brown, Kevin	1.0
Christianson, Leann	1.0
Daley, Jim	0.22 (FERP)
Ertaul, Levent	1.0
Grewe, Lynne	1.0
Johnson, Matt	1.0
Jurca, Dan	0.44 (FERP)
Reiter, Eddie	0.5 (FERP)
Roohparvar, Farzan	1.0
Simon, Steve	0.44 (FERP)
Thibault, William	1.0
Yang, David	1.0
Yu, Ytha	0.5 (FERP)
Zhong, Fay	1.0
<b>Total:</b>	<b>11.21</b>

#### Resources and Needs:

The Computer Science Department was dramatically impacted by IT Centralization several years back. Up until last year, we had only one small computing lab with less than a dozen machines -- despite the number of students in the majors -- and only one computer classroom. This year we were finally able to obtain at least primary usage to a second newly renovated computer classroom, and access to a second small computer lab

in VBT. CS is still SEVERELY underequipped. Students often try to make do with their own laptops and general purpose space (like the Cave of the Science building), but this often leads to difficulties from incompatibilities among their laptops. Many courses in the curriculum require dedicated servers that are isolated from the campus networks, as students write programs to interact or query these servers. Getting these configurations set up is difficult when IT centrally manages all systems on campus. Classroom space, retiring faculty, equipment and software shortages, and lack of dedicated IT support are all issues that impact the program's future growth.

## **2. SUMMARY OF ASSESSMENT (about 1 page)**

### **A. Program Student Learning Outcomes**

Students graduating with a Bachelor of Science in Computer Science will be able to:

1. apply knowledge of mathematics and computational theory to appropriate problems in computer science
2. analyze a problem, and identify and define the resources and requirements needed for its solution
3. design and implement a program to meet stated needs
4. develop and maintain computer-based systems, processes, and platforms
5. recognize and distinguish the mechanisms, components and architecture of computing systems
6. employ current techniques, skills, and tools necessary for computing practice
7. identify professional, ethical, legal, and security issues and responsibilities and the impact of computing on individuals, organizations, and society
8. perform successfully on teams to accomplish a common goal, and communicate effectively in written and oral form

## B. Program Student Learning Outcome(s) Assessed

1. apply knowledge of mathematics and computational theory to appropriate problems in computer science
2. analyze a problem, and identify and define the resources and requirements needed for its solution

## C. Summary of Assessment Process

We created SLOs and PLOs for the B.S. in Computer Science in the academic year 2012-2013. The Math and Computer Science Department in which this degree is housed made the decision to use Blackboard as a means to provide students with an assessment exam that addresses the SLOs of each course which are aligned to the PLOs for each program and the ILOs of the university. We have these in place for 11 key courses in the Computer Science program at this time. The results of these exams are being stored in a separate Blackboard shell repository for the department. Evaluating the results of these exams is challenging, as each assessment contains questions for multiple PLOs. We are currently looking at averages over the entire exam, which is suboptimal. Due to this, we are considering other options. The existing version of Blackboard unfortunately does not support aggregation and comparison of assessments across multiple courses.

We have also had a problem of oversubscribed courses. The university has limits on class sizes while students register for classes during specific scheduled time slots. Students have regularly signed up for many more courses than they intend to take, and drop courses at a later time. While this may seem like purely an administrative inconvenience, it does create concrete pedagogical problems. Because students join the programs with varying backgrounds, incoming students in some sense compete with existing students for many of the same classes. Since incoming students register after existing students, they are the ones who are often shut out of the classes they should be taking. This increases the chances they end up trying to learn material that is beyond them. To handle this problem, the department has started to limit early registration for courses. Early indications are positive. New students have been able to sign up for courses with very few complaints.

Under our assessment plan, a score of 7 or higher indicates success in achieving a PLO. For this academic year, the CS program is evaluating PLOs #1 and #2. As can be seen in the summary below, there is only one instance (in CS 4590 for PLO #1) where this threshold was not achieved. In closing the loop, the Chair met with the instructors for CS 4590 and the department's two graduate coordinators. Through discussion, it was made clear that targeting the student demographic and level of competence for this course was difficult due to the fact that it must serve all three programs in the Computer Science Department (B.S., M.S. and C.N.) and, as a result, it must be assessed three separate times for each degree. We will address this problem by offering separate sections of CS 4590 in the future.

#### D. Summary of Assessment Results

2013-2014 Assessment Exam results B.S. in Computer Science	1	2	3	4	5	6	7	8
	CS 1160 Introduction to Computer Science I			6.6			5.6	
CS 3120 Programming Language Concepts	7.2		6.6					
CS 3340 Introduction to OOP and Design			4.0		7.0			
CS 3520 Web Site Development				8.3		8.7		
CS 4020 Computers and Social Responsibility							9.2	9.2
CS 4110 Compiler Design	7.7	7.4	8.5					
CS 4245 Analysis of Algorithms	7.7	7.6				7.5		
CS 4310 Software Engineering I		8.0	8.0					8.0
CS 4590 Computer Networks	5.8			6.3	7.8			
CS 4596 Wireless and Mobile Networking	9.2			10		10		
CS 4849 Game Programming		7.1	6.4					

### 3. STATISTICAL DATA

All data available at <http://www20.csueastbay.edu/ir/academic-program-review/>

Student Demographics:

**CAPR Table 1**

**California State University, East Bay**

Computer Science		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013
<b>Female</b>	<b>Black, non-Hispanic</b>	4	3	3	2	3
	<b>American Indian or Alaska Native</b>					
	<b>Asian</b>	15	15	18	21	10
	<b>Pacific Islander</b>	1			2	
	<b>Hispanic</b>	9	4	3	5	7
	<b>White</b>	5	5	7	3	4
	<b>Multiple ethnicity</b>			2		2
	<b>Race/ethnicity unknown</b>	3	2	1	1	
	<b>Nonresident aliens</b>	4	7	7	5	3
<b>Male</b>	<b>Black, non-Hispanic</b>	20	17	23	12	12
	<b>American Indian or Alaska Native</b>					
	<b>Asian</b>	68	69	81	74	79
	<b>Pacific Islander</b>	6	5	3	1	3
	<b>Hispanic</b>	26	22	22	29	39
	<b>White</b>	47	52	60	80	79
	<b>Multiple ethnicity</b>	3	8	5	8	13
	<b>Race/ethnicity unknown</b>	24	7	7	12	11
	<b>Nonresident aliens</b>	46	44	48	60	61
<b>Total</b>	<b>Black, non-Hispanic</b>	24	20	26	14	15
	<b>American Indian or Alaska Native</b>					
	<b>Asian</b>	83	84	99	95	89
	<b>Pacific Islander</b>	7	5	3	3	3
	<b>Hispanic</b>	35	26	25	34	46
	<b>White</b>	52	57	67	83	83
	<b>Multiple ethnicity</b>	3	8	7	8	15
	<b>Race/ethnicity unknown</b>	27	9	8	13	11
	<b>Nonresident aliens</b>	50	51	55	65	64

Annual Data:

A. Student Headcount:

Computer Science B.S. and M.S.	Fall Quarter				
Headcount Enrollment	2009	2010	2011	2012	2013
1. Undergraduate	281	260	290	315	326
2. Postbaccalaureate	19	8	4	0	1
3. Graduate	183	184	148	105	152
4. Total Number of Majors	483	452	442	420	479

B. Degrees Awarded:

Computer Science B.S. and M.S.	College Years				
Degrees Awarded	08-09	09-10	10-11	11-12	12-13
1. Undergraduate	42	41	54	51	63
2. Graduate	38	62	102	89	57
3. Total Number of Majors	80	103	156	140	120

Accepted Applications for MS Computer Science (from Graduate Coordinator records):

- For the Winter 2014 quarter, there were 356 applicants, of whom 2 were accepted into the 4<sup>th</sup>-year Bridge program, 218 were accepted into the CS MS program, and 136 were rejected.
- For the Spring 2014 quarter, there were 250 applicants, of whom 1 was accepted into the 4<sup>th</sup>-year Bridge program, 115 were accepted into the CS MS program, and 134 were rejected.
- For the Fall 2014 quarter, there were 1150 applicants, of whom 3 were accepted into the 4<sup>th</sup>-year Bridge program, 142 were accepted into the CS MS program, and 1005 were rejected.



C. Faculty Information:

Please note that the university does not calculate separate data for the Math and Computer Science programs. Please see above (Program Needs) for information on Computer Science and Computer Network faculty.

Computer Science, Computer Network, and Mathematics	Fall Quarter				
Faculty	2009	2010	2011	2012	2013
<b>Tenured/Track Headcount</b>	Computer Science, Computer Network, and Mathematics				
1. Full-Time	28	25	25	23	21
2. Part-Time	3	4	2	1	1
3a. Total Tenure Track	31	29	27	24	22
3b. % Tenure Track	57.4%	80.6%	62.8%	58.5%	52.4%
<b>Lecturer Headcount</b>	Computer Science, Computer Network, and Mathematics				
4. Full-Time	3	1	1	1	2
5. Part-Time	20	6	15	16	18
6a. Total Non-Tenure Track	23	7	16	17	20
6b. % Non-Tenure Track	42.6%	19.4%	37.2%	41.5%	47.6%
7. Grand Total All Faculty	54	36	43	41	42
<b>Instructional FTE Faculty (FTEF)</b>	Computer Science, Computer Network, and Mathematics				
8. Tenured/Track FTEF	19.5	22.4	19.4	16.5	17.4
9. Lecturer FTEF	21.5	11.1	18.1	19.0	19.3
10. Total Instructional FTEF	41.0	33.5	37.4	35.4	36.7
<b>Lecturer Teaching</b>	Computer Science, Computer Network, and Mathematics				
11a. FTES Taught by Tenure/Track	372.5	439.1	307.1	288.1	314.9
11b. % of FTES Taught by Tenure/Track	37.8%	58.7%	38.7%	36.0%	36.2%
12a. FTES Taught by Lecturer	612.5	308.5	487.1	513.2	553.9
12b. % of FTES Taught by Lecturer	62.2%	41.3%	61.3%	64.0%	63.8%
13. Total FTES taught	985.0	747.7	794.2	801.3	868.7
14. Total SCU taught	14775.0	11215.0	11913.0	12019.0	13031.0

D. Student Faculty Ratios:

Computer Science and Networks	Fall Quarter				
Student Faculty Ratios	2009	2010	2011	2012	2013
1. Tenured/Track	17.8	16.8	14.7	17.1	19.4
2. Lecturer	22.3	26.4	23.6	27.5	30.2
3. SFR By Level (All Faculty)	18.8	17.5	15.5	18.5	21.5
4. Lower Division	26.7	24.6	22.5	20.8	24.9
5. Upper Division	18.0	17.0	17.5	20.2	21.4
6. Graduate	16.6	15.9	10.1	14.5	19.8

E. Sections:

Computer Science and Networks	Fall Quarter				
Section Size	2009	2010	2011	2012	2013
1. Number of Sections Offered	47.0	39.7	47.8	37.0	45.8
2. SCU taught	3505.0	3016.0	2962.0	3054.0	3938.0
3. Average Section Size	20.6	21.1	17.8	20.9	22.5
4. Average Section Size for LD	31.0	33.5	26.4	29.5	27.0
5. Average Section Size for UD	19.2	20.2	18.8	21.4	22.9
6. Average Section Size for GD	18.3	18.7	12.5	15.5	19.5
7. LD Section taught by Tenured/Track	4	4	5	5	5
8. UD Section taught by Tenured/Track	19	18	21	19	21
9. GD Section taught by Tenured/Track	13	16	18	10	12
10. LD Section taught by Lecturer	2	0	2	1	3
11. UD Section taught by Lecturer	6	1	0	3	5
12. GD Section taught by Lecturer	4	2	3	3	3