CALIFORNIA STATE UNIVERSITY EAST BAY

COMMITTEE ON ACADEMIC PLANNING AND REVIEW
ANNUAL PROGRAM REPORT

College	CoS
Department	Computer Science
Program Unit	Computer Networks
Reporting for Academic Year	2015-2016
Department Chair	Matt Johnson (Reported by Leann Christianson)
Date Submitted	6/28/2016

1. SELF-STUDY (about 1 page)

A. Five-year Review Planning Goals

The Computer Networks Master's degree program is managed by the Department of Computer Science. One of the program's challenges is that faculty members supporting the Networks program also support the Computer Science program. Additionally, all courses (except for CS 6899 Capstone Project) can be potentially dual-enrolled with M.S. Computer Networks and M.S. Computer Science students, thus hindering accurate assessment of the two individual programs.

Students participating in the Computer Networks program are very successful in finding employment at local companies such as Symantec, Qualcomm, NetXperts, NetApp, Brocade, Shutterfly, vCidr, Cloud Computing, LookingPoint, etc. We lose one to two students a year through attrition.

The Computer Network's program goals from the last 5 year review included the

following:
1) Increase enrollment in the program
2) Replace retiring faculty
3) Implement an assessment plan
4) Acquisition of Resources – technical laboratories, IT support

B. Five-year Review Planning Goals Progress

The demand for the Computer Networks degree is primarily external and based on location and employment opportunities. Students from India make up the majority of our population. They come because the university is located near Fremont and Silicon Valley. We also attract some currently employed networking professionals who wish to increase their knowledge and promotion opportunities. The economic upturn and the need for networking professionals have increased job opportunities. Consequently, students are finding internships and getting hired quickly. The Bureau of Labor statistics projects a 20% increase in jobs over the next 6 years.

Enrollment in 2015-16 has been steady though lower than last year due to increased standards for acceptance into the program. We have set minimum acceptable score for GRE results (above 20% verbal and 50% quantitative). Some applicants appear to be of higher caliber than recent years based on GREs and GPAs which is encouraging. Many applicants, however, cannot meet the minimum GRE level and have taken only one to two of the required seven prerequisite courses. Approximately 20% of accepted students end up registering for courses at CSUEB. We plan to increase contact with accepted students in an attempt to get more to enroll.

Fall 2015 was the first quarter that Computer Science operated as its own department apart from Math. The department currently functions with eight tenure track faculty. The department's search for two new faculty members resulted in the hire of one professor, Dr. Varick Erickson. His expertise is in wireless sensor networks will be an asset to the Computer Networks program. Potential candidates reported that they were deterred from accepting our position due to the cost of living in the Bay area and CSUEB's compensation. We will again search for two new faculty members next year as the department is under staffed and increasingly relies on lecturers.

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 three 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. Our assessment process is moving forward. We successfully administered post-assessment examinations for seven courses this year. We are compiling results and modifying questions so as to reap more informative information from our assessment quizzes. The complexity of compiling results is an ongoing challenge.

The primary task of the 2015-16 academic year was semester conversion for all our programs. Under semesters, the Masters programs in Computer Science and Computer Networks will be merged into one degree, Masters of Computer Science with options in Networking and Software Engineering.

C. Program Changes and Needs

Since our last five year review, three new hybrid courses have been added to the curriculum: Security in Mobile, Wireless, Grid and Pervasive Computing (CS 6526), Security Management (CS 6527) and Cloud Computing (CS 6593). Additionally, the new course Statistical Learning and Data Analysis (CS 6831) was added to the Computer Science curriculum. These are courses that provide students the opportunity to learn about more current technologies.

In previous reports, we mentioned a problem with oversubscribed courses. Students with early registration appointment times would sign up for the maximum allowed by the system (4 enrollments and 4 waiting lists). They would then drop the courses they did not want on the last day of the Add/Drop period. This meant that students with later registration appointments, including all incoming students, would have to be on waiting lists. The incoming students would be unable to register for courses that we had told them they were required to take, and for visa reasons had to sign up for courses for which they were unprepared. It also meant that sometimes extra sections created to meet supposed demand would turn out to be unnecessary after all the drops. Early attempts to mitigate the problem by appealing to students to stop enrolling in extra courses had no impact on the problem.

The department addressed this by limiting early registration for courses starting in the fall quarter of 2014. Students are limited to enrolling in two CS prefix courses prior to the start of the quarter. Any students who enroll in more than two CS courses prior to the start of the quarter are dropped from all courses. We have used this process for two years now and it has been effective. New students are able to enroll in appropriate courses, existing students have been able to find courses to satisfy requirements, and enrollment has reflected actual demand.

Academic dishonest continues to be an issue. The current departmental policy states that students with academic dishonesty report may not be graders and cannot take the CS3898 Coop course. Under semesters, graduate students with three academic dishonesty reports will be dismissed from the program.

A final issue is students leaving their prerequisites and completion of the Writing Skills Test to their final quarter. Students are not allowed to enroll in the Capstone course unless they have finished prerequisites and the WST. The practice of waiting until the final quarter is becoming less common, however, we are unable to deter it completely despite orientations, advising, and notifications.

Resources and Needs:

i) Facilities for Department faculty offices, teaching labs, research labs, including co-locating office space to provide opportunities for faculty to work together more easily.

The Department was pleased that space was made available in the new Student and Faculty Support (SF) building for the department office and faculty offices. Faculty had been spread over all four floors of both Science buildings previously. Proximity to colleagues and the department office has already led to increased communication between department faculty, more frequent department committee meetings, and increased productivity. Unfortunately, space was not made available for all department faculty. In particular, faculty participating in the FERP program, and all lecturers are still housed in the Science buildings. In addition, there is not enough space in the new building even to house the faculty that would result from successful searches that have been approved for next year. Ideally, it would be beneficial to house the entire department in one place with enough made available for desired growth.

The College of Science has provided some limited additional teaching lab space, but this is still a significant concern as current space is insufficient to meet department needs. As our outside reviewer mentioned, if we choose to seek accreditation, our relative lack of teaching and experimental lab space would be a major concern to the accrediting board. The Department is in discussions with the Dean of the College of Science to address these issues.

ii) Support from campus Information Technology Services for teaching and research needs.

The centralization of Information Technology Services (ITS) on campus left the Department of Computer Science with no dedicated support for its teaching and research support needs. The centralized model was unwieldy, slow, and has not served the Department well, leading to impact to the students as software and hardware testbeds and learning environments have become outdated or unusable. Our outside reviewer stated that even the support that was provided before centralization was insufficient. The Department is in discussions with the College of Science to provide dedicated lab course support as is the norm for other lab-based disciplines.

iii) Need for funds for readers, TAs, and travel to academic conferences.

The need for additional resources to fund readers, Teaching Assistants, and travel to academic conferences is little changed. Our outside reviewer specified lack of funding for continuing development and other department needs was a significant issue. The lack of funding is especially an important factor as we attempt to hire new faculty who are especially in need of grading support, and are expected to publish and present at conferences.

iv) Need for library resources, specifically to support graduate courses.

Library offerings have been uneven, with important database subscriptions cancelled and re-established. Access to a wide range of journals and conference proceedings is especially important as we plan to increase the rigor of our graduate courses under the semester system.

Faculty:

Name	Time Base
Brown, Kevin	1.0
Christianson, Leann	1.0
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)
Yang, David	1.0
Yu, Ytha	0.44 (FERP)
Zhong, Fay	1.0
TOTAL FTEF	**9.82**

2. SUMMARY OF ASSESSMENT (about 1 page)

A. Program Student Learning Outcomes

Students graduating with an M.S. in Computer Networks from CSU East Bay will be able to:

1. Exhibit mastery of advanced computer science theory as applied to the field of computer networks
2. Employ current techniques, skills, tools, and coding practices necessary for application and system development
3. Apply critical thinking and problem solving skills by analyzing problems, designing solutions, and evaluating results
4. Demonstrate communication skills in both written and oral form, and work in a team environment
5. Independently acquire new computer related skills through analysis of current computer science literature and industrial practices

B. Program Student Learning Outcome(s) Assessed

As according to our assessment plan, we are closing the loop on PLO #3 this year. The department does collect assessment data for all targeted courses each year, however, so as to track trajectories for scores on all PLOs.

Post-assessment quizzes were administered for five courses:

CS 6560 Mastering PLO1, Practicing PLO3, PLO4	(Core requirement)
CS 6525 Mastering PLO 1, Developing PLO 4, and PLO 5	(Breadth requirement)
CS 6596 mastering PLO1, Developing PLO2 and PLO3	(Breadth requirement)
CS 6715 Mastering PLO 1, Practicing PLO 3 and PLO 4	(Breadth requirement)
CS 6899 (Capstone Project), Mastering PLO 3, PLO 4, PLO 5	(Capstone requirement)

C. Summary of Assessment Process

We created PLOs and SLOs for the Master in Computer Networks in the academic year 2012-2013. The 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 mapped to PLOs for each program and the ILOs of the university). We have these in place for seven courses in the M.S. Computer Networks 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. To evaluate by PLO, hand calculations are needed. For the Capstone project, we are using a rubric for evaluating written projects.

As we move to semesters, we again use Blackboard, but we will assess one PLO only in each course which will simplify evaluating results. In evaluating our PLOs and SLOs and their correspondence to the ILOs, we note that diversity, social responsibility, and sustainability are not adequately addressed in our curriculum. We include these areas in our new classes that are tailored towards the semester calendar.

We evaluated PLO #3 in the following courses: CS 6560, 6596, 6715, and 6899.
PLO #3 states: Apply critical thinking and problem solving skills by analyzing problems, designing solutions, and evaluating results.

In regards to closing the loop and using the results of the assessment process to improve student learning for PLO #3, it would appear that CS 6560 needs fine tuning

CS 6560 – Operating Systems
This required course in Operating Systems Design addresses material which has a well-defined core of material but is constantly being enhanced by new research and advances in the industry. It clearly maps to both parts of PLO #3, in applying emerging technologies, and requiring advanced knowledge of algorithmic design. While perhaps two thirds of the course material is necessary for all students in the program, the remaining concepts may be presented through a number of avenues. Study of existing commercial operating systems, review of seminal research

papers, and creation of software artifacts may all provide opportunities for learning the desired concepts. All of these avenues are included in the current incarnation of the course, with some students finding one or another more useful in providing a grasp of the necessary ideas. The instructor regularly selects or removes research papers for review as they prove more or less successful in delivering the needed material. Programming assignments are also modified or enhanced as required. This sort of fine tuning may provide for even better student success.

CS 6596 Wireless and Mobile Architecture
This course covers wireless network architectures including cellular, WLAN, and satellite systems. Signal propagation models and reception techniques. Mobile computing issues including location management, routing, transport, and mobile application design. Students are required to implement three projects which simulate mobile units and issues such as handoff and locations discovery. Students average 86% for PLO#3 which indicates that the instructor is doing a good job meeting that particular PLO.

CS 6715 Data Compression
This course covers the basic algorithms in data compression. Student start with markov models and lossless compression and move on to lossy compression and algorithms such as JPEG and MPEG. To address PLO #3, students are required to complete a programming project in which they create their own compression algorithm based on what they have learned and the data they are given. Participation was minimal for the assessment due to the instructor forgetting to offer and extra credit incentive. Results were below average for this class which indicates a need to address design and implementation in more detail. The instructor will focus on these elements in the coming year.

CS 6899 Capstone Project
In the Capstone project, students work in groups of two to complete an implementation of a project. This Winter the teams created location aware applications. Students are required to create a working prototype and give a presentation on their application. Students must also submit a written project in the form of a journal article. Regarding PLO#3, 70% of the students exceeded or met standards for the PLO. Five papers were chosen to be published by refereed journals:

ICWN16

- Implementation of EAX Mode of Operation within a Real-Time Android Chatting Application
- Levent Ertaul, Nikhitha Vadla Konda, Dharani G Ramasamy

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- EasyAuth – Implementation of a Multi-Factor Authentication Scheme based on Sound, Fingerprint and One Time Passwords (OTP)
- Levent Ertaul, Ishita Thanki

D. Summary of Assessment Results

CS 6560	88%
CS 6596	83%
CS 6715	62% (note only 50% responded)
CS 6899	70%

3. STATISTICAL DATA (about 1 page)

Student Demographics: Updated demographic data for 2014-15 was not available.

Computer Network		Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall2015
Female	**Black, non-Hispanic**					
	Asian		2	2		
	White		1	1		
	Race/ethnicity unknown		1	3		
	Nonresident aliens	15	14	16	15	16
Male	**Black, non-Hispanic**		1	1	1	
	Asian		1	3	1	
	White			2	2	1
	Race/ethnicity unknown					
	Nonresident aliens	10	7	28	35	19
Total	**Black, non-Hispanic**		1	1	1	
	Asian		3	5	1	
	White		1	3	2	1
	Race/ethnicity unknown		1	3		
	Nonresident aliens	25	21	44	50	35

Annual Data:

A. Student Headcount:

	Fall Quarter				
Headcount Enrollment	**2011**	**2012**	**2013**	**2014**	**2015**
Computer Network					
1. Undergraduate	0	0	0	0	0
2. Postbaccalaureate	0	0	0	0	0
3. Graduate	25	26	53	57	37
4. Total Number of Majors	25	26	53	57	37

B. Degrees Awarded:

	College Years				
Degrees Awarded	**10-11**	**11-12**	**12-13**	**13-14**	**14-15**
Computer Network					
1. Undergraduate	0	0	0	0	0
2. Graduate	12	16	12	18	17
3. Total Number of Majors	12	16	12	18	17

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.

	Fall Quarter					
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
C. Faculty						
Tenured/Track Headcount	Computer Science and Mathematics Combined					
1. Full-Time	25	25	23	21	22	19
2. Part-Time	4	2	1	1	2	3
3a. Total Tenure Track	29	27	24	22	24	22
3b. % Tenure Track	80.6%	62.8%	58.5%	52.4%	57.1%	48.9%
Lecturer Headcount	Computer Science and Mathematics Combined					
4. Full-Time	1	1	1	2	2	4
5. Part-Time	6	15	16	18	16	19
6a. Total Non-Tenure Track	7	16	17	20	18	23
6b. % Non-Tenure Track	19.4%	37.2%	41.5%	47.6%	42.9%	51.1%
7. Grand Total All Faculty	36	43	41	42	42	45
Instructional FTE Faculty (FTEF)	Computer Science and Mathematics Combined					
8. Tenured/Track FTEF	22.4	19.4	16.5	17.4	17.0	21.0
9. Lecturer FTEF	11.1	18.1	19.0	19.3	18.4	13.7

10. Total Instructional FTEF	33.5	37.4	35.4	36.7	35.4	34.7
Lecturer Teaching	Computer Science and Mathematics Combined					
11a. FTES Taught by Tenure/Track	439.1	307.1	288.1	314.9	356.4	260.3
11b. % of FTES Taught by Tenure/Track	58.7%	38.7%	36.0%	36.2%	39.4%	28.3%
12a. FTES Taught by Lecturer	308.5	487.1	513.2	553.9	547.3	660.0
12b. % of FTES Taught by Lecturer	41.3%	61.3%	64.0%	63.8%	60.6%	71.7%
13. Total FTES taught	747.7	794.2	801.3	868.7	903.7	920.4
14. Total SCU taught	11215.0	11913.0	12019.0	13031.0	13566.0	13806.0

D. Student Faculty Ratios:

	Fall Quarter					
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
D. Student Faculty Ratios	Computer Science					
1. Tenured/Track	16.8	14.7	17.1	19.4	20.9	23.1
2. Lecturer	26.4	23.6	27.5	30.2	29.2	25.6
3. SFR By Level (All Faculty)	17.5	15.5	18.5	21.5	23.0	24.0
4. Lower Division	24.6	22.5	20.8	24.9	28.9	26.2
5. Upper Division	17.0	17.5	20.2	21.4	23.8	23.2
6. Graduate	15.9	10.1	14.5	19.8	19.9	23.6

E. Sections:

	Fall Quarter					
	2010	**2011**	**2012**	**2013**	**2014**	**2015**

E. Section Size					
1. Number of Sections Offered	47.8	37.0	45.8	49.0	47.0
2. SCU taught	2962.0	3054.0	3938.0	4556.0	3872.0

3. Average Section Size	17.8	20.9	22.5	24.0	22.9
4. Average Section Size for LD	26.4	29.5	27.0	27.0	25.9
5. Average Section Size for UD	18.8	21.4	22.9	25.5	22.5
6. Average Section Size for GD	12.5	15.5	19.5	21.1	21.3
7. LD Section taught by Tenured/Track	5	5	5	2	2
8. UD Section taught by Tenured/Track	21	19	21	15	14
9. GD Section taught by Tenured/Track	18	10	12	16	12
10. LD Section taught by Lecturer	2	1	3	7	8
11. UD Section taught by Lecturer	0	3	5	5	5
12. GD Section taught by Lecturer	3	3	3	4	6

CALIFORNIA STATE UNIVERSITY EAST BAY

College of Science (CSCI)
North Science 135
25800 Carlos Bee Boulevard, Hayward CA 94542

2015-2016 CSCI EETF Assessment Year End Report, June, 2016

Program Name(s)	EETF Faculty Rep	Department Chair
M.S. Computer Networks	Matt Johnson	Matt Johnson

[NOTE: Items A, B, C, and D are identical to your Page 2 on your Annual Report for CAPR. Please simply cut and paste from there. Item E is unique to the CSCI EETF.]

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E. Suggestions and Recommendations for the CSCI EETF in the Future

NONE