PROGRAM PERFORMANCE REVIEW
MAY 14, 2013 VISIT DATE

ELECTRICAL ENGINEERING DEPARTMENT
MASTERS OF SCIENCE

California State University, Fullerton

Reviewer Summary

June 2013

External Reviewer Team:

Dennis Derickson
Barry Pasternack
Goran Matijasevic

PROGRAM PERFORMANCE REVIEW
ELECTRICAL ENGINEERING DEPARTMENT
MASTER OF SCIENCE DEGREE
CALIFORNIA STATE UNIVERSITY, FULLERTON

Table of Contents

Program Performance Review

I Introduction

A team of three external reviewers, Dennis Derickson, Barry, Pasternack, and Goran Matijasevic were invited to review the Master of Science Degree Program of the Electrical Engineering Department at California State University, Fullerton. This document highlights the feedback from the external reviewer team.

II. Program Review Process Overview

Dean of Engineering Raman Unnikrishnan invited three external reviewers to prepare a program performance feedback document for the Master of Science Degree in Electrical Engineering at California State University, Fullerton. This team reviewed the CSUF MS EE self-study document, did a site visit on May 14, 2013 and wrote up this review document.

Review Team:

Dennis Derickson, Department Chair, Electrical Engineering, California Polytechnic
Barry Pasternack, Professor at California State University, Fullerton
Goran Matijasevic, University of California, Irvine

Schedule of Activities for the Review:

April 17, 2013: Reviewers receive Self-Study Document
May 1, 2013: Reviewer conference call and a question list is created
May 2, 2013: A list of questions is sent to Department Chair Shiva
May 10, 2013: Department Chair Shiva responds to the list of reviewer questions
May 14, 2013: External Reviewers visit California State University, Fullerton

Here was the Agenda for the May 14th visit:

California State University, Fullerton
College of Engineering and Computer Science

Program Performance Review (PPR)
Graduate Program, Electrical Engineering

Tuesday, May 14, 2013

CS-504: Review Team meetings & Team A (Dr. Goran Matijasevic) meetings with faculty

CS-506: Team B (Dr. Dennis Derickson & Dr. Barry Pasternack) meetings with faculty

08:15 a.m.	Breakfast at Marriott Review Team, Dr. Raman Unnikrishnan & Dr. Susan Barua
09:30 a.m.	Team Meeting (CS-504)
10:30 a.m.	Meeting with Department Chair, Dr. Mo Shiva (CS-504)
11:00 a.m.	Meeting with Faculty (CS-504 & CS-506) (Team A: Dr. Grewal; Team B: Dr. Hashemi)
11:30 a.m.	Meeting with Faculty (CS-504 & CS-506) (Team A: Dr. Kwon; Team B: Dr. Cheng)
12:00 p.m.	Lunch & Meeting with Selected Students (TRS – E-101)
1:30 p.m.	Meeting with Faculty (CS-504 & CS-506) (Team A: Dr. Ghazanshahi; Team B: Dr. Cohn)
2:00 p.m.	Meeting with Faculty (CS-504 & CS-506) (Team A: Dr. Huang; Team B: Dr. Chaudhry)
2:30 p.m.	Meeting with Faculty - Dr. Hamidian (CS-504)
3:00 p.m.	Meeting with Department Chair, Dr. Mo Shiva (CS-504)
3:30 p.m.	Meeting with Dean, Dr. Raman Unnikrishnan (CS-504)
4:00 p.m.	Review Team Meeting (CS-504)
5:30 p.m.	Class Visit, EGEE 580 - Analysis of Random Signals (E-221)

Summary of Review Process and this Review Document:

Prior to April 17 Dean Unnikrishnan and Associate Dean Barua conducted a teleconference outlining expectations for the external program review process and solicited questions from the external reviewer panel. The External Review team then individually spent time looking through the CSUF Masters of Science in Electrical Engineering self-study document provided to them starting on April 17, 2013.

The external review team had a teleconference on Wednesday, May 1st to talk about their thoughts on the CSUF self-study document. The result of this teleconference was to solicit more information and ask more questions about the self-study document. On Thursday, May 2nd the external review team sent a group of questions to CSUF in preparation for the site visit. These questions for CSUF are given in Appendix A. The CSU EE Chair responded to all of the questions on Friday, May 10th. These responses were extremely helpful to the site-visit. The department chair also provided the MSEE brochure and a copy of our 2008 ABET report. The MSEE brochure was helpful in answering some questions (would have been good to have received it earlier). In addition, the department chair gave the external reviewers a set of all of the thesis and project reports for the 2011-2012 academic year for review at the end of the site visit. The external review panel received 4 EE597 project reports, 1 EE499 independent study report, 1 EE599 independent study report and zero EE598 MS thesis reports for review post visit.

During the site visit the external reviewers has the opportunity to speak with many constituents from the CSUF Electrical Engineering Program. A summary of the contents of these discussions is given in the Appendices:

Appendix A: This appendix contains the questions from the review committee and responses from EE Department Chair Shiva.

Appendix B: This appendix contains comments from the Student group that met with the review committee during lunch hour on May 14th.

Appendix C: This appendix contains comments from the graduate student group in EE580 that met with the review panel.

Appendix D: This appendix contains comments consolidated from faculty discussions on May 14th.

The External Review Panel then used information gathered from the pre-visit, site visit and post- visit documents to construct this review document.

EXECUTIVE SUMMARY: The following comments constitute a summary of the feedback to the CSUF Masters of Science Degree in Electrical Engineering from the external review group.

Faculty: Needs Attention in the areas of:

a. Additional activity in the area of research and scholarly activity.
b. The department needs to provide more thesis and project opportunity for the graduate students.
c. Faculty need more departmental and college level support for scholarly activity.

Curriculum: Needs attention in the areas of:

a. The concentration areas in the graduate program need to be reviewed. Certain areas have plenty of faculty and have few students. Other areas are heavily enrolled and under-resourced (e.g. there is student demand, but have few course offerings). Some areas have few faculty but many listed courses that are not really offered; giving students a false impression of the scope of graduate offerings.
b. Although the graduate course content is perceived as quite good, the self-study document course summaries were often incomplete and of inconsistent quality. This lack of consistent course documentation made it difficult for reviewers to assess the quality of the offerings.
c. More EE597 project and EE598 thesis activity should be made available to students. The department faculty and students are underutilizing project and thesis activity typically seen in a healthy graduate program.

Students: Very good and motivated

Policies, Quality, Consistency and Practice: Needs attention in the area of

a. Over-reliance of the use of oral examination as the terminal evaluation for the MS program.

III Faculty Summary.

Appendix D gives a summary of notes taken from meetings between the external review panel and the faculty who were available to meet. Appendix A gives some additional information on faculty that was not provided in the self-study report.

The external reviewers were able meet with 11 faculty members during the May 14 meeting date. There were 12 faculty CVs listed in the self-study document.

TABLE 1: Faculty metrics from self-study report.

Name	**Qualifications**	**Publications (2 yrs/5 yrs)**	**Grant Activity (2 yrs/5 yrs)**	**% time available for research/scholarly activity**
Chaudry	Ph.D	1/4	0/1	25
Cheng	Ph.D.	?/5	0	
Cohn	Ph.D.	0/1	0	0
Constantine	Ph.D.	19/?	5/?	10
Ghazanshai	Ph.D.	1/4	1/1	15
Grewel	Ph.D.	3/9	0	25
Hamidian	Ph.D.	2/2	0	20
Hamidid-Hashemi	Ph.D.	0	0	0
Huang	Ph.D.	2/5	0	30
Kwon	Ph.D.	0/0	0	50
Shiva	Ph.D.	2/2	0	10
Tehrani	Ph.D.	4/12	0	50

Comments about Table 1: The faculty CVs in the CSUF MSEE self-study document were not always completely filled out so some data points are left as a question mark.

Qualifications: All faculty in the department are well qualified in terms of their academic backgrounds.

Publications: The faculty have a wide range of recent publication activity. Only four faculty have self-reported no publication activity in the last two years.

Grant Activity: Only a few faculty are engaged with external funding grants. This agrees with student comments that there are limited funded research and project opportunities in the department.

% Time Available for Research/Scholarly Activity: The self-reported time available for research and scholarly activities varied significantly.

Additional comments on faculty from the external review team:

A number of faculty members spoken to seemed disengaged in the program, while others seemed very excited about their students and some of the accomplishments. A common comment was that the teaching load was excessive, the support quite limited, and the salaries low. They also received limited support for their scholarly pursuits in terms of travel funds and release time for research.

The faculty were happy with their EE department operations but had limited college-wide exposure as a group. When asked when was the last time the College faculty had met as a group, the answer was "several years ago". While the junior faculty are engaged in research and are mentoring students in project or thesis, some of the more senior faculty members seem to be far less engaged in these endeavors. It is worth noting that a number of senior faculty appear quite dedicated to the teaching mission of the Department and are held in high regard by students and that the students appreciate the mentoring as well as the job opportunities upon graduation that the faculty have provided. Given the age demographics of the Department, careful strategic planning should be carried out in undertaking faculty recruitment efforts. Some of the faculty interviewed were partially retired which led to little or no course offerings in some of the areas of specialization. Others mostly taught the general math and undergraduatecourses.

Faculty: EE Chair Summary

The Department Chair seems quite dedicated to the program and the students. He indicated that he personally meets with every student one-on-one when they are admitted to the program and then assigns them to other faculty for advising, but keeps connected

with them. He seemed, however, somewhat ignorant of campus and system policies. For example, the program allows students to take up to half their coursework in 400 level courses. The campus UPS policy (UPS 410.106 section I E – see http://www.fullerton.edu/senate/documents/PDF/400/UPS410-106.pdf) states that this is permitted, but a program needs to justify allowing more than 30% of course work to be done at the 400 level. The team asked the Chair to prepare a justification as this is required as part of the PPR process. This was not provided. Also with regard to the 400 level courses, graduate students must do additional work beyond that required of undergraduate students (see UPS 411.100 section VI C - http://www.fullerton.edu/senate/documents/PDF/400/UPS411.100_effec_1-28-13_pg9_revised_link_to-UPS320.020.pdf). When asked if this was being carried out, the Chair indicated that it was up to the faculty member teaching the course and it was not always the case. The Chair indicated that he is only an academic year chair, with no support during the summer. It is not apparent to the Review Team that this is a valid reason for not following campus and system policies.

IV. Student Summary:

The team met with two groups of students. At lunch we met with students selected by the Associate Dean. In the early evening we met with the students in the class EGEE 580 (Analysis of Random Signals). Appendix B and C provides an outline of the student responses to the external review team.

In general, these students seemed pleased with the program although some seemed to want more contact with faculty. When asked about how much time they spend on coursework, one student in the group indicated that he spent an average of 20 hours a week for each of three classes and was working full time. When it was pointed out that this was 100 hours a week the student responded that he spent all weekend on his coursework. These students felt that the Masters Oral Comprehensive Examination was a great preparation for a job interview and that the questions asked during the exam were of the same type expected in the job interview which checks the knowledge of a candidate. They shared stories of past graduates who landed good jobs and were connecting back with other students telling them that the exam was very helpful. That said, some of the students wished that they would have had opportunities to do projects or thesis. One of the students was the leader of a team that won a national competition ION Robotic Lawnmower Competition, an impressive feat. He, along with several other California resident students, did his undergraduate at CSUF and then decided to stay for the Masters.

In the evening we met with students in a class. These students seemed less satisfied with the program. When asked why they selected the program, one student said that it was because it did not require the GRE. Several students indicated that they did not have to do much work in their classes. Some were disappointed in that they did not realize that CSUF was not a PhD-granting institution, thus giving them limited research opportunity. One student said he spent a couple of hours a week studying for each course and was getting all A's. Another student said that homework and exam solutions can be found on the web so extensive studying for the exams and working through homework problems was not necessary.

Many students in both groups commented about the limited number of graduate courses offered and that recently several courses were cancelled prematurely (i.e., before the enrollment period officially ended), not considering the fact that graduate students tend to enroll late due to financial reasons (waiting for the support to arrive, or delaying enrollment as the fees need to be paid within three days of enrollment, when the final deadline was still weeks away). They indicated that they were successful in petitioning for reinstatement of one course, but that other courses remained cancelled, forcing them to take classes not in their program. It would seem that a survey of the students on their intentions could help alleviate this situation.

Table 2: Students:

Preparation	**Bridge Requirements (if any)**	**Academic Status (Suspension/Probation, etc.)**	**Success/Potential for Success**
BS degree in Electrical Engineering or related major. All of the students we met were qualified to be in the program. Faculty report highly variable performance from students in the program.	Process for Bridge requirements was described in the deficiency Course table of the CSUF MS Handbook provided by the department.	No data provided to the reviewers	Student self-reported comments supported a successful outcome for the students that were interviewed by the reviewer team.

V. Curriculum Summary

Table 3: Curriculum – 5XX Graduate Only Courses

Course	Learning Goals and Course Content	Textbook Used (Copyright year, relevance, level, etc.)	Content in course description
503 Information Theory			Very good
504A Linear Network		1986 text on passive and active circuits?	Very good
507 detection theory		1978 text book?	Very good
510 Lightwave		Incomplete Book References	Very good
518 Digital Signal processing		Incomplete Book References	Very good
519A Parallel Processign		Incomplete Book References	Very good
519B Computer Networks		Lecture Notes	Very good
523A VLSI		2010	Very good
523B CMOS VLSI		2009	Very good
526 Digital Control			Very good
527 Faulty Diagnosis		Incomplete Book References	Very good
531 Phase Lock Loops			Very good
537 Satellite Communications			Very good
557 Embedded Microprocessors			Very good
558 A Intel Processors			Very good

558B System Applications		1996 – MC6800 (Seems a bit dated for a current microprocessor)	Good , Dated?
559 Robotics			Very good
580 Random Signals			Very good
581 Linear Systems			Very good
582 Linear Estimation Theory			Very good
585 Optimization Techniques			Very good
587 Operational Analysis			Very good
588 Engineering Design			Very good
EE597 Project			Very good, 4 reports reviewed
EE598 Thesis			NO DATA, no thesis reports were provided. Limited activity for thesis work in the department.
EE599 Independent Graduate Research			Good. 1 report provided

It was difficult judging the currency of the course material as a number of the syllabi presented in the Self-Study report did not have either the year of publication for the textbook used or the edition of the book. A major issue with the curriculum from the standpoint of students and faculty is that the Dean's Office has cancelled several graduate courses, thus delaying some students' graduation or forcing students to take courses that they may not have otherwise selected.

The current curriculum has five concentrations: Communication Systems/Signal Processing, Computer Engineering, Control Systems, Electronics and Circuit Theory, and Systems Engineering. Students are expected to select a minimum of five courses from their concentration of choice. Each concentration has at least eight courses offered at the 500 level, but due to budgetary restrictions, only a handful of 500 level courses have been recently offered each semester. For example, in spring 2013, not counting

project, research, or thesis courses, there were only four 500 level courses offered and these were taught by two faculty in the Department. There were no 500 level courses offered in the Computer Engineering or the Electronics and Circuit Theory concentrations. There were five 400 level courses offered in spring 2013, two of which could be used for the Electronics and Circuit Theory concentration, but none could be used for the Computer Engineering concentration. Given that the Dean indicated he wanted to have a separate MS in Computer Engineering, the EE Department should give careful consideration as to whether it should continue offering this concentration in their MS program. In a similar vein, the Department should consider if its resources are sufficient to offer five concentrations. **Given the strength of the faculty in the Communications and Control Systems and the presence of young faculty engaged in research in those areas, it would seem appropriate to strengthen those concentrations by adding new faculty and support.** On the other hand, in addition to considering on how to move forward with Computer Engineering, **unless new support to hire new faculty is found for the Electronics and Circuit Theory and there is an increase in enrollments for Systems Engineering, consideration should be given whether these should be phased out.**

While the MS degree had a detailed list of learning goals, it was not clear how these would be met for all students given that there may be little overlap in the courses students take. For courses which were identified as satisfying certain learning goals, it was not always clear how these could be satisfied. For example, in two courses that were listed as satisfying the communications learning goal, the graded course work consisted of exams and homework problems. When the Chair was queried on this, the Review Team was given the impression that it is only when a course is identified for such data collection that the learning goal would be addressed.

It would be good for the MSEE brochure be posted for downloading on the CSUF MSEE (website http://www.fullerton.edu/ecs/ee/eemasters_01.asp), so that students can see all the information about the program, as well as its requirements. Additionally, it was noted that the links for information about domestic and international admissions on the same webpage are currently broken (http://www.fullerton.edu/ecs/future/admissions/index.asp spells the correct link, but connects to a dead site at http://www.fullerton.edu/ecs/ecs/future/admissions/index.asp).

Terminal Evaluation

The majority of terminal evaluations done for the program are done orally with apparently no records kept as to the questions and the answers. This appears to be in violation of Title 5.Section 40510 section (b) 3. C. which states "A record of the examination questions and responses shall be maintained in accordance with the records retention policy of The California State University". Perhaps more importantly, it leaves open the charge of possible bias on the part of the faculty giving the oral exam and limits a student's appeal process. However, it was not clear how many, if any, students do not pass this comprehensive exam. When asked about this exam, several students indicated that it was useful in preparing for a job interview. It was unclear as to the depth of the questions asked as records were not kept. A number of students indicated that they

would have liked to work on a project or thesis, but have had trouble finding faculty willing to take on this responsibility. Other students preferred the examination route as they considered it easier and also a preparation for interviews with potential employers.

The majority of students take an oral examination at the end of their MS program. The reviewers asked the EE chair to provide all of the Project (EE597) and Thesis Reports (EE598) that were completed in a recent calendar year. The EE department chair provided 4 EE 597 reports and NO EE598 Thesis reports for review. The EE597 reports were surveyed by one of the external reviewers and found to be of acceptable quality. Since there were no MS thesis (EE598) documents provided, no feedback can be given on thesis quality.

Both the students and the department seem to favor oral examinations as the preferred terminal evaluation for the MS degree at Cal State Fullerton Electrical Engineering. The students like the predictable nature of the oral examination for completing their degree. The faculty in general does not provide the students with a large number of project or thesis opportunities. Students commented on the difficulty on finding thesis or project options for their terminal evaluation.

General Comments

The surveys provided in the Self-Study report were quite limited. It seems that there should be a greater effort made to reach out to alumni, but given the limited amount of release time provided to the Chair, it is understandable why efforts in this direction may be limited. The external reviewer committee was not provided to access to any member of the industrial advisory board to get another view on the curriculum.

While it was suggested that we complete tables dealing with curriculum, faculty, students, and policies and practices, in many cases we were not provided sufficient information in order to do this.

Conclusion

The MS in EE program should tighten up its procedures so that they are in conformance with CSUF campus and system policies. It should undertake a careful analysis of its resources to determine how many concentrations it can reasonably offer in the future. The Dean's Office should work collaboratively with the faculty to build the program and provide necessary support and engage in transparent decision making.

VI. **Policies- Quality, Consistency and Practice Summary**

Table 4: Policies- quality, consistency and practice

Consistent with University Guidelines	**Rigidity and Fairness of Treating Students**	**Advising**	**Student Perceptions and Realities**
	The major complaint was cancellation of courses at the last minute.	Good. Students happy with advising provided by University, Department Chair and Faculty	Students overall were happy with the program. International Students feel very welcomed.

APPENDICES TO THE REVIEW

APPENDIX A: This appendix A includes a set of questions from the review panel and responses from Department Chair Shiva. This questions were submitted to CSUF by the external reviewers on May 2, 2013. The responses were provided by Department Chair Shiva on May 10, 2013 to the external reviewers. This material was very helpful in answering many of the questions that were generated by the reviewers prior to the May 14th visit.

Dear Dennis,

Please allow me to take this opportunity and thank you and the other committee members for your thorough review of our report.

We have a departmental MS brochure that is provided to all of our graduate students. The committee should have been provided with a copy of it along with the report; I am sorry that it was not. Many of the questions raised in your letter of May 1, 2013 are addressed in this brochure. A copy of it shall be attached for your perusal.

After a thorough review of your questions, it appears that many of them put emphasis on topics related to scholarly activities in terms of projects and theses. The CSU system, generally (with the exception of CSU-SLO and possibly CSU-SD) is a teaching oriented system. The highest degree offered is MS and the main emphasis is on teaching. Research is required and is encouraged, but it is not the main objective of the system. The mandatory heavy teaching loads of 12 units (Minimum of 4 courses) per semester, as well as the committee service requirements, do not really leave much time for scholarly activities. In a research oriented system, such as the UC system, the teaching load is commonly 9 units (3 courses) per year. Faculty members are involved in writing grant proposals and research activities as their main objective. Ph.D. students greatly help in research projects and scholarly activities. If you refer to page 8 of our MSEE brochure, you will see that our students have three options for completing their degrees, i.e., (1) Comprehensive Oral Exam, (2) Project and (3) Thesis. The majority of our students work while they go to school. As a result, historically most of them choose option (1), which does not require as much time as for options 2 or 3. Please keep these in mind about teaching-oriented programs.

The following is the response to the questions in your letter of May 1, 2013. Should you have any other questions or need any further information about our program, please do not hesitate to contact me.

Regards,

Mo Shiva

(657) 278-3013
mshiva@fullerton.edu

The review committee had a teleconference on Wednesday, May 1st. The group gathered a set of questions after reading through the CSU-Fullerton MSEE self-study document. This document is a compilation of questions from the three reviewers. The questions are arranged into three categories: A. General Questions, B. Questions on student learning, and C. Questions on Curriculum and resumes. The group recognizes that a quite a few questions are posed here. The review group requests that the CSU-Fullerton make a reasonable effort to answer as many of these questions as is possible so the review committee can make the best use of its time on Tuesday, May 14th. It would be very convenient if a response document could be made available to the three reviewers by Friday, May 10th at the latest. Let us know if that is a reasonable request.

In addition, the group would like to have additional materials made available for the visit:

1. All thesis documents from the 2011-2012
   I will request for copies to be provided by the advisers. We should have them by May 14, 2013.

2. Material covering the 400 level courses that was talked about in the ABET undergrad document.
   A copy of our ABET report will be provided for your perusal.

3. Example Oral Exam or Comprehensive exam material.
   Oral exams are conducted orally; as such, we do not keep documentations. Questions asked during the exam vary from one student to another one since they are related to the set of courses that that individual student has taken.

4. Any graduate student handbook that you give out to new gradate students.
   As I mentioned above, there is a departmental MS brochure that is provided to all students. It contains all of the requirements and policies for the MSEE program.

We all look forward to a very productive and constructive visit.

Sincerely,

Dennis Derickson

ddericks@calpoly.edu

805-756-7584

A. General Questions on the MS EE Program at CSU-Fullerton.

The self-study document did not have a lot of detail on the structure of the MS EE program. Here is what was cut and pasted from the CSU-Fullerton web site. General clarification questions are listed in this first section.

http://webcert.fullerton.edu/ecs/ee/eemasters_01.htm

Study Plan
The study plan consists of a minimum of 30 units of adviser-approved upper-division and graduate-level course work which must be completed with an overall grade-point average of at least 3.0. At least half the units required for the degree must be in approved graduate (500-level) courses.

- Required Math Courses (6 units)
- EGGN 403 Computer Methods in Numerical Analysis (3)
- And one additional adviser-approved math-oriented course (3)
- Concentration Courses (15)

A student is required to select a minimum of 15 units in Electrical Engineering. These units may be 400-level and 500-level courses and are selected according to the student's area of interest. Graduate Project, EGEE 597 (1-3), and Thesis, EGEE 598 (6), are considered concentration courses. Course work may focus on the following areas:

- Communications Systems/Signal Processing
- Computer Engineering
- Control Systems
- Electronics and Circuit Theory
- Systems Engineering

Other Courses (9 units)
Elective units should be taken in Electrical Engineering or a related engineering field and are subject to adviser approval.

Exam/Thesis/Project Option
Subject to approval by the faculty adviser, students may select one of the following options for final review by the department graduate committee:

- Satisfactory completion of a final oral comprehensive examination on coursework OR
- Satisfactory completion of a formal project EGEE 597 (3 units) and a final oral comprehensive examination on coursework OR
- Satisfactory completion and oral defense of a thesis EGEE 598 (3 to 6 units).

A typed draft of the thesis or project report must be submitted to the student's thesis or project committee no later than four weeks prior to the last day of the semester in which the oral defense of the thesis or project report is scheduled.

The thesis or project committee consists of a minimum of three members of the Electrical Engineering faculty. The thesis should cover original research and be prepared according to the university guidelines. Committee questions will be directed in part toward defense of the project

report and in part toward an oral examination related to coursework. Guidelines for the preparation of theses and formal reports are available in the Electrical Engineering Department and the Office of Graduate Studies.

Students requesting Graduate Project (EGEE 597), Thesis (EGEE 598) or Independent Study (EGEE 599) must complete a study application form and submit it for approval to the supervising faculty member and department chair prior to the semester in which the course work is to begin.

1. Is there a department-supplied graduate student handbook that you give out to prospective and current students to help them navigate through the program? If a university related MS handbook is used by students, that would also be helpful. Please supply both documents if they are available.

   We have a departmental MSEE brochure that is provided to all prospective students. Copies of it are available for current students and visitors in the EE Department Office. A PDF copy of the brochure is attached to my email.

2. Could you go through the process of how you decide to admit students all the way through how the student finishes his/her MS. Degree? Who is on the admissions decision committee? How often do they meet? How do you decide whom to admit and how many students to admit? What are the criteria for admission, is there an average GPA, what has been the trend? Are there any fixed decision criteria? Could you elaborate on the MS student orientation? Is this required of all students? How long is it? What are the final requirements for graduation? Final GPA requirement?

   Admission requirements, classification, advancement to candidacy, and graduation requirements are covered in pages 3 to 9 of the MSEE brochure. Minimum required GPA for admission is 3.0 (cumulative or the last 60 units). We have conditional admittance for those with GPAs between 2.5 and 3.0.

   The initial decision is taken by the Department Chair, or an experienced faculty member assigned to it. The number of students admitted depends on the number of applicants. The current numbers for fall 2013, as of April 24, 2013, are:

   Applied: 287
   Admitted: 98
   In process: 50

There is an initial MS students' orientation. During the orientation university representatives introduce the general policies and requirements to the students. This is followed up by the Department Orientation where policies, requirements, available options, etc. are discussed in details and everyone is provided with a copy of the MSEE brochure.

Students will have an initial meeting with either me or a designated faculty member. They will be advised for their first semester and will be assigned a faculty adviser in the area of their interests. Before they complete nine (9) units, they have to meet with their advisers and complete their initial Study Plans, i.e., a set of ten courses.

The process and requirements are described in detail in the MSEE brochure.

3. How would you work with applicants who do not have EE or Computer Engineering undergraduate degrees? Do you conditionally admit? Who decides what undergraduate coursework needs to be taken to catch up? How does the institution track that the student has actually taken the recommended undergraduate coursework?

   We accept students with non-EE BS degrees. A guideline for approximate number of required undergraduate deficiency courses is included in the MSEE brochure (Page 5). An initial meeting is arranged between the student and (commonly) the Department Chair or a faculty member designee. The undergraduate deficiency courses are discussed in detail and the student is informed of the requirements. Students will meet with their advisers at least once every semester to make sure they are following the assigned course work.

4. Is any combination of course-work only, MS Project registration (EE597), MS Thesis registration (EE598) allowed? Would all of these course/project/thesis options be treated the same in terms of the issued MS degree? How do you advise students on which of these options to pursue. Are there any expectations on the amount of work associated with EE597 or EE598? How do you differentiate between project work (EE597) and thesis work (598)? How do you determine the number of credits to register for in EE597 and EE598? Tell us about the final oral or comprehensive exam? How long is it, when is it being administered, by whom?

   The requirement for the MSEE degree is to finish ten courses (30 units) of work with a minimum GPA of 3.0/4.0. Students have the option of replacing one of the courses with MS Project (EE597) or MS Thesis (EE598). Whether the option is taken, and which of the two is elected depends on the student. Below is a short description of the options:

If Project or Thesis is not selected, students will take a comprehensive oral exam with questions related to all ten courses that they have taken. It is a two-hour exam, administered by two faculty members who are familiar with the coursework taken by the student. Usually the oral exam committee members include the student's adviser and the faculty member with whom the student has had the largest number of courses.

MSEE Project is used if the student likes to design an electronic/electric device. Initially they register for 3 units. If the design is not completed within one semester, they can extend their work to the next semester by registering for one unit of the same course. The final project is presented to the adviser and another faculty member. The members may ask questions about the project, suggest modifications, and ask questions related to the courses taken. I will be very glad to show you a couple of our current projects for your evaluation. A two-hour time slot is provided for the exam.

MSEE Thesis is used if the student likes to do research. It is usually taken by students who plan to continue their education and work toward their Ph.D. degrees. Initially students register for 3 units. In some cases, with the recommendation of the faculty supervisor – justifying the complication of the work – they are permitted to register for 6 units (replacing two courses). If the research is not completed within one semester, they can extend their work to the next semester by registering for one unit of thesis. The final results are presented to the adviser and two more faculty members who are provided with copies of the thesis ahead of time. The members may ask questions about the thesis and suggest modifications and improvements. The oral exam in this case is a two hour exam and questions are limited to the work done for the thesis.

Taking both EE 597 and 598 is not an option.

5. Is department funding tied to graduate student enrollment and unit generation?

   General funding is similar to the other CSU sister universities and it is based on the enrollment.

6. How are faculty rewarded and recognized for advising MS students? How are faculty rewarded for their research?

   Advising for MS students is part of the regular duties of the faculty. Most of the initial advising is done by the Department Chair, after which each student is assigned a faculty adviser for his/her Study Plan. For teaching

EE597 and 598 faculty members get (1/3) WTU for each unit of the course.

7. Does the department provide space for graduate students in the department? What would the space look like for graduate students? What is the lab space available for graduate work?

   The Department does not have any space to assign to graduate students. A room provided by the Dean's office is available to all ECS graduate students. The Department provides space for lab work and facilitates access to the labs. Students are provided with permits to work in the labs after hours and during the weekends.

8. What fraction of your CSUF undergraduate Electrical Engineers or Computer Engineers go on to the CSUF EE grad program?

   It varies from semester to semester. My estimate is somewhere between 30 to 50 percent.

9. Can you provide a more detailed summary of full-time resident graduate student numbers versus working professional MS students and part-time MS students? Does your program accommodate both types of students well?

   In general, the majority of our international students are full-time and the majority of the remaining graduate students are part-time. To accommodate all graduate students, we offer most of our graduate courses after 5:30 PM.

10. What are the funding opportunities for graduate students? Teaching Associate, Research Associate, Grader, Tuition Wavers? How many graduate students are awarded TA, GA, and Grader responsibilities each year?

    We do not have any TAs. All of our lecture and laboratory courses are taught by regular full-time faculty. If the faculty members have research funds, they can use it to employ student research assistants. Grading funds are used by the faculty to hire graduate students as their graders. A few Tuition waivers are available each semester and they can only be assigned to the incoming students. Our graduates are well desired in the local industry and many of them get into internship programs during the regular semesters and summers.

11. How are thesis and project activities funded? What is your total thesis and project activity expenditures for a year?

    They are mainly funded through faculty funds and donations from companies. The Department hardly has any funds to support any

projects or theses. Some support may become available through the Dean's office. The most common choice for our graduates is Oral Exam. In the past couple of years, for graduate projects we have received around $40,000.00 in parts and equipment from NAVCOM (currently John Deere), major discounts for parts from MicroStrain and two Microcontroller kits from Renesas.

12. How is graduate student thesis/project activity divided between faculty?

    It is not equally divided since the students choose the concentration area that they like to work in. Any student interested in thesis/project writes a summary and presents it to the faculty with expertise in that area. The proposal has to get approved by the faculty member and the Department Chair. As such, some faculty members may end up with more theses/projects than the others.

13. Do you allow MS thesis/project activity to be done in conjunction with the student's work place? If so, how is this thesis/project activity managed?

    We do if it is allowed by the student's work place. Student's activities are managed through regular meetings with the supervising faculty member.

14. Please provide the reviewer committee with all of the Thesis/Project reports that were filed in the 2011-2012 academic year for review.

    The thesis and project reports for graduate students are usually kept by the faculty supervisors and are provided to the faculty members taking part in the MS oral exams. Department does not keep copies of these reports. I will do my best to collect as many of them as I can for your review.

15. Please provide the review committee with example oral or written exam materials from recent activity in this area.

    As I mentioned previously, the questions asked from students during the oral exams are directly related to the coursework of the students. We do not have any written exams. Students work on the blackboard and answer the questions. As such, we do not keep records of the questions asked from the students. I have a set of notes myself from some recent oral exams that I will be glad to provide to you.

16. Is a blended "4+1" program available to CSUF undergraduate EE students? If so, what fraction of students take advantage of the program. What "shortcuts" are made available to make the "4+1" blended program time efficient for the student?

    We do not have a 4+1 program for our EE students.

17. What fraction of your MS students go on to pursue their Ph.D. degree? Do you have any special partnership relations with Ph.D. granting Universities?

    The majority of our graduate students are international students who go back to their own country. Almost all of the remaining graduate students work while they attend school or join workforce immediately after graduation. Consequently, a very small fraction of our graduate students go on to pursue their Ph.D. degree, but historically all of them complete the Ph.D. program successfully. We do not have any special partnership with Ph.D. granting universities.

18. When was the BSEE program started at CSUF?

    Approximately fifty years ago.

19. When was the MSEE program started at CSUF?

    A few years after the BSEE program started.

20. You state that your program attracts a very large number of international students. What support structure does the department and University offer for these students? Minimum and Average TOEFL scores for International students?

    There are a few tuition waivers per semester, usually given to incoming applicants with the highest GPAs. Otherwise, there is no financial support for the students. Some students get grading money starting with their second semester. The minimum required TOEFL score is 98 (IBT).

21. Do all faculty do thesis projects, do all concentrations have a thesis project?

    Since students choose their areas of interest as well as the option of thesis/project, a faculty member may or may not have one. Theses/Projects are possible in all areas of concentrations.

22. Thesis project seems to imply 2 semesters, how are the topics chosen and how many are work-related for students who do their studies part-time?

    As I mentioned previously, thesis/project is initially scheduled as a 3-unit course for one semester. If needed, it can be extended to the next semester. Thesis, based on recommendation and justification by the supervising faculty, can be 6 units, and in lieu of two out of the required ten courses.

23. It was not clear to me if the terminal evaluation is covered in the 30 units.

Terminal evaluation is in the form of (1) Comprehensive Oral Exam, (2) Project presentation and evaluation, or (3) Thesis presentation and evaluation.

24. It seems that there may be hidden prerequisites that a student would have to take that would increase the number of units required for the degree.

    There are absolutely no hidden prerequisites for students who satisfy the standard admission requirements. For students with low GPAs who are admitted conditionally, or those with a BS degree where some main EE courses are missing (e.g., Physics), all prerequisite courses are spelled out before the students start the program.

25. Justification for keeping the program at a minimum of 15 units of 500 level coursework should be provided in the PPR process (see UPS 410.106 I. B. 3).

    500-level courses are related to more advanced topics in Electrical Engineering and are only available to graduate students. Many of these courses have 400-level prerequisites (Please refer to the MSEE brochure for details). 400-level courses are available to graduate students; however, they can also be taken as technical electives by undergraduate EE students. Some universities do not put a minimum on the number of 500-level courses as a part of their MSEE program. We believe that for our graduates to be master in their field they should have at least half of their courses from more advanced EE courses.

26. Study plan discussion from website states that a minimum of 15 units should be in Electrical Engineering. It seems that there are also 12 units of math courses, which leaves 3 units that can be taken somewhere else?

    There are two mandatory math courses, EGGN-403 (Computer Methods in Numerical Analysis) and EE-580 (Analysis of Random Signals). EGGN-403 is not in any concentration area, but EE-580 is included in some. Out of the remaining 8 courses, at least 5 of them (a minimum of 15 units) must be from the area of concentration selected by the student, e.g., Communication Systems & Signal Processing, Control Theory, etc. The remaining ones can be from any area of concentration in EE.

    A List of the courses approved for each concentration is available on pages 10 through 12 of the MSEE brochure.

27. We should get some information on how students are directed to which class to take. It would be useful to look at some student transcripts to see what courses they took and how many units they actually needed.

Graduate student files are available in the EE Office. I will be glad to provide you with as many as you would require.

B. Student Learning Section Questions

1. It was not clear to me how communication skills were covered in a couple of the courses cited as having this responsibility.

   The courses used for direct and indirect evaluation of SLO 6 have a project component which requires written, oral and electronic communication. As an example, I teach EE-518, Digital Signal Processing. Every student in the class is to complete a project or research related to DSP. Close to the end of the semester, students turn in a written report and prepare a PowerPoint presentation for the class. They are assigned a time slot for presenting their results to the class. I will be glad to show you some of these reports during the visit. For the other courses during the semester that the assessment was done, a special project (not usually a part of the course) was used to assess the SLO.

2. As students may take different courses in the program, how is exposure to the stated learning objectives assured.

   Some SLOs such as SLO-1 (Academic preparation and the proficiency in mathematics, and science) exist in most courses and are often a part of the required math courses. Others exist in a few courses. Combination of the overall 10 courses taken by students will expose them to all SLOs. Our Indirect Surveys and Direct Evaluations show a high rate of satisfaction of all SLOs. In fact, this being our first assessment of the program, the results were delightfully well above our expectations.

3. Where are ethical standards covered in the program?

   We have selected our SLOs to be at a higher level for MS students. Ethical standards are usually assessed at BSEE level, especially for ABET accredited programs. They are a part of our own ABET assessment for our BSEE program. As such, we assume they are covered and satisfied for MSEE applicants and we do not repeat the assessment in assessment of our MSEE program. Please refer to the answer to question 11 below for more details.

4. In terms of the communications goal, some of the courses listed as satisfying this do not seem to have any written or oral assignments (e.g. EGEE 537 and 587).

They do; a short description of what was used in each course (in fine print) is included under the direct measurement table for SLO-6 on page 66 of the report. During the semester that the assessment was performed, extra work, in terms of a special project, was used to test communication skills.

5. How is the learning outcome of "ability to assume leadership role" (p13.) assured?

   It is obviously difficult to assess by means of a test. However, it is included as a part of Indirect and Direct assessment of our Goals. The SLO is a part of Goal-B and is assessed based on satisfying the goal. Please refer to pages 50 to 55 of the report.

6. On page 14 it states that goals A, B, and C are satisfied by assessment of 400-level courses under ABET requirements. But isn't this for the program and not for courses?

   It is only related to Goal C, i.e., Professional Attitude and Citizenship. This goal is usually assessed at BSEE level, especially for all ABET accredited programs. It is assessed and satisfied for during ABET assessment for our BSEE program using 400 level courses. This was discussed with CSUF MS PPR experts and we were told since the goal is commonly assessed by all ABET accredited BS Programs, there is no need to repeat the assessment here. We believe all of the applicants to an MSEE program have already covered Goal C in their undergraduate program.

7. As a student can go through the program without taking all of the listed courses, how are the learning goals assured?

   It is highly improbable to get adviser's approval for such a study plan. Goals are learned by satisfying SLOs in different courses. Direct and indirect assessments of our goals show a high rate of success. Additionally, performance of each MSEE graduate is well observed during their final oral exam.

8. On page 16 mention is made of an informal survey of graduate students. What exactly is meant by this and why is it not formalized? Also on this page, what exactly is meant by "we will scrutinize the results of the assessments of our MSEE degree?

   We have both formal and informal surveys. We perform a formal survey of our graduating students by means of a questionnaire. The informal survey is based on the informal conversations. We pay close attention to all informal comments as well. The sentence you referred to reads: "we

will scrutinize the results of the assessments of our MSEE degree to find places for improvements."

9. I am having a hard time reconciling the data in Table 8 with the data in Table 7.

   Table 7 shows time taken to complete the degree for fall semesters. Table 8 is the number of degrees awarded for each academic year; it includes graduates from fall and spring semesters.

10. What does "sabbaticals supplied by department mean" on page 43? Aren't sabbaticals supplied by the University?

    All of CSUF sabbaticals are supplied by the university. That column is a part of the original table included in the guidelines and I believe it refers to universities where faculty can use their own funds, in a department account, to go on sabbatical leaves.

11. In Appendix 6, are the surveys done focusing on MS graduates only or on all graduates? The sample size for Tables 6.1 and 6.2 seem quite low. How frequently are such surveys carried out?

    The section titled 400-level Courses refers to undergraduate program. As I mentioned before, Goal 3 should have been satisfied for all ABET accredited BSEE programs. Here we used the results of the surveys done for ABET for Goal 3, as well as SLO-f, i.e., an understanding of professional and ethical responsibility, which you asked about in question 3 above. About the sample sizes, we sent out 100 questionnaires to the last known addresses of our graduates and their employers. The number of responses is commonly very low. This is also a fact recognized by ABET, and that is why the surveys of Program Educational Objectives (PEOs) are removed from future ABET assessments and reports. Now they only require them to be defined and published. We do these surveys once every three years for our undergraduate program. For our MSEE program, this is the first time that we have done the survey.

    The section titled 500-level Courses refers to assessment of the MSEE program only.

12. On page 64 it is noted that the second test in EGEE 507 (Detection Theory) was considered for the assessment of SLO 2 (Ability to integrate into the local and global taskforce). Could we see the questions asked on this test?

    I should have this information by the time of your visit. I teach EE-518, used in the same table, and keep electronic copies of the reports and presentations. I will be glad to present them to you for your perusal.

13. On page 66 the assessments for SLO 6 (communications) do not seem to line up with the course syllabi submitted. For example, it indicates a special project was considered in EGEE 503, but the syllabus has a student's grade based on exams (88%) and homework (12%). Similarly for EEGE 537. How is a student assessed on this SLO if he/she does not take these three courses?

    We are used to completing assessment of our undergraduate program for the purpose of getting accreditation by ABET. The last two accreditation cycles were in 2002 and 2008 and both times we received an NGR rating, the highest possible. Like most of the U.S. universities, we never attempted to get ABET accreditation for our MSEE program. This is the very first time that we are assessing our graduate program. As such, for SLO 6 we decided to sample a group of our graduate students for assessment. We picked up three of our graduate courses which usually have a much higher enrollment compared to others, namely, EE503, 518, and 537. EE518 has a project/report as a part of the course. In the other two courses a special project was used just for the purpose of assessing this SLO. These projects are not included in the course every semester, and were only used once for assessing SLO 6. It is possible that there are students who do not take these courses; however, for the purpose of assessment, we needed to sample a large group of our MSEE students, so we chose the three courses with commonly very high enrollment as a good representation of the MSEE class of students.

14. Could you send along your ABET self-study document so that we can get more information on your assessment of 400 level courses?

    As I mentioned previously, I will have a hard copy of the report for your review during the visit. I will also email you an electronic copy for your perusal.

15. On page 3 you list three department goals. At the bottom of page three, you list goals strategies. I guess I am mixed up on your statement about what are goals and what are your strategies.

    Department goals A, B, and C are educational goals for our students. They represent what we like our graduate students to be able to do and show a few years after they have completed the MSEE program, and beyond. At the bottom of the page, there is a list of university goals and strategies that our program will contribute to.

16. A general question: Are your MS goals and strategies significantly different than your MS goals and strategies. It would be interesting to see your 2008 ABET self-study to understand the differences. Are your MS goal statements highly targeted to MS student desired student outcomes?

I guess you are referring to MS goals versus BS goals. The goals are the same, representing what is expected of an Electrical Engineer in the work environment. The SLOs are different; they represent what the students should learn and understand while they are at school. SLOs for the graduate program are set at a higher level compared to the ones for the undergraduate program. They represent what is expected of a student pursuing an MSEE degree. I will email you a copy of our 2008 ABET report for your perusal.

17. Strategy iv on page 4 talks about encouraging and rewarding interdisciplinary and cross unit collaboration. How is this encouraging and rewarding accomplished?

    Strategy iv is a university strategy. Our undergraduate students work in teams in a few places during the program. Our graduate students have the option of working on projects with students in other concentrations, or students with other departments. We encourage these activities to contribute to the university goals and strategies. Several of our graduate projects will be available during the visit for display. I hope we will have a few minutes to check them out.

18. I see that you have identified the RF and Power areas as those that need more development. How did you come to the conclusion that these were the target areas for development (what data shows this?). What is your strategy going forward?

    We collect a lot of informal data from different companies during the annual recruitments organized by the College, our working group of graduates, our colleagues working in industry, industry representatives visiting our events, members of different advisory boards, advertised job openings, inputs from our colleagues teaching at other universities, etc., which indicate the trend for the future needs of the industry. We also look at sister universities, e.g., CSU Los Angeles, which has power courses with high enrolment.

    We need to employ new faculty so as to expand our program in these areas; however, with the recent budget cuts it is not a simple task to do.

19. On page 6 in the middle, you say "We use feedback from our constituencies for review, assessment, and improvement of the program. They include faculty, industrial advisory board members, alumni, employers and colleagues in other Universities. Can you tell us about your committee structure and information processing techniques for this feedback process? Do you have any meeting notes that might show us how this is done?

We have a committee of 3 EE faculty members, called Assessment Committee, for the assessment of the results of all indirect and direct assessments. It analyzes the collected data and generates the tables and plots that you find in our report. We also have another committee of 2 EE faculty members and the chair, called ABET committee. It comes up with the recommendations based on the assessments. Both committees are standing committees that generally work toward assessments and improvements of the BSEE program. For the purpose of this review, we formed the PPR committee, which is a combination of the members of these two committees. The committee recommendations are presented to the EE faculty for discussion and approval.

20. Tell us about the "Systems Engineering" formal option for your MS degree. Does this appear on the degree document?

    The systems Engineering option has a set of five (5) required courses, they are:
    EGEE 580 Analysis of Random Signals (3)
    EGEE 581 Theory of Linear Systems (3)
    EGEE 582 Linear Estimation Theory (3)
    EGEE 585 Optimization Techniques in Systems Engineering (3)
    EGEE 587 Operational Analysis Techniques in Systems Engineering (3)

    The remainder of the systems engineering study plan will include other electrical engineering courses or civil or mechanical engineering courses. Students can also take up to nine units of adviser approved subjects offered by the school of Business Administration and Economics as a part of their study plan. The option appears on the MSEE degree document.

21. Can you give us 2011-2012 data for the figures on page 17 for MS degrees awarded.

    It is public information and is published by the university's Institutional Research and Analytical Studies unit. Please go to the following link. It is shown at the bottom of the first page under EG-EE section.

    http://www.fullerton.edu/analyticalstudies/degrees_grad/degreeaward/2.61.9.11.pdf

22. How important would preparation for Ph.D. work in your graduate student learning outcomes (page 13). Is this just assumed by the breadth of coursework that is required by the degree?

    It is assumed by the depth and breadth of the coursework for the MSEE program. The set of courses that we have is compatible with any good

university. The CSU system, in general, is oriented towards producing engineers. As such, a low percentage of our graduates continue to pursue a Ph.D. program. However, during my tenure as the Department Chair (Since 2001), I have never heard of any of our graduates who pursued a Ph.D. degree to no avail.

23. Why don't you allow any undergraduate students in your 500 level courses? Is this allowed by exception?

    500-level courses are too advanced for undergraduate students. As shown in our MSEE brochure, many of them have 400-level courses, and sometimes other 500-level courses, as prerequisites.

24. On page 16; Do you get student feedback primarily through clubs or are there other mechanisms?

    We get feedback through informal conversations with student club members, course surveys, course tests, and the final graduation surveys.

25. On page 16: Do you include staff/technicians as constituents?

    Not formally since they are not involved in teaching any graduate course; however, technicians help with student projects by making sure all equipment is working. They also help in ordering parts for projects. Their informal inputs are used for improvements to the program.

26. On page 17. It would be useful to understand the size of your undergraduate program so I can see how the size of the BS and MS programs compare.

    The size of the undergraduate program is shown in the table below.

FTES			**Headcount**
Year	Undergrad		Undergrad
2004-05	66.5		175.5
2005-06	77.3		180.5
2006-07	92.9		166.0
2007-08	105.9		156.0
2008-09	103.9		145.5
2009-10	100.8		130.0
2010-11	98.5		171.5
2011-12	111.5		189.5

    However, our MSEE program attracts many students from other universities and a very large number of international students. As such,

there is no close correlation between the size of our undergraduate and graduate programs.

27. What is the graduate student and faculty activity during the summer quarter?

    Not much. All faculty members, as well as the Department Chair, are employed as academic year employees. As such, they are not required to be on campus during the summer.

28. What do you think the hiring priorities might be and how would this impact the graduate program. This discussion is on page 18.

    We need faculty with expertise in the following areas, listed in order of priority: Computer Engineering (Hardware), Communications (including RF), Power, and Digital Signal Processing.

29. Can you outline and perhaps give us an example of how changes to the graduate program are accomplished. How did you identify the need for change? How did you implement and evaluate the change.

    As described in question 18 previously, there are many sources to find the future direction of the needs of the industry. We try to address the needs by offering new courses and changing/improving the contents of the current courses. If a course is in the expertise area of a single faculty member, he/she will be asked to address the needs. If several faculty members are teaching the same course, they will meet and decide on what improvements should be included in the course.

30. What orientation programs do you have for new graduate students? How is the study plan established for the 30 MS units?

    There is an initial MS students' orientation arranged for the incoming group of the students by the College. During the orientation university representatives introduce the general policies and requirements to the students. This if followed up by the Department Orientation where policies, requirements, available options, etc. are discussed in details.

    Afterwards, students will have an initial advising session with the Department Chair or a designated faculty member. They will be advised for their first semester, and will be assigned a faculty adviser in the area of their interest. Before they complete nine (9) units of course work, they have to meet with their adviser and complete their initial Study Plan. They can make changes to the study plan in the future by getting the approval of the faculty adviser and the Department Chair. The process and requirements are described in detail in the MSEE brochure.

31. Are your thesis documents from the department available on-line for the general public? What fraction of your students do a thesis option versus project option versus coursework only?

    No, they are not. The most common option taken by the students is the comprehensive oral exam. A low percentage of the students choose one of the other two options. Thesis is usually chosen by students who will pursue a Ph.D. degree. As I mentioned previously, since CSU is a teaching oriented university, most of our students join the workforce immediately after graduation, and a large majority of them work while they pursue their MSEE degree. As such, most do not have the time to spend on projects/theses and choose the comprehensive oral exam.

32. Any plans in the future to extend on-line coursework?

    It has been one of the recent goals of the university, and there is a general movement towards Massive Open Online Course (MOOC) aiming at large-scale interactive participation and open access for teaching. There will be a MOOC course workshop in Circuit Analysis at San Jose State University this summer and we are considering to attend this workshop and study feasibility of joining MOOC.

33. Can you add 2011-2012 MS awarded numbers and 2012-2013 MS projections to this tables.

    The total of degrees awarded for 2011-2012 was 66. 63 MSEEs and 3 MSEEs with Systems Engineering Option. I expect the number to be slightly smaller for 2012-2013.

34. Can you provide copies of some of your survey and exams instruments during the visit?

    I will be glad to.

35. The self-study mentions that 33% complete the MS program in 2 years and 67% take over 4 years, implying that nobody finishes in between 2 and 4 years (p 11)

    I think you are referring to Table 7 on page 39. The data was provided by the University's Analytical Studies via the Dean's Office. The following is the revised table:

TABLE 7. Graduate Students Graduation Rate

Headcount

All Master's Enrolled in:	Headcount	Graduated within 1 year	Graduated within 2 years	Graduated within 3 years	Graduated in 4 years	Graduated in 5 years	Graduated in 6 years plus 7 year persistence
Fall 2000	26	2	10	14	1	3	0
Fall 2001	22	3	9	12	2	1	0
Fall 2002	19	0	6	10	2	1	0
Fall 2003	18	0	6	10	1	0	0
Fall 2004	25	0	6	11	4	1	2
Fall 2005	20	0	6	9	2	0	0
Fall 2006	24	2	8	12	1	2	
Fall 2007	40	0	17	29	0		
Fall 2008	32	1	12	22			
Fall 2009	50	1	14				
Fall 2010	55	0					

Percent

All Master's Enrolled in:	Headcount	% Graduated within 1 year	% Graduated within 2 years	% Graduated within 3 years	% Graduated in 4 years	% Graduated in 5 years	% Graduated in 6 years plus 7 year persistence
Fall 2000	26	7.7%	38.5%	53.8%	3.8%	11.5%	0.0%
Fall 2001	22	13.6%	40.9%	54.5%	9.1%	4.5%	0.0%
Fall 2002	19	0.0%	31.6%	52.6%	10.5%	5.3%	0.0%
Fall 2003	18	0.0%	33.3%	55.6%	5.6%	0.0%	0.0%
Fall 2004	25	0.0%	24.0%	44.0%	16.0%	4.0%	8.0%
Fall 2005	20	0.0%	30.0%	45.0%	10.0%	0.0%	0.0%
Fall 2006	24	8.3%	33.3%	50.0%	4.2%	8.3%	
Fall 2007	40	0.0%	42.5%	72.5%	0.0%		
Fall 2008	32	3.2%	37.5%	68.8%			
Fall 2009	50	2.0%	28.0%				
Fall 2010	55	0.0%					

36. Table 8 with MS degrees awarded does not seem to match the graduation rates in table 7?

Table 7 is for fall semesters only, while Table 8 shows the totals for the academic year, i.e., total of fall and spring semesters.

37. I may have missed the discussion of these math courses in the self-study

There are two required math courses, namely, EGGN 403, Computer Methods in Numerical Analysis and EE 580, Analysis of Random Signals. If EGGN 403 (or its equivalent) is taken during the BSEE program as a technical elective, then EE 518 (Digital Signal Processing) will be required instead of EGGN-403 as a second math course. Please refer to Page 6 of the MSEE brochure.

38. The SLO table on p. 15 is not corroborated by the syllabi, esp. on SLO 5 – leadership role and SLO 6 – communicate effectively (only 2 classes have projects that might involve that, rest are all exam grad based)

For SLO-5, please refer to the answer to question number 5 above.
For SLO-6, please refer to the answer to question 13 above.

39. Why is the survey of graduate students "informal", while the rest are not?

Please refer to answer to question 8 above.

40. Where are the alumni employed (names of companies or at least type of employer and size)

We have our alumni working at large corporations such as Boeing, Tales Raytheon, Broadcom, Qualcomm, Southern California Edison, EMTG Consultants Inc., etc., and in many smaller companies such as Monolithic Solutions Inc., Terra Universal, Futek Advanced, Sensor Technology, etc.

41. Who were the employers interviewed? Individuals who are on advisory board or sample from local companies? Are they alumni of CSUF?

Two sets of questionnaire forms, with return stamped envelopes, were sent to our alumni. Alumni Survey Forms were to be filled out by the alumni and then returned to us. We also requested the alumni to provide the Employer Survey Forms to their immediate supervisors to be filled out and mailed to us directly.

C. Faculty Resumes and Courses

1. Why wouldn't most of your faculty be senior members of the IEEE?

   As I mentioned above, CSUF is a teaching-oriented university. Although there has been some recent emphasis on research, teaching is still our primary objective. As such, the teaching load per semester is 12 credit hours of lectures, i.e., minimum of 4 courses. The faculty members are also required to hold a minimum of three office hours every week to meet with students. They also attend the Department's faculty meetings and participate in Department, College, and University committees. The total average load is around 15-19 credit hours per week, depending on the lecture/lab mixture of the teaching assignments and the committee services. Time is also spent on professional development.

   The heavy teaching load does not leave enough time for research activities. In research oriented universities the common teaching load is three courses per year. These universities also have a Ph.D. program with Ph.D. students to carry out the research projects that the faculty will supervise and participate in. Being a senior member of IEEE requires a very strong publication record which is not practical for those who teach in teaching-oriented universities.

2. In the faculty resume section, I see wide variability on the reported fraction of time available for professional development. Are these times "best guess" estimates? Is there some official policy that allows trade-offs between more teaching related time allocations versus professional development related time allocations?

   You are absolutely right, and the reasons for it are provided in the previous part. Heavy teaching load, i.e., minimum of four (4) courses per semester, leaves little time for professional development and scholarly activities, which are listed by individual faculty members. Unlike research oriented universities, there is no trade-off between teaching and professional activities, since the teaching part is mandatory. Faculty members who may have research projects funded by grants have the option of buying back a portion of their teaching load, i.e., their grant provides funds for a part-time replacement faculty.

3. Given the Self-Study report was prepared in Sept. 2012, can we get updated resumes for the faculty? Should work in progress be listed under publications? Should faculty service recognitions be listed under Honors and Awards?

It will take a while to get updated resumes of all faculty members and we are reaching the end of the semester which is a very busy time for faculty; as such, it is really not practical to attempt to update those. If I had an earlier notice I would have given it my best.

Work in progress is included in the regular resumes of the faculty; however, for this report we decided to limit it to actual published work. This is what usually is done for ABET reports and we followed the same format.

Service recognitions have their own section right below the Honors and Awards section.

4. Textbook edition/year of copyright should be provided.

   I will make sure that during the visit copies of the actual textbooks used in every course are available in my office for your review.

5. More detailed course syllabi should, if possible be provided.

   Course syllabi are collected for each course every semester. I will be glad to provide you with the most recent version; however, they follow the same format and include the information requested by the university. Some faculty members have extended syllabi for their classes and I am sure they can provide them to you during the visit.

6. It would be worthwhile to see syllabi of some 400 level courses taken by graduate students.

   I cannot agree with you more. Please refer to Appendix A (pages 39 to 81) of the attached 2008 ABET report for the 400-level Course syllabi.

7. We should have some statistics on the number of courses a student needs to take in order to complete the degree as well as the undergraduate degrees of study.

   Our BSEE degree requires 129 units. We are currently working on reducing the number of units to 120. The requirement for all qualified MSEE applicants, which form the majority of our students, is exactly 30 units. Students with BSEE degree and GPAs between 2.5 and 2.99 are accepted conditionally; their acceptance is based on taking one or two extra courses that they should pass with a 3.0 average. This category is approximately 7-12% of applicants. There are applicants from other majors who apply for MSEE degree who may end up with several prerequisite/deficiency courses; however, their percentage is very low.

8. There is a lot of inconsistency in the faculty resume documents. Some are detailed and some are not. Some show good publication citation formats and some are incomplete.

   A sample file with standard format was distributed to all faculty members. Most followed the format, and a few changed it to what they would prefer for the publication section.

9. Some of the books listed in the course description section are not completely described and some of the editions are not current.

   Textbooks are selected either by the individual faculty member teaching a course, or by the group of the faculty teaching the same course. When new editions of the books are printed, the most recent version will be ordered. Copies of all textbooks are available during the visit.

10. The Self Study report did not give information on EGGN- 403 and information on EGEE 570 was not provided.

    Only 500-level courses were included in the report. Please refer to the attached 2008 ABET Report, Appendix A, Page 81 for information regarding EGGN-403.

    EE 570, Seminar in Electrical Engineering, is not a standard course. It is used when and if some recent subjects become very important in practice, or when a faculty member would like to try a new course and possibly invite outside guests for some lectures, etc. It has not been used in the past few years, which is why it was not included in the report.

APPENDIX B: This appendix B includes a set of comments generated from the Noon-hour visit with students on Tuesday, May 14th. This student group was chosen by Department Chair Shiva to help the review panel understand the student perspective of the CSUF EE graduate program.

Student 1 (from Iran) Second year in the program concentrating in communication. He applied to 4 universities: CSUF, CSULB, CSULA and UCI. Was admissted to all three CSUs, chose CSUF for its Communications program. He was satisfied with his coursework. He is applying for a Ph.D. at UC-Riverside

Student 2: Did his undergraduate at CSUF. His brother and dad also went to CSUF, younger brother now at CSUF. He is concentrating on control systems and is targeting defense companies. He likes taking night classes so he can work and go to school.

Student 3; From Iran. Communications specialty.. He heard about the CSUF MS program from other students. He likes Dr. Hamidian. He had also looked at UK schools. This is his third semester on campus.

Student 4: Applied to several southern California CSU schools. He wasn't admitted at CSU Pomona. He presently works for Broadcom as an intern. This is his third semester and he needs 5 more classes. Praised the role of Dr. Hamidian in getting them prepared for company interviews.

Student 5: Undergrad in Physics from CSUF. She did one year of undergraduate catch-up work as she started in the MS program. She is working at Broadcom as in intern. She is a communications MS concentration.

Student 6: CSUF undergraduate in EE. Work is in the area of sensor fusion. He had a moderate GPA and probably could not get admitted elsewhere. He is working as a RA for Dr. Huang. Robotics is his career goal. He has previously been involved in an automated lawnmower competition and NATCAR at UCDavis. He is doing the Project MS option (not a thesis option).

Student 7: From China University of Electronics and Sciences. He has worked for several years. He chose this school because it is very nice to international students. He lives with his uncle. His area of study is electronics and IC circuits. He has ½ year left in the program. There are not enough professors in the Electronics and IC design area and not enough coursework in this area either. He is also finding it hard to get internships in the area.

Student 8: From Iraq. Shee has a BS degree and worked for the Ministry of Oil, has a scholarship to get her MS degree, but it must be completed in 2 years. Chose CSUF EE because of its strength in communications. Husband's relatives are local. Shee had a conditional admit with English Language development needed.

Student 9: From Iran. He has 6 years of experience in Iran and Singapore. His area is communications. He has an internship. He would prefer the MS project option at CSUF.

General Comments from the Student Group:

a. Most students choose Oral exam because it better prepares you for an industry interview. The oral exam typically includes 10 questions. There are quite a few block diagrams. There are not so many "solving" problems with real numbers.

Professors drop hints during lecture like "This is the type of question I would ask on an oral exam"

b. They are in general happy with advising there are given on the topic of concentrations. They do have a worry about class cancellations so that their schedule is not predictable. Students register at the very last minute often due to financial reasons. They have had to petition to reopen classes. Tuition is due three days after registration so students delay registration to the very end.
c. In general they are quite happy with the Professors at CSUF, they said that the professors were friendly and available. Communication classes with Dr. Hamidian prepare them well for industry. . He gives out his cell phone number should his students have questions about the course material or assignments.
d. They would like to see more summer class offerings in the MS level
e. MS Class sizes range from 10 at the small end to up to 25 at the large end, most classes are small. At the undergraduate level, 40 is a common class size.
f. Some professors have different expectations for graduate students at the 400 level where they are mixed with undergraduate students.
g. There are not enough elective course offerings in the electronics and IC areas.
h. The "systems concentration" needs to be beefed up". There are lots of cancelled courses in this area. They just cancelled a course that had 10 registered students.
i. Students don't know too much about the computer engineering program.
j. Faculty are generally good in responding to email questions about classes.
k. Dr. Costantine is a newer professor working in the rf communication area. They don't yet have a well-equipped rf communication laboratory. (comment was made that they had a better equipped lab at their undergraduate institution)
l. The program is missing laboratory experiences at the graduate level.
m. It is hard to find faculty who will commit the time for graduate projects.

APPENDIX C: This appendix B includes a set of comments generated from the EE580 Evening Class visit with students on Tuesday, May 14th. This student class group was chosen to help the review panel understand the student perspective of the CSUF EE graduate program.

There were 25 people in this EE580 class. The classroom instructor left while the review team asked questions of the group.

Why did you choose Cal State Fullerton Graduate School?
a. The school is in California (some also applied to San Jose State or San Francisco State)
b. The cost was reasonable
c. CSUF was very helpful and actually returned emails to potential students
d. Doesn't need GRE scores for admission. Some students felt the GRE was a waste of time and money.

Other Comments:
e. Too many classes were being cancelled. This semester was the worst. The VLSI course was cancelled. EE583 and EE585 were needed for graduation but they were cancelled. Other classes were supposed to be taken sequentially, but they were only offered in the same semester, so they had to take them concurrently.
f. Students wanted coursework available in the summer.
g. They liked that many classes were offered after 4PM. This allowed them to work while attending graduate classes. (3 of them worked, 4 were resident, 21 were non-residents)
h. There are no labs associated with the MSEE experience.
i. It is difficult to find and advisor for the thesis option. The faculty in general are not interested in research. Perhaps two of the faculty they have encountered are happy to provide thesis topics.
j. The classes are relatively easy. There are plenty of old homework and test solutions available.
k. The graduate students wanted more funding opportunities in the form of research assistantships and teaching assistantships.
l. They liked the small class sizes.
m. They can get to know their professors well.
n. Department Chair Shiva is very helpful.

APPENDIX D: Comments from Faculty Interviews with external review team

Program Strengths as viewed by Faculty

a. Faculty are working very hard
b. We have great students to work with. Many students very hands on.
c. Department has a good working environment.
d. Several faculty are involved in local IEEE committees
e. Diversity of the student group. There is a world-wide participation. A mix of full time and part time students.
f. Well Qualified Faculty
g. Some very promising young faculty recently hired
h. Instructors are good
i. Good collegiality in the department
j. Good connection with industry

Program Weaknesses as viewed by Faculty

a. No travel funds are available from the University
b. In general, no release time for research
c. Lack of money to support M.S. projects and M.S. thesis
d. It is very difficult to do research given the teaching load.
e. No support from College of Engineering for funding of travel to conferences and only $300 of support is available from the department.
f. Not enough support from university and school when there were opportunities over the years to get industry funding which required school match
g. Uncertainty of relationship of EE MS program to that of potential computer engineering graduate program.
h. Few faculty members actually join the IEEE professional society because it costs $200 per year.
i. Competing MS in EE with computer concentration and potential computer engineering MS program

j. Fighting for resources
k. Cancellation of courses. This has caused some of the students to take courses at other nearby universities so they are not delayed to graduation.
l. Issue of last-minute reassignments of classes (example: one month before semester start informed of cancellation of the class and reassigned to teach a class the faculty member had not previously taught)
m. EE graduate program does not allow computer engineering or computer science courses to count for their MS program.
n. Worried about circuit design graduate program specialty going away
o. Highly variable student quality. Worry that some of the foreign students are not qualified enough (while other foreign students are very good)
p. Not enough new faculty hired, many faculty near retirement or partially retired
q. Wish they had more full-time students (for projects)

General Comments from faculty

a. The College of Engineering has a questionable working environment. There have been no college of engineering meetings in the last 5-6 years. The college lacks an "espirit-de-corps
b. Cancellation of Courses recently. Students are notorious for late registration. Need better prediction of course availability.
c. Mostly graduate student advising is initially done by the department chair. Chair looks at undergraduate deficiencies for grad students and puts together a make-up plan. Faculty give advising on a particular concentration in the MS program

Vision for Graduate Program from the faculty

a. Hoping to grow the program. Would like to see a Ph.D. program some day
b. Graduate student are hungry for laboratory work
c. Graduate students want more research work.
d. Most students want to spend 1.5 to 2 years on the program and get done as soon as they can.
e. Students are discouraged to do research by the program design. They are not allowed to sign up for thesis research on their first quarter on campus.
f. Faculty do not get enough credit for supervising graduate students.
g. Too many faculty are having to look for other sources of money given the low salaries of the faculty
h. Views curriculum as reasonably current

i. Needs to shift toward more research
j. Would like to see more faculty involved in research work
k. Too many of the students opt for oral exam. They like the certainty of the schedule.